

111TH CONGRESS }
2d Session

HOUSE OF REPRESENTATIVES

{ REPORT
111-576

NATIONAL AERONAUTICS AND SPACE ADMIN-
ISTRATION AUTHORIZATION ACT OF 2010

R E P O R T

OF THE

COMMITTEE ON SCIENCE
AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ON

H.R. 5781

together with

ADDITIONAL VIEWS

[Including cost estimate of the Congressional Budget Office]



JULY 28, 2010.—Committed to the Committee of the Whole House on
the State of the Union and ordered to be printed

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AUTHORIZATION ACT OF 2010

—————
JULY 28, 2010.—Committed to the Committee of the Whole House on the State of
the Union and ordered to be printed
—————

Mr. GORDON of Tennessee, from the Committee on Science and
Technology, submitted the following

R E P O R T

together with

ADDITIONAL VIEWS

[To accompany H.R. 5781]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to whom was referred the bill (H.R. 5781) to authorize the programs of the National Aeronautics and Space Administration, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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I. BILL

The amendment is as follows:
Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This Act may be cited as the “National Aeronautics and Space Administration Authorization Act of 2010”.

(b) **TABLE OF CONTENTS.**—The table of contents for this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Findings.
- Sec. 3. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

- Sec. 101. Fiscal year 2011.
- Sec. 102. Fiscal year 2012.
- Sec. 103. Fiscal year 2013.

TITLE II—HUMAN SPACE FLIGHT

Subtitle A—Exploration

- Sec. 201. Reaffirmation of exploration policy.
- Sec. 202. Restructured Exploration program.
- Sec. 203. Space radiation.

Subtitle B—International Space Station

- Sec. 211. Extension of ISS operations.
- Sec. 212. ISS research management institution.
- Sec. 213. ISS research management plan.
- Sec. 214. Outreach plan for United States ISS research.
- Sec. 215. ISS cargo resupply requirements and contingency capacity through 2020.
- Sec. 216. Centrifuge.
- Sec. 217. Exploration technology development using the ISS.
- Sec. 218. Fundamental space life science and physical sciences and related technology research.

Subtitle C—Space Shuttle

- Sec. 221. Contingent authorization of additional space shuttle mission.
- Sec. 222. Expanded scope of Space Shuttle Transition Liaison Office.
- Sec. 223. Post-Shuttle workforce transition initiative grant program.
- Sec. 224. Disposition of orbiter vehicles.

Subtitle D—Space and Flight Support

- Sec. 231. 21st Century Space Launch Complex Initiative.

Subtitle E—Commercial Crew Transportation

- Sec. 241. Affirmation of policy.
- Sec. 242. Commercial crew and related commercial space initiatives.
- Sec. 243. Federal assistance for the development of commercial orbital human space transportation services.

Subtitle F—General Provisions

- Sec. 251. Use of program funds.

TITLE III—SCIENCE

Subtitle A—Earth Science

- Sec. 301. Earth science applications.
- Sec. 302. Essential space-based Earth science and climate measurements.
- Sec. 303. Commercial remote sensing data purchases pilot project.
- Sec. 304. Report on temperature records.

Subtitle B—Space Science

- Sec. 311. Suborbital programs.
- Sec. 312. Review of Explorer program.
- Sec. 313. Radioisotope thermoelectric generator material requirements and supply.

TITLE IV—AERONAUTICS

- Sec. 401. Environmentally friendly aircraft research and development initiative.
- Sec. 402. Research on NextGen airspace management concepts and tools.
- Sec. 403. Research on aircraft cabin air quality.
- Sec. 404. Research on on-board volcanic ash sensor systems.
- Sec. 405. Aeronautics test facilities.
- Sec. 406. Expanded research program on composite materials used in aerospace.

TITLE V—SPACE TECHNOLOGY

- Sec. 501. Space technology program.

TITLE VI—EDUCATION AND OUTREACH

- Sec. 601. STEM education and training.
- Sec. 602. Assessment of impediments to space science and engineering workforce development for minority and underrepresented groups at NASA.
- Sec. 603. Independent review of the National Space Grant College and Fellowship Program.
- Sec. 604. Hands-on space science and engineering education and training.

TITLE VII—INSTITUTIONAL CAPABILITIES REVITALIZATION

- Sec. 701. Institutional management.
- Sec. 702. James E. Webb Cooperative Education Distinguished Scholar Program.

TITLE VIII—ACQUISITION MANAGEMENT

- Sec. 801. Prohibition on expenditure of funds when 30 percent threshold is exceeded.
- Sec. 802. Project and program reserves.
- Sec. 803. Independent reviews.
- Sec. 804. Avoiding organizational conflicts of interest in major NASA acquisition programs.
- Sec. 805. Report to Congress.

TITLE IX—OTHER PROVISIONS

- Sec. 901. Cloud computing.
- Sec. 902. Review of practices to detect and prevent the use of counterfeit parts.
- Sec. 903. Preservation and management of lunar sites.
- Sec. 904. Continuity of moderate resolution land imaging remote sensing data.
- Sec. 905. Space weather.
- Sec. 906. Use of operational commercial suborbital vehicles for research, development, and education.
- Sec. 907. Study on export control matters related to United States astronaut safety and NASA mission operations.
- Sec. 908. Amendment to the National Aeronautics and Space Act of 1958.
- Sec. 909. Near-Earth objects.
- Sec. 910. Sense of Congress.
- Sec. 911. Ethics programs in the Office of General Counsel.

SEC. 2. FINDINGS.

The Congress finds the following:

(1) NASA is and should remain a multimission agency with a balanced and robust set of core missions in science, aeronautics, and human space flight and exploration.

(2) NASA's programs have the potential to inspire our youth to pursue studies and careers in science, technology, engineering, and mathematics, and the agency should carry out its activities in a manner that enhances the educational and outreach potential of its programs.

(3) NASA should begin to reinvest in sustained fashion in a long-term space technology research and development activity. Such investments are an important catalyst for innovation, and they represent the critically important "seed corn" on which NASA's ability to carry out challenging and productive missions in the future will depend.

(4) The Space Shuttle workforce, both civil servants and contractors, encompasses skills and experience that will be needed in the Nation's future human space flight activities, and the transition of that workforce to a challenging human space flight and exploration program needs to be carried out in as expeditious and nondisruptive a manner as possible.

(5) Human and robotic exploration of the solar system will be a significant undertaking of humanity in the 21st century and beyond, and it is in the national interest that the United States should assume a leadership role in a cooperative international exploration initiative. Continuity of exploration goals is critical if progress is to be maximized and costly inefficiencies are to be minimized.

(6) Commercial activities have long contributed to the vitality and strength of the Nation's space and aeronautics programs, and the growth of a healthy, self-sustaining United States commercial space and aeronautics sector should continue to be encouraged.

(7) Congress agrees with the finding of the Review of United States Human Spaceflight Plans Committee that: "While there are many potential benefits of commercial services that transport crew to low-Earth orbit, there are simply too many risks at the present time not to have a viable fallback option for risk mitigation."

(8) It is in the national interest for the United States Government to develop a government system to serve as an independent means—whether primary or backup—of crewed access to low-Earth orbit and beyond so that it is not dependent on either non-United States or commercial systems for its crewed access to space.

(9) Development of the next crewed space transportation system to low-Earth orbit should be guided by the Columbia Accident Investigation Board's recommendation that "the design of the system should give overriding priority to crew safety, rather than trade safety against other performance criteria, such as low cost and reusability".

(10) In an environment of constrained budgets, responsible stewardship of taxpayer-provided resources makes it imperative that NASA's exploration program be carried out in a manner that builds on the investments made to date in the Orion, Ares I, and heavy lift projects and other activities of the exploration program in existence prior to fiscal year 2011 rather than discarding them. A restructured exploration program should pursue the incremental development and demonstration of crewed and heavy-lift transportation systems in a manner that ensures that investments to provide assured access to low-Earth orbit also directly support the expeditious development of the heavy lift launch vehicle system, minimize the looming human space flight "gap", provide a very high level of crew safety, and enable challenging missions beyond low-Earth orbit in a timely manner.

(11) NASA's programs in astrophysics, heliophysics, planetary science, and Earth science and climate research have greatly increased our understanding of both our home planet and the rest of the universe, and they have also provided numerous benefits to our society.

(12) NASA's aeronautics program is undertaking research and development that benefits our economic development and competitiveness, enhances our quality of life and enables environmentally responsible aviation operations, and strengthens our national defense.

(13) The ISS provides a unique research environment and capabilities for basic and applied research, as well as having the potential to serve as a testbed for human space flight technologies and operational concepts. It is critically important that NASA make needed investments to promote productive ISS utilization, including a meaningful program of grants in the life and physical sciences microgravity research disciplines.

(14) It is in the national interest for the United States to have an export control policy that protects the national security while also enabling the United States aerospace industry to compete effectively in the global marketplace and the United States to undertake cooperative programs in science and human space flight in an effective manner.

(15) A strong, robust NASA program is in the national interest. Ensuring that it can continue to pursue cutting-edge space and aeronautical research and development activities and push back the frontier of space exploration requires a sustained and adequate commitment in resources. However, NASA's share of the Federal discretionary budgetary authority has declined significantly relative to its post-Apollo historical average share of 2.07 percent. It should be a national goal to restore NASA's funding share to its post-Apollo historical average.

(16) NASA should be vigilant in taking all necessary steps to control cost and schedule growth in mission projects, including the development of an integrated cost containment strategy, and adopt measures that improve the performance and transparency of its cost and acquisition management practices. NASA should approach cost and schedule management with the same level of innovation, rigor, and technical excellence that it applies to the execution of its mission projects.

(17) NASA has been inconsistent in its treatment of termination liability costs for contracts issued by different mission directorates and across various agency programs relative to historical practice. This inconsistency has hampered NASA's ability to effectively execute its Exploration programs.

(18) NASA's temperature records substantially overlap with the records of the Climatic Research Unit (CRU) at the University of East Anglia.

SEC. 3. DEFINITIONS.

In this Act:

(1) ADMINISTRATOR.—The term "Administrator" means the Administrator of NASA.

(2) ISS.—The term "ISS" means the International Space Station.

(3) NASA.—The term "NASA" means the National Aeronautics and Space Administration.

(4) NOAA.—The term "NOAA" means the National Oceanic and Atmospheric Administration.

(5) OSTP.—The term "OSTP" means the Office of Science and Technology Policy.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

SEC. 101. FISCAL YEAR 2011.

There are authorized to be appropriated to the Administrator for fiscal year 2011 \$19,000,000,000, to be allocated as follows:

- (1) For Science, \$5,015,700,000, of which—
 - (A) \$1,801,800,000 shall be for Earth Science;
 - (B) \$1,485,700,000 shall be for Planetary Science;
 - (C) \$1,076,300,000 shall be for Astrophysics;
 - (D) \$646,900,000 shall be for Heliophysics, of which \$5,000,000 shall be an augmentation to the Explorers program; and
 - (E) \$5,000,000 shall be an augmentation to the total amount provided under subparagraphs (C) and (D) for Astrophysics and Heliophysics in order to augment the funding for the Science Mission Directorate's suborbital research programs, to be allocated between the Astrophysics and Heliophysics suborbital programs at the Administrator's discretion.
- (2) For Aeronautics, \$579,600,000.
- (3) For Space Technology, \$572,200,000.
- (4) For Exploration, \$4,535,300,000 of which—
 - (A) \$215,000,000 shall be for Human Research;
 - (B) \$14,000,000 shall be for the Commercial Orbital Transportation System demonstration program;
 - (C) \$50,000,000 shall be for commercial crew transportation-related activities;
 - (D) \$4,156,300,000 shall be for the restructured exploration program described in section 202; and
 - (E) \$100,000,000 shall be for the loan and loan guarantee program described in section 243.
- (5) For Space Operations, \$4,594,300,000, of which—
 - (A) \$989,100,000 shall be for the Space Shuttle program;
 - (B) \$2,804,800,000 shall be for the ISS, of which \$75,000,000 shall be for fundamental space life science and physical sciences and related technology research using ground-based, free-flyer, and ISS facilities, including ISS National Laboratory research;
 - (C) \$60,000,000 shall be for the Post-Shuttle Workforce Transition Initiative grant program described in section 223; and
 - (D) \$740,400,000 shall be for Space and Flight Support, of which \$50,000,000 shall be for the 21st Century Launch Complex Initiative.
- (6) For Education, \$145,800,000.
- (7) For Cross-Agency Support Programs, \$3,111,400,000.
- (8) For Construction and Environmental Compliance and Restoration, \$407,300,000, of which \$10,000,000 is an augmentation to the President's requested funding level in order to support the NASA laboratory revitalization initiative described in section 701.
- (9) For Inspector General, \$38,400,000.

SEC. 102. FISCAL YEAR 2012.

There are authorized to be appropriated to the Administrator for fiscal year 2012 \$19,450,000,000, to be allocated as follows:

- (1) For Science, \$5,278,600,000 of which—
 - (A) \$1,944,500,000 shall be for Earth Science;
 - (B) \$1,547,200,000 shall be for Planetary Science;
 - (C) \$1,109,300,000 shall be for Astrophysics;
 - (D) \$672,600,000 shall be for Heliophysics, of which \$25,000,000 shall be an augmentation to the Explorers program; and
 - (E) \$5,000,000 shall be an augmentation to the total amount provided under subparagraphs (C) and (D) for Astrophysics and Heliophysics in order to augment the funding for the Science Mission Directorate's suborbital research programs, to be allocated between the Astrophysics and Heliophysics suborbital programs at the Administrator's discretion.
- (2) For Aeronautics, \$598,700,000, of which \$78,900,000 shall be for the Aviation Safety Program, \$80,400,000 shall be for the Aeronautics Test Program, \$83,900,000 shall be for the Airspace Systems Program, \$233,500,000 shall be for Fundamental Aeronautics, and \$122,000,000 shall be for Integrated Systems Research.
- (3) For Space Technology, \$1,012,200,000.
- (4) For Exploration, \$4,881,800,000 of which—

- (A) \$215,000,000 shall be for Human Research;
 - (B) \$50,000,000 shall be for commercial crew transportation-related activities;
 - (C) \$4,516,800,000 shall be for the restructured exploration program described in section 202; and
 - (D) \$100,000,000 shall be for the loan and loan guarantee program described in section 243.
- (5) For Space Operations, \$3,930,300,000, of which—
- (A) \$86,100,000 shall be for the Space Shuttle program;
 - (B) \$3,033,600,000 shall be for the ISS, of which \$100,000,000 shall be for fundamental space life science and physical sciences and related technology research using ground-based, free-flyer, and ISS facilities, including ISS National Laboratory research;
 - (C) \$40,000,000 shall be for the Post-Shuttle Workforce Transition Initiative grant program described in section 223; and
 - (D) \$770,600,000 shall be for Space and Flight Support, of which \$50,000,000 shall be for the 21st Century Launch Complex Initiative.
- (6) For Education, \$145,800,000.
- (7) For Cross-Agency Support Programs, \$3,189,600,000.
- (8) For Construction and Environmental Compliance and Restoration, \$373,800,000, of which \$10,000,000 is an augmentation to the President's requested level in order to support the NASA laboratory revitalization initiative described in section 701.
- (9) For Inspector General, \$39,200,000.

SEC. 103. FISCAL YEAR 2013.

There are authorized to be appropriated to the Administrator for fiscal year 2013 \$19,960,000,000, to be allocated as follows:

- (1) For Science, \$5,569,500,000, of which—
- (A) \$2,089,500,000 shall be for Earth Science;
 - (B) \$1,591,200,000 shall be for Planetary Science;
 - (C) \$1,149,100,000 shall be for Astrophysics;
 - (D) \$734,700,000 shall be for Heliophysics, of which \$55,000,000 shall be an augmentation to the Explorers program; and
 - (E) \$5,000,000 shall be an augmentation to the total amount provided under subparagraphs (C) and (D) for Astrophysics and Heliophysics in order to augment the funding for the Science Mission Directorate's suborbital research programs, to be allocated between the Astrophysics and Heliophysics suborbital programs at the Administrator's discretion.
- (2) For Aeronautics, \$609,400,000, of which \$81,200,000 shall be for the Aviation Safety Program, \$79,600,000 shall be for the Aeronautics Test Program, \$87,300,000 shall be for the Airspace Systems Program, \$239,000,000 shall be for Fundamental Aeronautics, and \$122,300,000 shall be for Integrated Systems Research.
- (3) For Space Technology, \$1,059,700,000.
- (4) For Exploration, \$4,888,500,000 of which—
- (A) \$215,000,000 shall be for Human Research;
 - (B) \$5,000,000, shall be for the Exploration Technology and Demonstration program;
 - (C) \$5,000,000 shall be for the Exploration Precursor Robotic Missions program;
 - (D) \$50,000,000 shall be for commercial crew transportation-related activities;
 - (E) \$4,513,500,000 shall be for the restructured exploration program described in section 202; and
 - (F) \$100,000,000 shall be for the loan and loan guarantee program described in section 243.
- (5) For Space Operations, \$3,993,300,000, of which—
- (A) \$3,179,400,000 shall be for the ISS, of which \$100,000,000 shall be for fundamental space life science and physical sciences and related technology research using ground-based, free-flyer, and ISS facilities, including ISS National Laboratory research;
 - (B) \$40,000,000 shall be for the Post-Shuttle Workforce Transition Initiative grant program described in section 223; and
 - (C) \$773,900,000 shall be for Space and Flight Support, of which \$50,000,000 shall be for the 21st Century Launch Complex Initiative.
- (6) For Education, \$145,800,000.
- (7) For Cross-Agency Support Programs, \$3,276,800,000.

(8) For Construction and Environmental Compliance and Restoration, \$376,900,000, of which \$10,000,000 is an augmentation to the President's requested funding level in order to support the NASA laboratory revitalization initiative described in section 701.

(9) For Inspector General, \$40,100,000.

TITLE II—HUMAN SPACE FLIGHT

Subtitle A—Exploration

SEC. 201. REAFFIRMATION OF EXPLORATION POLICY.

Congress reaffirms its support for the exploration policy set forth in sections 401 and 402 of the National Aeronautics and Space Administration Authorization Act of 2008 (Public Law 110–422; 122 Stat. 4788–4789).

SEC. 202. RESTRUCTURED EXPLORATION PROGRAM.

(a) REQUIREMENTS.—Not later than 180 days after the date of enactment of this Act, the Administrator shall develop a plan to restructure the exploration program in existence prior to fiscal year 2011 in order to develop and demonstrate in an integrated manner and as expeditiously and efficiently as practicable a governmentally owned crew transportation system and heavy lift transportation system that satisfies the following requirements:

(1) The plan shall make maximum practicable use of the design, development, and test work completed to date on the Orion crew exploration vehicle, Ares I crew launch vehicle, heavy lift launch vehicle system, and associated ground support and exploration enabling systems, including spacesuit development and related life support technology, and take best advantage of investments and contracts implemented to date.

(2) The performance capabilities of the crew transportation system shall be phased in a manner that is consistent with available and anticipated resources, with the initial operational goal of having the crew transportation system developed under this section available to assure crewed access to low-Earth orbit and the ISS no later than December 31, 2015, in order to minimize the duration of the United States human space flight gap following the retirement of the Space Shuttle fleet. If one or more United States commercial entities are certified to provide ISS crew transportation and rescue services, the crew transportation system developed under this section shall be available as a backup ISS crew transportation and rescue service as needed but shall not be utilized as the primary means of ISS crew transportation and rescue or otherwise compete with the commercial system for ISS crew transportation and rescue services.

(3) The crewed spacecraft element of the crew transportation system shall be evolvable on a continuous development path to support—

- (A) ISS crew transportation and rescue capability;
- (B) non-ISS missions to, from, and in low-Earth orbit; and
- (C) human missions beyond low-Earth orbit.

(4) The crew transportation system shall be able to serve as a testbed for demonstrating operations concepts for exploration missions beyond low-Earth orbit, as well as for demonstrating technologies and carrying out risk reduction for the heavy lift launch vehicle development program.

(5) The crew transportation system shall have predicted levels of safety during ascent to low-Earth orbit, transit, and descent from low-Earth orbit that are not less than those required of the Ares I/Orion configuration that has completed program preliminary design review.

(6) In order to make the most cost-effective use of the funds available for the restructured exploration program, the Administrator shall pursue the expeditious and cost-efficient development of a heavy lift launch system that utilizes the systems and flight and ground test activities of the crew transportation system developed under this section to the maximum extent practicable. In developing the heavy lift launch vehicle—

(A) the heavy lift launch vehicle shall be sized to enable challenging missions beyond low-Earth orbit and evolvable on a continuous development path to enable the efficient and cost-effective conduct of crewed missions to the full range of destinations envisioned in the National Aeronautics and Space Administration Authorization Act of 2008, namely Lagrangian points, the Moon, near-Earth objects, and Mars and its moons;

(B) not later than 180 days after the date of enactment of this Act, the Administrator shall carry out a review of the heavy lift launch vehicle re-

quirements needed to support crewed missions to the full range of destinations envisioned in the National Aeronautics and Space Administration Authorization Act of 2008, and shall select an exploration launch vehicle architecture to meet those requirements;

(C) the development of the heavy lift launch vehicle authorized in this paragraph shall be completed as expeditiously as possible within available resources and shall take maximum benefit from the prior investments made in the Orion, Ares I, and heavy lift projects and from investments made in the restructured program on the development, demonstration, and test of the crew transportation system; and

(D) the Administrator shall strive to meet the goal of having the heavy lift launch vehicle authorized in this paragraph available for operational missions by the end of the current decade.

(b) IMPLEMENTATION OF RESTRUCTURED PROGRAM.—The restructured exploration program shall be implemented in a manner that—

(1) facilitates the planned transition of Space Shuttle program personnel to the restructured exploration program upon the retirement of the Space Shuttle fleet, while providing for cost effective management and vehicle development;

(2) provides for a robust flight and ground test and demonstration program;

(3) streamlines program management processes to the maximum extent practicable while ensuring that the Government's ability to meet its responsibilities for cost discipline, safety, and mission assurance is maintained;

(4) working with industry, eliminates unnecessary NASA and industry institutional infrastructure, other fixed costs, processes, and oversight, reducing exploration program fixed costs to the extent practicable and maximizing the program's affordability;

(5) incentivizes, through innovative management practices, NASA program and project managers and industry counterparts to establish and maintain realistic cost and schedule estimates, and take necessary steps to avoid cost and schedule growth;

(6) seeks to minimize to the extent practicable the operating costs of the crew transportation system developed under the restructured exploration program;

(7) enables the restructured exploration program to undertake in an incremental fashion increasingly challenging uncrewed and crewed demonstration flights in and beyond low-Earth orbit;

(8) allows the systems developed under the restructured exploration program to serve as potential testbeds for the demonstration of key enabling exploration technologies and operational capabilities; and

(9) prepares for and enables human missions to a variety of destinations in the inner solar system, including cislunar space, the Moon, Lagrangian points, near-Earth objects, and ultimately Mars and its moons.

(c) SUPPORT SYSTEMS.—The restructured exploration program shall continue work on ground systems and other exploration-enabling technologies and capabilities needed to support the exploration program, including spacesuit development, as expeditiously as possible within available resources.

(d) NASA LAUNCH SUPPORT AND INFRASTRUCTURE MODERNIZATION PROGRAM FOR THE RESTRUCTURED EXPLORATION PROGRAM.—

(1) IN GENERAL.—The Administrator shall carry out a program to prepare infrastructure at the Kennedy Space Center that is needed to enable processing and launch of the elements of the restructured exploration program, including simplifying vehicle interfaces and other ground processing and payload integration areas to minimize overall costs, enhance safety, and complement the purpose of this section.

(2) ELEMENTS.—The program required by this section shall include—

(A) investments in support of the restructured exploration program to—

(i) improve processing and launch operations at the Kennedy Space Center;

(ii) enhance the overall capabilities of the Eastern Range; and

(iii) reduce the long-term cost of operations and maintenance;

(B) measures in support of the restructured exploration program to provide multivehicle support and improvements in payload processing; and

(C) such other measures in support of the restructured exploration program as the Administrator may consider appropriate.

(e) REPORT ON NASA LAUNCH SUPPORT AND INFRASTRUCTURE MODERNIZATION PROGRAM FOR THE RESTRUCTURED EXPLORATION PROGRAM.—Not later than 180 days after the date of enactment of this Act, the Administrator shall submit to the appropriate committees of the Congress a report on the plan for the implementation of the program authorized in subsection (d).

(f) INTERNATIONAL COLLABORATION.—The Administrator shall explore potential international collaborations that would enable more ambitious exploration missions in a timely manner and within available resources than would otherwise be possible, such as human lunar landings or the incremental establishment of a lunar research outpost.

SEC. 203. SPACE RADIATION.

(a) STRATEGY.—The Administrator shall develop a space radiation mitigation and management strategy and implementation plan that includes key milestones, a timetable, and estimation of budget requirements. The strategy shall include a mechanism to coordinate NASA research, technology, facilities, engineering, operations, and other functions required to support the strategy and plan. The Administrator shall transmit the strategy and plan to the Congress not later than 1 year after the date of enactment of this Act.

(b) SPACE RADIATION RESEARCH FACILITIES.—The Administrator, in consultation with the heads of other appropriate Federal agencies, shall assess the national capabilities for carrying out critical ground-based research on space radiation biology, and shall identify any issues that could affect the ability to carry out that research.

(c) RESEARCH ON SOLAR PARTICLE EVENTS.—The Administrator shall carry out research on solar particle events to improve the predictions and forecasts of solar particle events that could affect human missions beyond low-Earth orbit.

(d) RADIATION RESEARCH ON NON-HUMAN PRIMATES.—

(1) IN GENERAL.—The Administrator shall transmit to the Congress not later than 1 year after the date of enactment of this Act a report on prior radiation research on non-human primates and the justification and rationale for any additional research involving non-human primates.

(2) CONSULTATION.—In preparing the report, the Administrator shall consult with other Government agencies that have previously conducted radiation research on non-human primates.

Subtitle B—International Space Station

SEC. 211. EXTENSION OF ISS OPERATIONS.

(a) IN GENERAL.—The Administrator shall, in consultation with the ISS partners, take all necessary measures to support the operation and full utilization of the International Space Station through at least the year 2020, if it can continue to be operated safely over that period. The Administrator shall, in consultation with the ISS partners, seek to minimize to the extent practicable the operating costs of the ISS.

(b) VEHICLE AND COMPONENT REVIEW.—

(1) IN GENERAL.—In carrying out subsection (a), the Administrator shall—

(A) conduct an in-depth assessment of all essential modules, operational systems and components, structural elements, and permanent scientific equipment on board or planned for delivery and installation aboard the ISS, including both United States and international partner elements, to determine anticipated spare or replacement requirements to ensure complete, effective, and safe function and full scientific utilization of the ISS; and

(B) provide the completed assessment to the Congress within 90 days after the date of enactment of this Act.

(2) REQUIREMENTS OF ASSESSMENT.—The results of the required assessment shall include, at a minimum, the following:

(A) The identification of spare or replacement elements and parts currently produced, in inventory, or on order, and the state of readiness and schedule for delivery to the ISS, including the planned transportation means for such delivery. Each element identified shall include a description of its location, function, criticality for system integrity, and specifications regarding size, weight, and necessary configuration for launch and delivery.

(B) The identification of anticipated requirements for spare or replacement elements not currently in inventory or on order, a description of their location, function, criticality for system integrity, the anticipated cost and schedule for design, procurement, manufacture and delivery, and specifications regarding size, weight, and necessary configuration for launch and delivery, including available launch vehicles capable of transportation of such items to the ISS.

(C) The identification of spare or replacement parts existing or planned that due to size, weight, and launch configuration can only be carried to the ISS by the Space Shuttle.

(3) **COMPTROLLER GENERAL.**—The Administrator shall enable the Comptroller General to monitor and, as appropriate, participate in the assessment required by paragraph (1) in such a way as to enable the Comptroller General to provide to the Congress an independent review of the assessment.

SEC. 212. ISS RESEARCH MANAGEMENT INSTITUTION.

(a) **DESIGNATION.**—Pursuant to section 507 of the National Aeronautics and Space Administration Authorization Act of 2005 (42 U.S.C. 16767), the Administrator shall designate an independent, nonprofit United States institution, based on the result of a competitive solicitation, for the management of fundamental space life science and physical sciences and related technology research to be conducted on the ISS, as well as all research, including United States commercial research, that is funded by non-NASA United States domestic entities and carried out on the ISS.

(b) **RESPONSIBILITIES.**—The research management institution designated under subsection (a) shall make recommendations to the Administrator for—

- (1) competitively selecting, prioritizing, and overseeing United States ISS research projects across all United States users, sponsors, and disciplines, including domestic entities other than NASA, seeking to carry out research on the ISS;
- (2) establishing a process for governance of United States ISS research users;
- (3) conducting outreach and education to enhance the utilization of the ISS; and
- (4) providing easily accessible information on the United States capabilities, research facilities, and resources associated with the United States research use of the ISS.

(c) **DEVIATIONS.**—If the Administrator takes actions that deviate from the recommendations provided by the research management institution under subsection (b), the Administrator shall transmit to the Congress a report explaining the reasons for such deviation.

(d) **OTHER GOVERNMENT CONTRACTS.**—Other government agencies engaged in research and development are authorized to enter into contracts with the nonprofit organization designated under subsection (a) if it is determined by those agencies to be beneficial to meeting their mission requirements for use of the ISS.

SEC. 213. ISS RESEARCH MANAGEMENT PLAN.

(a) **IN GENERAL.**—The Administrator, in coordination with the Associate Administrator for the Space Operations Mission Directorate, shall require that the institution designated under section 212(a) prepare for the Administrator a United States ISS research management plan that—

- (1) establishes a process for selecting United States ISS research;
- (2) identifies the expertise and support available to researchers selected to carry out research on the ISS;
- (3) establishes a process for determining allocation schedules for research to be carried out on the ISS;
- (4) establishes a process for accommodating logistical and transportation requirements for ISS research payloads;
- (5) prescribes flight schedules for research payloads to the ISS (and research materials to be returned to Earth, if necessary); and
- (6) addresses other factors associated with the selection, management, and oversight of United States ISS research.

(b) **TRANSMITTAL TO CONGRESS.**—The plan shall be transmitted to the Congress not later than 2 years after the date of enactment of this Act.

SEC. 214. OUTREACH PLAN FOR UNITED STATES ISS RESEARCH.

Not later than 2 years after the date of enactment of this Act, the Administrator shall transmit to the Congress a plan prepared by the institution designated under section 212(a) for broadening and enhancing the outreach to potential United States Government, academic, and commercial users of the ISS.

SEC. 215. ISS CARGO RESUPPLY REQUIREMENTS AND CONTINGENCY CAPACITY THROUGH 2020.

(a) **IN GENERAL.**—The Administrator shall ensure the availability of ISS cargo resupply capacity to support the full and productive utilization and the extended operations of the ISS through the year 2020.

(b) **ASSESSMENT.**—The Administrator shall conduct an assessment of the ISS cargo resupply capacity required to support the enhanced research utilization and extended operations of the ISS through 2020. The assessment shall describe the methodology and assumptions used to define the cargo requirements and provide a breakdown of the cargo resupply requirements (upmass and downmass) to support scientific research, other research and development, operations and maintenance, crew supplies, and other necessary activities. In addition, the assessment shall iden-

tify the systems to be used for ISS cargo resupply, the amount of cargo those systems will transport, and the timeline for cargo resupply services to the ISS.

(c) **ADDITIONAL RESUPPLY OPTIONS.**—The Administrator shall explore with ISS partners options for ensuring the provision of needed upmass to and downmass from the ISS in the event that adequate commercial cargo resupply capabilities are not available during any extended period after the date that the Space Shuttle is retired. Before relying on ISS partners to upmass or downmass cargo, the Administrator must certify to the Congress that no United States or commercial cargo resupply capabilities are available.

SEC. 216. CENTRIFUGE.

(a) **ASSESSMENT.**—The Administrator shall carry out an assessment of innovative options for deploying a variable-gravity centrifuge on the ISS. The assessment shall identify the requirements for a variable-gravity centrifuge to support fundamental and applied research on the ISS, including research to help mitigate the risk of long-term spaceflight beyond low-Earth orbit. The assessment shall also—

(1) review the requirements for development, launch, and operation of the facility on the ISS;

(2) provide an estimate of the potential cost and timeline for developing and deploying the centrifuge capabilities evaluated as part of the assessment;

(3) evaluate the status of previous work on development of an in-flight centrifuge for the ISS and the cost and time that would be required to complete the work and launch the facility; and

(4) identify the potential for international collaboration and other potential partnerships or innovative acquisition approaches that could facilitate the development and deployment of a centrifuge facility for the ISS.

(b) **TRANSMITTAL TO CONGRESS.**—The Administrator shall transmit the assessment described in subsection (a) to the Congress not later than 1 year after the date of enactment of this Act.

SEC. 217. EXPLORATION TECHNOLOGY DEVELOPMENT USING THE ISS.

(a) **PLAN.**—The Administrator shall develop priorities for technology development, testing, and demonstration activities that enable and support NASA's long-term plans for exploration beyond low-Earth orbit and that require the capabilities of the ISS, and shall develop a plan, including milestones, a schedule, and an estimate of resource requirements, for carrying out the prioritized activities. The plan shall be developed for the period of fiscal years 2011 through 2020.

(b) **TRANSMITTAL TO CONGRESS.**—The Administrator shall transmit the plan developed under subsection (a) to the Congress not later than 270 days after the date of enactment of this Act.

SEC. 218. FUNDAMENTAL SPACE LIFE SCIENCE AND PHYSICAL SCIENCES AND RELATED TECHNOLOGY RESEARCH.

(a) **STRATEGIC PLAN FOR SCIENCE AND TECHNOLOGY RESEARCH.**—

(1) **DEVELOPMENT.**—The Administrator, in consultation with academia, other Federal agencies, and other potential stakeholders, shall develop a strategic plan for carrying out competitive, peer-reviewed fundamental space life science and physical sciences and related technology research, including research on phenomena such as the response of fluids and materials to reduced gravity environments that need to be understood in developing exploration-related technologies and systems. The plan shall—

(A) address the facilities and instrumentation that would enable and facilitate such research;

(B) be consistent with the priorities and recommendations established by the National Academies in its decadal survey of life and microgravity sciences;

(C) provide a research timeline and identify the resource requirements for its implementation;

(D) include an estimate of the number of students, including undergraduate, graduate, and post-doctoral students, and early-career researchers that would be supported in carrying out the plan; and

(E) identify—

(i) criteria for the proposed space research, including—

(I) a justification for the research to be carried out in the space microgravity environment;

(II) the use of model systems;

(III) the testing of flight hardware to understand and ensure its functioning in the microgravity environment;

(IV) the use of controls to help distinguish among the direct and indirect effects of microgravity, among other effects of the flight or space environment;

(V) approaches for facilitating data collection, analysis, and interpretation;

(VI) procedures to ensure repetition of experiments as needed; and

(VII) support for timely presentation of the peer-reviewed results of the research;

(ii) instrumentation required to support the measurements and analysis of the research to be carried out under the strategic plan, including the potential use of instrumentation developed by other countries and the potential for a variable-gravity centrifuge to support the research;

(iii) the capabilities needed to support direct, real-time communications between astronauts working on research experiments onboard the ISS and the principal investigator on the ground; and

(iv) a process for involving the external user community in research planning, including planning for relevant flight hardware and instrumentation, and for utilization of the ISS, free flyers, or other research platforms.

(2) TRANSMITTAL TO CONGRESS.—Not later than 1 year after the date of enactment of this Act, the Administrator shall transmit the strategic plan developed under paragraph (1) to the Congress.

(b) INTEGRATED RESEARCH MANAGEMENT ORGANIZATION.—

(1) RESPONSIBLE OFFICIAL.—

(A) IN GENERAL.—The Administrator shall ensure that a responsible official is designated at NASA headquarters to lead a competitive, integrated basic and applied research program in fundamental space life science and physical sciences and related technology.

(B) RESPONSIBILITIES.—The official designated under subparagraph (A) shall be responsible for—

(i) leading near-term and long-term strategic planning pursuant to the research plan developed under subsection (a);

(ii) ensuring the input of the external user community in science planning processes;

(iii) ensuring the implementation of an integrated, multidisciplinary and interdisciplinary, competitive research program in fundamental space life and physical sciences and related technology;

(iv) supporting the appropriate interaction of research investigators and agency managers and engineers in planning, designing, testing, and operations related to such research projects;

(v) monitoring progress of the program in achieving the objectives and milestones identified in the strategic plan developed under subsection (a)(1); and

(vi) other functions required to support the research program under this section.

(C) COORDINATION AND COMMUNICATIONS.—The Administrator shall ensure that the responsible official coordinates and communicates the fundamental space life science and physical sciences and related technology research activities with relevant entities within NASA, with the ISS research management institution designated under section 212(a), and with other relevant agencies and organizations.

(2) BUDGET REQUEST.—The Administrator shall, as part of the annual NASA fiscal year budget request—

(A) identify and include a description of research being carried out pursuant to section 204 of the National Aeronautics and Space Administration Authorization Act of 2005 (42 U.S.C. 16633);

(B) identify the percentage of the total research budget for ISS research that the research described in subparagraph (A) represents; and

(C) identify the programs proposed for carrying out research activities on the ISS and the proposed funding to support those research programs, including a breakdown for each of the programs identified of the funding requested for competitive grants.

Subtitle C—Space Shuttle

SEC. 221. CONTINGENT AUTHORIZATION OF ADDITIONAL SPACE SHUTTLE MISSION.

(a) SENSE OF THE CONGRESS.—It is the sense of the Congress that it is very important, in view of the extension of the life of the ISS until at least 2020, for the Shuttle fleet to leave the ISS in the best possible configuration for the post-Shuttle era and that NASA should take all necessary steps to ensure the continued viability of the ISS in the event that there are delays in the delivery or the inability to deliver critical parts and supplies once the Shuttle is retired.

(b) CONTINGENT AUTHORIZATION OF ADDITIONAL SHUTTLE MISSION BEYOND THE PLANNED MANIFEST.—The Administrator is authorized to conduct 1 additional Space Shuttle mission to the ISS beyond the missions contained in the flight manifest as of February 1, 2010, if—

(1) the Administrator determines that an additional Space Shuttle mission is a useful and necessary step to reduce risks to the operation and utilization of the ISS that are associated with the retirement of the Shuttle fleet; and

(2) the conditions in subsection (c) have been met.

(c) CONDITIONS.—In order to comply with subsection (b), the Administrator shall determine and certify that all of the following conditions have been met:

(1) The importance of conducting the additional Space Shuttle mission to the ISS outweighs the risks associated with conducting a Shuttle mission without a backup Shuttle launch-on-need capability.

(2) Any actions resulting from safety inspections and reviews required by NASA's Orbiter Modification Down Period (OMDP) and other safety guidance have been successfully addressed.

(3) Workarounds addressing mandatory OMDP requirements, if any, have been identified and the associated risks have been characterized.

(4) The Aerospace Safety Advisory Panel has reviewed the safety issues associated with the additional Shuttle mission as well as NASA's plans to mitigate any identified risks.

(d) CONTINGENT AUTHORIZATION OF APPROPRIATIONS.—In the event that the additional Shuttle flight to the ISS is authorized, funding for the incremental costs associated with the additional mission is authorized as follows from within funds authorized in title I:

(1) For fiscal year 2011, \$700,000,000, to be taken in the amounts specified below from within the funding for the following accounts and transferred to the Space Shuttle account:

(A) \$175,000,000 from the ISS, except that at least \$50,000,000 shall remain available for fundamental space life and physical sciences and related technology research.

(B) \$525,000,000 from the restructured exploration program.

(2) For Fiscal Year 2012, \$200,000,000, to be taken from within the funding for the ISS and transferred to the Space Shuttle account, except that at least \$50,000,000 shall remain available for fundamental space life and physical sciences and related technology research.

SEC. 222. EXPANDED SCOPE OF SPACE SHUTTLE TRANSITION LIAISON OFFICE.

Section 613(b) of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17761(b)) is amended—

(1) in paragraph (1), by striking "Space Shuttle Transition Liaison Office" and inserting "Post-Shuttle Transition Liaison Office"; and

(2) in paragraph (3), by striking "2 years after the completion of the last Space Shuttle flight" and inserting "2 years after the award of the final grant under section 223 of the National Aeronautics and Space Administration Authorization Act of 2010".

SEC. 223. POST-SHUTTLE WORKFORCE TRANSITION INITIATIVE GRANT PROGRAM.

(a) ESTABLISHMENT.—

(1) IN GENERAL.—The Administrator, acting through the Post-Shuttle Transition Liaison Office established under section 613(b) of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17761(b)), as amended by section 222, is authorized to make grants for the establishment, operation, coordination, and implementation of aerospace workforce and community transition strategies.

(2) TRANSFER.—The Administrator may transfer amounts made available under this section to other Federal agencies for the purpose of assisting in the transition of aerospace workers and communities adversely affected by the termination of the Space Shuttle program.

(b) USE OF FUNDS.—A recipient of a grant under subsection (a) shall use the funds made available through the grant to—

- (1) conduct community and business outreach;
- (2) develop and implement regional revitalization and facilities reuse strategies;
- (3) support entrepreneurship and new business development initiatives; and
- (4) support workforce retraining.

SEC. 224. DISPOSITION OF ORBITER VEHICLES.

(a) IN GENERAL.—Upon the termination of the Space Shuttle Program, the Administrator shall decommission any remaining Space Shuttle orbiter vehicles according to established safety and historic preservation procedures prior to their designation as surplus government property. The orbiter vehicles shall be made available and located for display and maintenance through a competitive procedure that takes into account geographical diversity, established pursuant to the disposition plan developed under section 613(a) of the National Aeronautics and Space Administration Act of 2008 (42 U.S.C. 17761(a)), with priority consideration given to eligible applicants meeting all conditions of that plan which would provide for the display and maintenance of orbiters at locations with the best potential value to the public, including where the location of the orbiters can advance educational opportunities in science, technology, engineering, and mathematics disciplines, and with an historical relationship with the Space Shuttle orbiters.

(b) SMITHSONIAN INSTITUTION ORBITER.—Notwithstanding the procedures in subsection (a), the Smithsonian Institution shall be entitled to receive one of the remaining Space Shuttle orbiter vehicles. The Administrator shall collaborate with the Secretary of the Smithsonian Institution to determine which orbiter the Smithsonian Institution shall receive, and otherwise determine the timing and procedures of transfer from NASA to the Smithsonian Institution. The Smithsonian Institution, which, as of the date of enactment of this Act, houses the Space Shuttle Enterprise, shall determine any new location for the Enterprise.

(c) DISPLAY AND MAINTENANCE.—The orbiter vehicles made available under subsection (a) shall be displayed and maintained through agreements and procedures established pursuant to section 613(a) of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17761(a)).

Subtitle D—Space and Flight Support

SEC. 231. 21ST CENTURY SPACE LAUNCH COMPLEX INITIATIVE.

(a) PURPOSE.—Funding authorized in title I for the 21st Century Space Launch Complex Initiative shall be available to carry out the following activities:

- (1) Investments to improve civil and national security operations at the Kennedy Space Center and Cape Canaveral Air Force Station to enhance the overall capabilities of the Eastern Range and to reduce the long-term cost of operations and maintenance.
- (2) Measures to provide multivehicle support, improvements in payload processing, and partnering at the Kennedy Space Center and Cape Canaveral Air Force Station.
- (3) Measures to support the restructured exploration program.
- (4) Such other measures related to launch support and infrastructure modernization at the Kennedy Space Center as the Administrator may consider appropriate to carry out NASA's launch operations.

(b) REPORT ON THE 21ST CENTURY SPACE LAUNCH COMPLEX INITIATIVE.—

(1) REPORT REQUIRED.—Not later than 60 days after the date of enactment of this Act, the Administrator shall submit to the appropriate committees of the Congress a report on the plan for the implementation of the 21st Century Space Launch Complex Initiative.

(2) ELEMENTS.—The report required by this subsection shall include—

(A) a description of those initiatives tied to the restructured exploration program;

(B) a description of proposed initiatives intended to be conducted jointly or in cooperation with Cape Canaveral Air Force Station, Florida, or other installations or components of the United States Government; and

(C) a timetable for carrying out activities and initiatives planned for the 21st Century Space Launch Complex Initiative.

Subtitle E—Commercial Crew Transportation

SEC. 241. AFFIRMATION OF POLICY.

The Congress affirms the policy of—

- (1) making use of United States commercially provided ISS crew transportation and crew rescue services to the maximum extent practicable;
- (2) limiting, to the maximum extent practicable, the use of the system developed under section 202 to non-ISS missions once commercial crew transportation and crew rescue services that meet safety requirements become operational; and
- (3) facilitating, to the maximum extent practicable, the transfer of NASA-developed technologies to United States commercial orbital human space transportation companies in order to help promote the development of commercially provided ISS crew transportation and crew rescue services.

SEC. 242. COMMERCIAL CREW AND RELATED COMMERCIAL SPACE INITIATIVES.

(a) **COMMERCIAL SERVICES OPPORTUNITIES.**—NASA shall seek, to the extent practicable, to make use of commercially available space services, including commercially available services to transport United States Government astronauts to and from the ISS, provided that—

- (1) those commercial services have demonstrated the capability to meet NASA-specified ascent, transit, entry, and ISS proximity operations safety requirements;
- (2) the services provider has completed, and NASA has verified, crewed flight demonstrations or operational flights that comply with NASA standards, policies, and procedures; and
- (3) the per-seat cost to the United States is not greater than the per-seat cost for the system developed under section 202.

(b) **HUMAN-RATING.**—The Administrator shall establish requirements, standards, and processes for the human rating of space transportation systems that are equivalent to NASA safety processes and procedures.

(c) **TECHNOLOGY TRANSFER.**—The Administrator shall make available, on a non-exclusive basis, NASA-developed technologies for transfer to potential United States commercial orbital human space transportation companies. NASA shall determine the appropriate means, through cost-reimbursable arrangements or other mechanisms, to transfer the technologies.

(d) **TECHNICAL ASSISTANCE AND FACILITIES.**—The Administrator shall make available, to the extent practicable, NASA facilities and equipment to assist in the testing and demonstration of commercial crew transportation systems, including those associated with NASA's safety and mission assurance activities, such as NASA's Independent Verification and Validation facility for software verification. The Administrator shall determine the appropriate means, through cost-reimbursable arrangements, agreements entered into under section 203(c)(5) of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2473(c)(5)), or other mechanisms, to provide technical assistance and access to facilities to the commercial space sector.

(e) **NASA INSIGHT AND OVERSIGHT PROCESSES.**—Any company that seeks to provide commercial crew transportation services under contract to NASA shall enter into an arrangement with NASA that allows NASA to obtain ongoing insight into the design methodologies, processes, technologies, test data, and production and quality control practices employed in the development of the commercial crew transportation system throughout the development, test, demonstration, and production phases. NASA may offer early warning of conditions that could lead NASA to withhold certification of the crew transportation systems for the flight of United States Government personnel or to decline to enter into a contract for services. NASA may not require the company to make changes to its design, technologies, or processes during the development, test, demonstration, or production phases.

(f) **CONTRACTS FOR COMMERCIALLY AVAILABLE ISS CREW TRANSPORTATION AND CREW RESCUE SERVICES.**—

- (1) **CERTIFICATION OF SAFETY AND RELIABILITY.**—Before entering into a contract for the use of commercially available commercial crew transportation or crew rescue services for United States Government astronauts, the Administrator shall certify that a commercial ISS crew transportation and crew rescue service provider with which a contract is planned has demonstrated the safety and reliability of its systems for crew transportation and crew rescue to be equivalent to NASA-promulgated safety and reliability policies, procedures, and standards for human spaceflight. Individual certifications made under this paragraph shall be provided to the Committee on Science and Technology of the

House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate.

(2) FLIGHT EXPERIENCE.—The Administrator shall not enter into any contract or commit any United States Government funds for a commercial ISS crew transportation or rescue service to a service provider until sufficient successful flight experience has been accrued by the service provider's system to provide to NASA the safety-related and reliability-related data and information needed to determine whether to fly its astronauts on that system. The Administrator shall require an amount of demonstrated flight experience for a commercial crew transportation system that is at least as much as NASA requires under Alternative 1 as delineated in the NASA Policy Directive NPD 8610.7D, effective January 31, 2008, for common launch vehicle configurations before Class A (high cost and high priority) payloads can be flown on them.

(3) ADMINISTRATOR'S ACTIONS.—To facilitate the ability of commercial crew transportation providers to comply with NASA human spaceflight safety and reliability requirements, the Administrator shall—

(A) develop and communicate the human-rating requirements established under subsection (b) to commercial space companies;

(B) establish minimum acceptable safety levels;

(C) provide technical assistance, to the maximum extent practicable, to the commercial space sector in understanding and applying NASA human-rating requirements, standards, and processes to commercial crew transportation and crew rescue systems;

(D) establish and communicate to the commercial sector the process NASA will apply for securing ongoing NASA insight into the design methodologies, processes, technologies, test data, and production and quality control practices employed in the development of the commercial crew transportation system throughout the development, test, demonstration, and production phases;

(E) establish and communicate to the commercial sector NASA's process for certifying that commercial human spaceflight systems (including mission control, operations, ground systems, and other supporting infrastructure) comply with NASA human-rating requirements and standards and related NASA policies and procedures for safety and reliability, which process shall be no less stringent than the NASA policies and procedural requirements established for launch of Class A (high cost and high priority) payloads; and

(F) ensure that the certification established under subparagraph (E) includes independent verification and validation of compliance with NASA policies, procedures, and standards.

(g) ASAP REVIEW OF NASA'S HUMAN-RATING REQUIREMENTS, STANDARDS, AND PROCESSES.—

(1) IN GENERAL.—The Aerospace Safety Advisory Panel shall conduct a review to identify issues pertinent to the establishment of human-rating requirements, standards, and processes for commercial crew transportation and rescue systems that are proposed for transport of United States astronauts.

(2) REPORT.—Not later than 1 year after the date of enactment of this Act, the Aerospace Safety and Advisory Panel shall transmit to the Congress a report describing—

(A) the Panel's assessment of NASA's currently established human-rating specifications and guidance;

(B) the Panel's view of the mandatory safety requirements that must be met with regard to human rating; and

(C) the steps NASA and the commercial space industry need to take to ensure that commercial crew transportation and rescue vehicles have human rating requirements, standards, and processes equivalent to those of NASA.

(h) INDEMNIFICATION AND LIABILITY.—The Administrator shall not proceed with a request for proposals, award any contract, or commit any United States Government funds for a commercial ISS crew transportation or rescue service to be provided by a commercial service provider until all indemnification and liability issues associated with the use of such systems by the United States Government shall have been addressed and the Administrator has provided to the Congress a report describing the indemnification and liability provisions that are planned to be included in such contracts.

(i) PREDICTED LEVEL OF SAFETY.—The Administrator shall not award any contract or commit any United States Government funds for a commercial ISS crew transportation system service to a service provider unless that commercial crew transportation system has a predicted level of safety during ascent to low-Earth orbit, tran-

sit, and descent from low-Earth orbit that is not less than that specified for the Government system in section 202(a)(5).

SEC. 243. FEDERAL ASSISTANCE FOR THE DEVELOPMENT OF COMMERCIAL ORBITAL HUMAN SPACE TRANSPORTATION SERVICES.

(a) **ESTABLISHMENT.**—The Administrator shall establish a program to provide financial assistance in the form of direct loans or loan guarantees to commercial entities for the costs of development of orbital human space transportation systems.

(b) **ELIGIBLE PROJECTS.**—A loan or loan guarantee may be made under such program only for a project in the United States to develop commercial orbital human space transportation systems that would be used to provide transportation services to and from low-earth orbit.

(c) **ELIGIBLE BORROWER.**—A loan or loan guarantee may be made under such program only for a borrower who is determined by the Administrator to be eligible under the criteria established pursuant to subsection (i).

(d) **LIMITATIONS.**—No loan or loan guarantee shall be made unless the Administrator determines that—

(1) there is a reasonable prospect of repayment of the principal and interest on the obligation by the borrower;

(2) the amount of the obligation (when combined with amounts available to the borrower from other sources which shall be a minimum of 25 percent of the total expected project development cost) is sufficient to carry out the total development project.

(e) **SUPERIORITY OF RIGHTS.**—The rights of the Administrator, with respect to any property acquired pursuant to a loan, shall be superior to the rights of any other person with respect to the property.

(f) **TERMS AND CONDITIONS.**—Notwithstanding any other provision of law, a loan or loan guarantee made pursuant to this section shall—

(1) bear interest at an annual rate, as determined by the Administrator, of—

(A) in the case of a direct loan—

(i) the cost of borrowing to the Department of the Treasury for obligations of comparable maturity; or

(ii) 4 percent; and

(B) in the case of a guaranteed loan, the current applicable market rate for a loan of comparable maturity; and

(2) have a term not to exceed 30 years.

(g) **CONSULTATION.**—In establishing the terms and conditions of a loan or loan guarantee under this section, the Administrator shall consult with the Secretary of the Treasury.

(h) **FEES.**—

(1) **IN GENERAL.**—The Administrator shall charge and collect fees for loans and loan guarantees in amounts the Administrator determines are sufficient to cover applicable administrative expenses.

(2) **AVAILABILITY.**—Fees collected under this subsection shall—

(A) be deposited by the Administrator into the Treasury of the United States; and

(B) remain available until expended, subject to such other conditions as are contained in annual appropriations Acts.

(3) **LIMITATION.**—In charging and collecting fees under paragraph (1), the Administrator shall take into consideration the amount of the obligation.

(i) **REGULATIONS.**—The Administrator shall issue final regulations before making any loan or loan guarantee under the program. Such regulations shall include—

(1) criteria that the Administrator shall use to determine eligibility for loans and loan guarantees under this section, including whether a borrower demonstrates that a non-governmental market exists for the orbital human space transportation service, as evidenced by written statements of interest from potential purchasers of the services;

(2) criteria that the Administrator shall use to determine the amount of any fees charged under subsection (h), including criteria related to the amount of the obligation; and

(3) any other policies, procedures, or information necessary to implement this section.

(j) **AUDIT.**—

(1) **ANNUAL INDEPENDENT AUDITS.**—The Administrator shall enter into an arrangement with an independent auditor for annual evaluations of the program under this section.

(2) **COMPTROLLER GENERAL REVIEW.**—The Comptroller General of the United States shall conduct a biennial review of the Administrator's execution of the program under this section.

(3) REPORT.—The results of the independent audit under paragraph (1) and the Comptroller General’s review under paragraph (2) shall be provided directly to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

(k) REPORT TO CONGRESS.—Concurrent with the submission to the Congress of the President’s annual budget request in each year after the date of enactment of this section, the Administrator shall transmit to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report containing a summary of all activities carried out under this section.

(l) MINIMIZING RISK.—The Administrator shall promulgate regulations and policies to carry out this section in accordance with Office of Management and Budget Circular No. A-129, entitled “Policies for Federal Credit Programs and Non-Tax Receivables”, as in effect on the date of enactment of this section.

(m) DEFINITIONS.—In this section:

(1) COST.—The term “cost” has the meaning given such term under section 502 of the Federal Credit Reform Act of 1990 (2 U.S.C. 661a).

(2) OBLIGATION.—The term “obligation” means the loan issued under this section or the loan or other debt obligation that is guaranteed under this section.

(3) PROGRAM.—The term “program” means the program established in subsection (a).

Subtitle F—General Provisions

SEC. 251. USE OF PROGRAM FUNDS.

For all programs authorized under this title, authorized funds may be obligated only for performance of the programs.

TITLE III—SCIENCE

Subtitle A—Earth Science

SEC. 301. EARTH SCIENCE APPLICATIONS.

The Administrator shall develop guidelines and procedures for entering into arrangements with State, local, regional, tribal, and other Federal Government agencies that seek to benefit from ongoing NASA technical information, capabilities, and support related to Earth science applications and decision support systems. The guidelines and procedures shall include a definition of the partnership, milestones, cost-sharing, and project-relevant criteria for the project. The guidelines and procedures shall define arrangements for reimbursement for Government services, as appropriate, including the use of NASA spacecraft and aircraft, sensors, equipment, facilities, and associated personnel for the purpose of aiding State, local, regional, tribal, and other Federal Government needs.

SEC. 302. ESSENTIAL SPACE-BASED EARTH SCIENCE AND CLIMATE MEASUREMENTS.

The Administrator, in cooperation with the Administrator of NOAA and other relevant Federal agencies, shall enter into an arrangement with the National Academies for a study, to be completed, and transmitted to the Congress not later than 18 months after the date of enactment of this Act, to provide a prioritized list and definition of essential Earth science and climate measurements that should be collected with space-based means, and maintained and archived by the Federal Government on a continuous basis. The study shall also identify which measurements could potentially be obtained through international partnerships, from data purchases or other arrangements with private or commercial entities, or from other relevant sources.

SEC. 303. COMMERCIAL REMOTE SENSING DATA PURCHASES PILOT PROJECT.

(a) WORKSHOP.—Not later than 9 months after the date of enactment of this Act, the Administrator shall organize a workshop including relevant commercial remote sensing data providers, scientists, and remote sensing data users, among other relevant stakeholders, to identify the essential criteria for a pilot project for purchasing commercial remote sensing data to support research in Earth science and for applied uses of the data to address State, local, regional, and tribal needs. The workshop shall address lessons learned and recommendations related to past experience with commercial data purchases, including those outlined in the National Research

Council report entitled “Toward New Partnerships in Remote Sensing: Government, the Private Sector, and Earth Science Research”.

(b) PILOT PROJECT.—Not later than 18 months after the date of enactment of this Act, after consideration of the results of the workshop under subsection (a) and after obtaining relevant information from potential commercial remote sensing data providers and users of such data, the Administrator shall establish a pilot project for the provision, through competitive solicitations, of commercial remote sensing data to serve research and applied uses of the data to serve State, local, regional, and tribal needs.

SEC. 304. REPORT ON TEMPERATURE RECORDS.

Not later than 1 year after the date of enactment of this Act, the Administrator shall issue a report to the Congress detailing the extent and degree to which NASA’s temperature records overlap with the records at the Climatic Research Unit at the University of East Anglia, the reasons for and sources of that overlap, and the possibility that NASA’s temperature records have been compromised.

Subtitle B—Space Science

SEC. 311. SUBORBITAL PROGRAMS.

(a) RESPONSIBLE OFFICIAL.—

(1) IN GENERAL.—The Administrator shall ensure that an individual who shall report directly to the Associate Administrator of the Science Mission Directorate is designated to lead NASA’s suborbital and airborne program.

(2) RESPONSIBILITIES.—The designated individual shall be responsible for—

(A) leading near-term and long-term strategic planning for the suborbital and airborne program;

(B) ensuring the implementation of strategic and other relevant plans;

(C) integrating NASA’s suborbital and airborne programs;

(D) ensuring the productivity of the suborbital facilities and assets as necessary to carry out the plans;

(E) coordinating NASA’s suborbital activities with associated NASA offices and Centers, universities, and other external institutions; and

(F) monitoring progress on meeting the strategic objectives for enhanced suborbital and airborne activities, NASA workforce development, and integration of suborbital activities within NASA’s overall plans and priorities.

(b) STRATEGIC PLAN.—Not later than 1 year after the date of enactment of this Act, the Administrator shall provide to the Congress a strategic plan to support the full and productive use of NASA’s suborbital and airborne assets as a foundation for meeting its scientific research, engineering, workforce development, and education goals and objectives across NASA centers and mission directorates and in partnership with universities and other relevant external institutions. The strategic plan shall—

(1) be developed in consultation with relevant NASA offices and Centers and with input from universities, nonprofit research institutions, and private industry;

(2) identify the needs and priorities for using NASA’s airborne and suborbital assets to support NASA’s scientific research, engineering, workforce development, and educational goals;

(3) identify and prioritize the required infrastructure investments, including maintenance, upgrades, and any enhanced facility or equipment capabilities, that are required to carry out the needs and priorities described in paragraph (2); and

(4) provide an estimate of the budget requirements and a schedule and timeline for implementing the plan.

(c) TRAINING AND PROFESSIONAL DEVELOPMENT.—The Administrator shall, to the extent practicable, expand the opportunities within NASA’s suborbital programs for training science and engineering students and for providing professional development for early career professionals. Training and development activities shall be expanded consistent with the goals and objectives of the strategic plan to be developed under subsection (b).

SEC. 312. REVIEW OF EXPLORER PROGRAM.

(a) ESTABLISHMENT.—Not later than 120 days after the date of enactment of this Act, the Administrator shall enter into an arrangement with the National Academies to conduct a review of the Explorer Program and offer any recommendations as it considers necessary.

(b) SCOPE.—Such review shall address at least the following:

(1) A review of existing or recent Explorer program elements such as NASA's University Class Explorer (UNEX), Small Explorer (SMEX), Medium Class Explorer (MIDEX), Explorers (EX), and Missions of Opportunity to assess the degree of—

- (A) innovation in instrumentation, and other technology and space mission elements;
 - (B) flexibility and new approaches in management and collaboration;
 - (C) project implementation within the planned budget and schedule; and
 - (D) training opportunities for space scientists and engineers.
- (2) The status, capability, and availability of launch vehicles and infrastructure to support the Explorer program elements.
- (3) Projected launch capabilities and facilities for Explorers, including private sector launch capabilities.
- (4) The frequency of Explorer missions.
- (5) The balance of Explorer missions among theme areas and between larger and smaller mission sizes.
- (6) The opportunities and challenges for partner participation in Explorer missions, including international and interagency collaborations.
- (7) The contributions of Explorers to a robust space science program, and the value of the Explorer Program for the Nation's scientific research and engineering community, including its impact on training of younger researchers and engineers.

(c) REPORT.—Not later than 16 months after the date of enactment of this Act, the Administrator shall transmit to the Congress the review and a plan for responding to the recommendations of the review.

SEC. 313. RADIOISOTOPE THERMOELECTRIC GENERATOR MATERIAL REQUIREMENTS AND SUPPLY.

(a) ANALYSIS OF REQUIREMENTS AND RISKS.—The Administrator, in consultation with other Federal agencies, shall conduct an analysis of NASA requirements for radioisotope power system material which is needed to carry out planned, high priority robotic missions in the solar system and other surface exploration activities beyond low-Earth orbit, as well as the risks to NASA missions in meeting those requirements, or any additional requirements, due to a lack of adequate domestic production of radioisotope power system material. The analysis shall—

- (1) detail NASA's current projected mission requirements for radioisotope power system material;
- (2) explain the assumptions used to determine NASA's requirements for the material, including—
 - (A) the planned use of Advanced Stirling Radioisotope Generator technology;
 - (B) the status of and timeline for completing development and demonstration of the Advanced Stirling Radioisotope Generator technology, including the development of flight readiness requirements; and
 - (C) the risks, implications, and contingencies for NASA mission plans of any delays or unanticipated technical challenges related to the anticipated use of Advanced Stirling Radioisotope Generator technology;
- (3) assess the risk to NASA programs of any potential delays in achieving the schedule and milestones for planned domestic production of radioisotope power system material;
- (4) outline a process for meeting any additional NASA requirements for the material; and
- (5) estimate the incremental costs required to increase the amount of material produced each year, if such an increase is needed to support additional NASA requirements for the material.

(b) TRANSMITTAL.—Not later than 180 days after the date of enactment of this Act, the Administrator, in consultation with other Federal agencies, shall transmit the results of the analysis to the Congress.

TITLE IV—AERONAUTICS

SEC. 401. ENVIRONMENTALLY FRIENDLY AIRCRAFT RESEARCH AND DEVELOPMENT INITIATIVE.

Section 302 of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17721) is amended—

- (1) by striking “The Administrator” and inserting the following:
 - “(a) IN GENERAL.—The Administrator”; and
 - (2) by adding at the end the following:

“(b) PLAN.—

“(1) IN GENERAL.—The Administrator shall develop a plan and associated timetable for this initiative identifying key milestones, including projected flight demonstrations to validate vehicle and technology concepts in a relevant environment.

“(2) SUBMISSION.—Not later than 270 days after the date of enactment of the National Aeronautics and Space Administration Authorization Act of 2010, the Administrator shall transmit the plan to the Congress.”

SEC. 402. RESEARCH ON NEXTGEN AIRSPACE MANAGEMENT CONCEPTS AND TOOLS.

The Administrator shall review at least annually the alignment and timing of NASA’s research and development activities in support of the NextGen airspace management modernization initiative and shall make any necessary adjustments by reprioritizing or retargeting NASA’s research and development activities in support of the NextGen initiative.

SEC. 403. RESEARCH ON AIRCRAFT CABIN AIR QUALITY.

The Administrator shall initiate research on aircraft cabin air quality that complements research conducted by the Federal Aviation Administration and its Center of Excellence on Research in the Intermodal Transport Environment, including research on innovative aircraft cabin air quality sensors operating during ground and flight operations and on innovative warning and mitigation technologies for poor air quality.

SEC. 404. RESEARCH ON ON-BOARD VOLCANIC ASH SENSOR SYSTEMS.

(a) IN GENERAL.—The Administrator shall conduct a study to assess the feasibility of establishing a project focused on the development of a low-cost on-board volcanic ash sensor system.

(b) SPECIFICATIONS.— The study shall consider, at a minimum—

- (1) NASA’s unique capabilities;
- (2) opportunities for collaboration, both nationally and internationally; and
- (3) projected resource requirements, research milestones, and potential accomplishments.

SEC. 405. AERONAUTICS TEST FACILITIES.

(a) SENSE OF CONGRESS.—It is the sense of the Congress that—

(1) NASA must reverse the deteriorating condition of its aeronautics ground test facilities and infrastructure, as this condition is hampering the effectiveness and efficiency of aeronautics research performed by both NASA and industry participants making use of NASA facilities, thus reducing the competitiveness of the United States aviation industry;

(2) NASA has a role in providing test capabilities that are not economically viable as commercial entities and thus are not available elsewhere; and

(3) to ensure continued access to reliable and efficient national-class test capabilities by researchers, NASA should seek to establish strategic partnerships with other Federal agencies, academic institutions, and industry.

(b) PLAN.—The Administrator shall develop a plan to stabilize and, where possible, reverse the deterioration of NASA’s aeronautics ground test facilities. The Administrator shall transmit such plan to the Congress not later than 1 year after the date of enactment of this Act.

SEC. 406. EXPANDED RESEARCH PROGRAM ON COMPOSITE MATERIALS USED IN AEROSPACE.

The Administrator shall expand NASA’s research program on composite materials used in aerospace applications to address—

(1) progressive damage analysis, aging, inspection techniques, and new manufacturing and repair techniques; and

(2) ways to mitigate how the environment, operating fluids, and mechanical loads interact with composite materials over time.

TITLE V—SPACE TECHNOLOGY

SEC. 501. SPACE TECHNOLOGY PROGRAM.

(a) ESTABLISHMENT.—The Administrator shall establish a space technology program to enable research and development on advanced space technologies and systems that are independent of specific space mission flight projects. The program shall support—

(1) early-stage concepts and innovation;

(2) development of innovative technologies in areas such as in-space propulsion, power generation and storage, liquid rocket propulsion, avionics, struc-

tures, and materials that may enable new approaches to human and robotic space missions;

(3) flight demonstrations of technologies, including those that have the potential to benefit multiple NASA mission directorates, other Federal Government agencies, and the commercial space industry; and

(4) research, development, and demonstration of enabling technologies in support of future exploration missions.

(b) PROCEDURE.—In establishing the space technology program under this section, the Administrator shall—

(1) to the maximum extent practicable, use a competitive process to select projects to be supported as part of the program;

(2) support the development of an organization to investigate innovative concepts for technological approaches, systems, architectures, or mission strategies;

(3) make use of small satellites and NASA suborbital platforms, to the extent practicable, to demonstrate space technology concepts and developments; and

(4) undertake partnerships with other Federal agencies, universities, private industry, and other spacefaring nations, as appropriate.

(c) DECADEAL SURVEY.—The Administrator shall enter into an arrangement with the National Academies for a decadal survey study to make recommendations for research and development priorities for NASA’s space technology program over the next decade. Included in the decadal survey shall be an identification and prioritization of key technology research and development activities needed to enable a robust exploration technology program, from basic research and development through flight demonstrations. The Administrator shall transmit the results of the study to the Congress not later than 20 months after the date of enactment of this Act.

TITLE VI—EDUCATION AND OUTREACH

SEC. 601. STEM EDUCATION AND TRAINING.

(a) IN GENERAL.—In order to create the diverse, skilled scientific and technical workforce essential to meeting the challenges facing NASA and the Nation in the 21st century, the Administrator shall develop, conduct, support, promote, and coordinate formal and informal educational and training activities that leverage NASA’s unique content expertise and facilities to—

(1) contribute to improving science, technology, engineering and mathematics (STEM) education and training at all levels in the United States; and

(2) enhance awareness and understanding of STEM, including space and Earth sciences, aeronautics, and engineering.

(b) PROGRAMS.—

(1) IN GENERAL.—The Administrator shall carry out evidence-based programs designed to—

(A) increase student interest and participation, including by women, underrepresented minority students, and students in rural schools;

(B) improve public literacy and support; and

(C) improve the teaching and learning of space and Earth sciences, aeronautics, engineering, and other STEM disciplines supported by NASA.

(2) INCLUDED PROGRAMS.—Programs authorized under this subsection may include—

(A) informal educational programming designed to excite and inspire students and the general public about space and Earth science, aeronautics, engineering, and other STEM disciplines supported by NASA while strengthening their content knowledge in these disciplines;

(B) teacher training and professional development opportunities for pre-service and in-service elementary and secondary school teachers designed to increase the content knowledge of teachers in space and Earth science, aeronautics, engineering, and other STEM disciplines supported by NASA, especially through hands-on research and technology experiences;

(C) research opportunities for secondary school students, including internships at NASA and its field centers, that provide secondary school students with hands-on research and technology experiences as well as exposure to working scientists and engineers;

(D) research opportunities at NASA and its field centers for undergraduate and graduate students pursuing degrees in space and Earth sciences, aeronautics, engineering, and other STEM disciplines supported by NASA;

(E) competitive scholarships, fellowships, and traineeships for undergraduate and graduate students in space and Earth sciences, aeronautics, engineering, and other STEM disciplines supported by NASA; and

(F) competitive grants for institutions of higher education, with special consideration for minority serving institutions, including 2-year institutions of higher education, to establish or expand degree programs or courses in space and Earth sciences, aeronautics, engineering, and other STEM disciplines supported by NASA.

(c) ORGANIZATION OF STEM EDUCATION PROGRAMS.—

(1) DIRECTOR OF STEM EDUCATION.—The Administrator shall appoint or designate a Director of STEM Education, who shall have the principal responsibility to oversee and coordinate all NASA programs and activities in support of STEM education and training, including space and Earth sciences, aeronautics, and engineering.

(2) QUALIFICATIONS.—The Director shall be an individual who, by reason of professional background and experience, is specially qualified to advise the Administrator on all matters pertaining to STEM education and training, including space and Earth sciences, aeronautics, and engineering, at NASA.

(3) DUTIES.—The Director shall—

(A) oversee and coordinate all programs in support of STEM education and training, including space and Earth sciences, aeronautics, and engineering;

(B) represent NASA as the principal interagency liaison for all STEM education and training programs, unless otherwise represented by the Administrator or the Associate Administrator for Education;

(C) prepare the annual budget and advise the Associate Administrator for Education and the Administrator on all budgetary issues for STEM education and training relative to the programs of NASA;

(D) establish, periodically update, and maintain a publicly accessible online inventory of STEM education and training programs and activities;

(E) develop, implement, and update the STEM education and training strategic plan required under subsection (d);

(F) increase, to the maximum extent practicable, the participation and advancement of women and underrepresented minorities at every level of STEM education and training; and

(G) perform such other matters relating to STEM education and training as are required by the Administrator or the Associate Administrator for Education.

(d) STRATEGIC PLAN.—The Director of STEM Education shall develop, implement, and update once every 3 years a STEM education and training strategic plan for NASA. The plan shall—

(1) identify and prioritize annual and long-term STEM education and training goals and objectives for NASA;

(2) describe the role of each NASA program or activity in contributing to the goals and objectives identified under paragraph (1);

(3) specify the metrics that will be used to assess progress toward achieving those goals and objectives; and

(4) describe the approaches that will be taken to assess the effectiveness of each STEM education program and activity supported by NASA.

(e) OUTREACH TO STUDENTS FROM UNDERREPRESENTED GROUPS.—The Administrator shall seek to ensure that program participants include minority and underrepresented groups, including students from a high-need local education agency as defined in section 2102(3) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6602(3)).

(f) CONSULTATION AND PARTNERSHIP WITH OTHER AGENCIES.—In carrying out the programs and activities authorized under this section, the Administrator shall—

(1) consult with the Secretary of Education and the Director of the National Science Foundation regarding activities designed to improve elementary and secondary STEM education and training, and recruit minorities that are underrepresented in STEM teaching; and

(2) consult and partner with the Director of the National Science Foundation in carrying out programs under this section designed to build capacity in STEM education and training at the undergraduate and graduate level.

SEC. 602. ASSESSMENT OF IMPEDIMENTS TO SPACE SCIENCE AND ENGINEERING WORKFORCE DEVELOPMENT FOR MINORITY AND UNDERREPRESENTED GROUPS AT NASA.

(a) ASSESSMENT.—The Administrator shall enter into an arrangement for an independent assessment of any impediments to space science and engineering workforce

development for minority and underrepresented groups at NASA, including recommendations on—

- (1) measures to address such impediments;
- (2) opportunities for augmenting the impact of space science and engineering workforce development activities and for expanding proven, effective programs; and
- (3) best practices and lessons learned, as identified through the assessment, to help maximize the effectiveness of existing and future programs to increase the participation of minority and underrepresented groups in the space science and engineering workforce at NASA.

(b) REPORT.—A report on the assessment carried out under subsection (a) shall be transmitted to the Congress not later than 15 months after the date of enactment of this Act.

(c) IMPLEMENTATION.—To the extent practicable, the Administrator shall take all necessary steps to address any impediments identified in the assessment.

SEC. 603. INDEPENDENT REVIEW OF THE NATIONAL SPACE GRANT COLLEGE AND FELLOWSHIP PROGRAM.

(a) SENSE OF CONGRESS.—It is the sense of the Congress that—

(1) the National Space Grant College and Fellowship Program, established in title II of the National Aeronautics and Space Administration Authorization Act of 1988 (42 U.S.C. 2486 et seq.), has been an important program through which the Federal Government has partnered with State and local governments, universities, private industry, and other organizations to enhance the understanding and use of space and aeronautics activities and their benefits through education, the fostering of interdisciplinary and multidisciplinary space research and training, and supporting Federal funding for graduate fellowships in space-related fields; and

(2) enhancing the National Space Grant College and Fellowship Program's effectiveness will support the program's maximum contribution to NASA's and the Nation's goals for science, technology, engineering and mathematics (STEM) education and training.

(b) REVIEW.—The Administrator shall enter into an arrangement with the National Academies for a review of the National Space Grant College and Fellowship Program, including its structure and capabilities for supporting STEM education and training, and recommendations on measures, if needed, to enhance the program's effectiveness.

(c) TRANSMITTAL.—The Administrator shall transmit the results of the review to the Congress not later than 18 months after the date of enactment of this Act.

SEC. 604. HANDS-ON SPACE SCIENCE AND ENGINEERING EDUCATION AND TRAINING.

(a) PILOT PROJECTS.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Administrator shall competitively select pilot projects that test and demonstrate new forms of collaborative and hands-on education and training projects related to aeronautics, exploration, science, space operations, and human spaceflight, that serve to stimulate and engage students in science and engineering, and that foster skills including engineering, teamwork, project management, and problem solving. In particular, the pilot projects shall emphasize engineering and technology-related education and training. The pilot projects shall include a breadth of activities that range in scope and complexity and shall also test and demonstrate selection, evaluation, mentoring, and related tools and services required to support the projects. The program shall be directed at serving undergraduates. The Administrator may include broader participation from pre-collegiate and graduate students, as appropriate. To the extent practicable, the initiative shall also be accessible to NASA's young science, technical, and project management professionals.

(2) PROJECTS.—Pursuant to subsection (b), the pilot projects shall be carried out through competitive solicitations. The duration of a project awarded under the pilot program shall be no more than 4 years. The pilot projects program shall—

- (A) include a range of projects of varying scope and complexity;
- (B) provide participants with experience in areas such as—
 - (i) formulating, planning, designing, developing, testing and integrating, and operating mission or flight hardware;
 - (ii) systems engineering;
 - (iii) analyzing data from a mission or investigation; and
 - (iv) documentation, reporting, and reviews;
- (C) include defined and measurable objectives;
- (D) provide mentoring for participants;

(E) provide for evaluation of the project and documentation of the outcomes of the project and its contribution to education and training; and

(F) encourage outreach to and partnerships with universities, Federal agencies, private entities, and other institutions involved in student collaborations and hands-on training and education, including organizations that focus on engaging young girls in science and engineering hands-on education and training activities.

(3) EMPHASIS ON PARTICIPATION OF INDIVIDUALS FROM UNDERREPRESENTED MINORITY POPULATIONS.—The Administrator shall make it an emphasis of the pilot projects to seek the involvement of participants from underserved and underrepresented minority populations.

(4) FLIGHT OPPORTUNITIES AND ACCESS TO SPACE.—The Administrator shall ensure, to the extent practicable, the availability and accessibility of platforms for flying and launching into space student's collaborative and hands-on projects.

(5) FORUM FOR PARTICIPANT PRESENTATIONS.—The Administrator shall organize a forum for students and other participants in the pilot projects to discuss and present their work, at an appropriate stage of the project, and to engage with other students and young professionals involved in ongoing collaborative and hands-on training activities related to space science and engineering, aeronautics, space exploration, and human spaceflight.

(6) WORKSHOP.—The Administrator shall organize a workshop or workshops involving the competitively-selected pilot project teams for the purposes of collecting information on the results of the pilot projects (including on selection, evaluation tools, and mentoring services) and identifying lessons learned and best practices for NASA-supported collaborative and hands-on education and training projects.

(7) REPORT AND STRATEGY.—Not later than 3 years after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report—

(A) on the outcomes of existing student collaborative and hands-on projects such as those being conducted as part of NASA's science programs;

(B) on the results of the pilot projects; and

(C) on best practices of NASA's student collaborations and hands-on education and training activities.

The report shall define decision criteria, a strategy, and a process for extending successful projects or transitioning them into an ongoing, competitive program.

(b) INFORMATION EXCHANGE.—The Administrator shall support mission directorates sponsoring student collaborative and hands-on education and training projects in exchanging information, sharing knowledge, and leveraging activities, as appropriate.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Administrator such sums as may be necessary for fiscal years 2011, 2012, 2013, and 2014 to carry out this section, to remain available until expended.

TITLE VII—INSTITUTIONAL CAPABILITIES REVITALIZATION

SEC. 701. INSTITUTIONAL MANAGEMENT.

(a) MODERNIZATION OF LABORATORIES, FACILITIES, AND EQUIPMENT.—

(1) STRATEGY.—

(A) IN GENERAL.—The Administrator shall develop a strategy for the maintenance, repair, upgrading, and modernization of NASA's laboratories, facilities, and equipment.

(B) CRITERIA.—The strategy shall include criteria for prioritizing deferred maintenance tasks and also for upgrading or modernizing laboratories, facilities, and equipment.

(C) OTHER CONSIDERATIONS.—The strategy shall also include an assessment of modifications needed to maximize usage of facilities that offer unique and highly specialized benefits to the aerospace industry and the American public.

(2) PLAN.—The Administrator shall develop a plan for implementing the strategy in paragraph (1), including a timeline, milestones, and an estimate of resources required for carrying out the plan.

(3) TRANSMITTAL TO CONGRESS.—The Administrator shall transmit to the Congress the strategy under paragraph (1) and the plan under paragraph (2) not later than 180 days after the date of enactment of this Act.

(b) ESTABLISHMENT OF CAPITAL FUND.—

(1) IN GENERAL.—The Administrator shall establish a capital fund at each of NASA’s field centers for the modernization of facilities and laboratories.

(2) SOURCE OF FUNDING.—The Administrator shall ensure to the maximum extent practicable that all financial savings achieved by closing outdated or surplus facilities at a NASA field center shall be made available to that center’s capital fund for the purpose of modernizing the field center’s facilities and laboratories and for upgrading the infrastructure at the field center.

SEC. 702. JAMES E. WEBB COOPERATIVE EDUCATION DISTINGUISHED SCHOLAR PROGRAM.

(a) ESTABLISHMENT.—The Administrator is authorized to establish a national cooperative education program to complement existing NASA Center-administered cooperative education initiatives.

(b) APPLICATION PROCESS.—The Administrator shall encourage and seek applications from the pool of American students pursuing science, technology, engineering, or mathematics degrees who wish to gain working experience in NASA.

(c) SELECTION.—From the applications, the Administrator shall select 10 finalists annually as James E. Webb Cooperative Education Distinguished Scholars.

(d) AWARD.—The James E. Webb Cooperative Education Distinguished Scholars shall be provided with—

(1) learning experiences that will enhance their understanding of activities conducted in the various NASA Centers in furtherance of NASA’s missions and priorities;

(2) exposure to NASA headquarters functions and activities; and

(3) stipends for living expenses.

TITLE VIII—ACQUISITION MANAGEMENT

SEC. 801. PROHIBITION ON EXPENDITURE OF FUNDS WHEN 30 PERCENT THRESHOLD IS EXCEEDED.

Section 103(e) of the National Aeronautics and Space Administration Authorization of 2005 (42 U.S.C. 16613(e)) is amended by striking “beginning 18 months after the date the Administrator transmits a report under subsection (d)(1)” and inserting “beginning 18 months after the Administrator makes such determination”.

SEC. 802. PROJECT AND PROGRAM RESERVES.

To ensure that the establishment, maintenance, and allotment of project and program reserves contribute to prudent management, not later than 180 days after the date of enactment of this Act, the Administrator shall transmit to the Congress a report describing NASA’s criteria for establishing the amount of reserves at the project and program levels and how such criteria complement NASA’s policy of budgeting at a 70 percent confidence level.

SEC. 803. INDEPENDENT REVIEWS.

Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit to the Congress a report describing NASA’s procedures for conducting independent reviews of projects and programs at lifecycle milestones and how NASA ensures the independence of the individuals who conduct those reviews prior to their assignment.

SEC. 804. AVOIDING ORGANIZATIONAL CONFLICTS OF INTEREST IN MAJOR NASA ACQUISITION PROGRAMS.

(a) REVISED REGULATIONS REQUIRED.—Not later than 270 days after the date of enactment of this Act, the Administrator shall revise the NASA Supplement to the Federal Acquisition Regulation to provide uniform guidance and tighten existing requirements for preventing organizational conflicts of interest by contractors in major acquisition programs.

(b) ELEMENTS.—The revised regulations required by subsection (a) shall, at a minimum—

(1) address organizational conflicts of interest that could potentially arise as a result of—

(A) lead system integrator contracts on major acquisition programs and contracts that follow lead system integrator contracts on such programs, particularly contracts for production;

(B) the ownership of business units performing systems engineering and technical assistance functions, professional services, or management sup-

port services in relation to major acquisition programs by contractors who simultaneously own business units competing to perform as either the prime contractor or the supplier of a major subsystem or component for such programs;

(C) the award of major subsystem contracts by a prime contractor for a major acquisition program to business units or other affiliates of the same parent corporate entity, and particularly the award of subcontracts for software integration or the development of a proprietary software system architecture; or

(D) the performance by, or assistance of, contractors in technical evaluations on major acquisition programs;

(2) ensure that NASA receives advice, when appropriate, on systems architecture and systems engineering matters with respect to major acquisition programs from federally funded research and development centers or other sources independent of the prime contractor;

(3) require that a contract for the performance of systems engineering and technical assistance functions for a major acquisition program contains a provision prohibiting the contractor or any affiliate of the contractor from participating as a prime contractor or a major subcontractor in the development of a system under the program; and

(4) establish such limited exceptions to the requirement in paragraphs (2) and (3) as may be necessary to ensure that NASA has continued access to advice on systems architecture and systems engineering matters from highly qualified contractors with domain experience and expertise, while ensuring that such advice comes from sources that are objective and unbiased.

SEC. 805. REPORT TO CONGRESS.

The Administrator shall transmit to the Congress, not later than April 30 of each year, an estimate of the total termination liability as of the end of the second fiscal quarter for all NASA contracts with a total value in excess of \$200,000,000.

TITLE IX—OTHER PROVISIONS

SEC. 901. CLOUD COMPUTING.

(a) **DEFINITION.**—As defined by the National Institute of Standards and Technology, for purposes of this section, the term “cloud computing” means a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned with minimal management effort or service provider interaction.

(b) **REPORT.**—Not later than 1 year after NASA has entered into a contract for its first use of a non-Federal cloud computing facility, the Comptroller General shall transmit to the Congress a report detailing whether sensitive but unclassified and classified NASA information was processed on that facility and if so, how NASA ensured that data access and security requirements were in place to safeguard NASA’s scientific and technical information.

SEC. 902. REVIEW OF PRACTICES TO DETECT AND PREVENT THE USE OF COUNTERFEIT PARTS.

Not later than 1 year after the date of enactment of this Act, the Comptroller General shall transmit to the Congress a review of NASA’s processes and controls to detect and prevent the use of counterfeit parts in NASA mission projects and related assets. The review shall examine—

(1) the trends in known and identified counterfeit parts in NASA’s supply chain;

(2) NASA’s processes and controls to detect counterfeit parts and prevent their incorporation into NASA mission projects, instruments, and other mission-related assets; and

(3) any gaps in NASA’s controls and processes for detecting counterfeit parts and preventing their incorporation into NASA missions and related assets.

SEC. 903. PRESERVATION AND MANAGEMENT OF LUNAR SITES.

(a) **INTERNATIONAL DIALOGUE.**—The Director of OSTP, in cooperation with the Administrator, other relevant Federal agencies, commercial entities, and international bodies, shall enter into a dialogue to identify the questions and research needed to understand—

(1) the potential adverse impacts of various uses of the Moon on scientific research activities;

(2) the potential adverse impacts of such uses on lunar areas of historical, cultural, or scientific value; and

(3) how to prevent or mitigate such impacts.

(b) **GRANTS PROGRAM.**—The Administrator, in cooperation with other relevant Federal agencies and stakeholders, shall establish a grants program to conduct research for the purpose of identifying and characterizing potential impacts related to lunar activities and describing potential means for managing and mitigating the impacts.

(c) **INTERNATIONAL FRAMEWORK.**—As a result of the dialogue under subsection (a), the Director of OSTP shall initiate an effort to establish an international framework for identifying, protecting, and preserving lunar areas determined to be of significant historical, cultural, or scientific value.

(d) **REPORT.**—The Director of OSTP shall provide a report on the results of the international dialogue under subsection (a) and the establishment of an international framework under subsection (c), to be transmitted to the Congress not later than 2 years after the date of enactment of this Act.

SEC. 904. CONTINUITY OF MODERATE RESOLUTION LAND IMAGING REMOTE SENSING DATA.

(a) **REAFFIRMATION OF POLICY.**—The Congress reaffirms the finding in section 2(1) of the Land Remote Sensing Policy Act of 1992 (15 U.S.C. 5601(1)) which states that “The continuous collection and utilization of land remote sensing data from space are of major benefit in studying and understanding human impacts on the global environment, in managing the Earth’s natural resources, in carrying out national security functions, and in planning and conducting many other activities of scientific, economic, and social importance.”.

(b) **CONTINUOUS LAND REMOTE SENSING DATA COLLECTION.**—The Director of OSTP shall take steps in consultation with other relevant Federal agencies to ensure, to the maximum extent practicable, the continuous collection of space-based medium-resolution observations of the Earth’s land cover and to ensure that the data are made available in such ways as to facilitate the widest possible use.

SEC. 905. SPACE WEATHER.

(a) **STRATEGY AND IMPLEMENTATION PLAN.**—The Director of OSTP, in coordination with the Administrator and with other relevant Federal agencies, space weather coordinating bodies, industry, academia, and other stakeholders, shall prepare a long-term strategy for a sustainable space weather program and develop a plan to implement the strategy. The implementation plan shall—

(1) define individual agency responsibilities for carrying out the strategy;

(2) identify the milestones and schedule required for each agency’s contributions;

(3) provide an estimate of the resources required for each agency to carry out its responsibilities;

(4) establish a process for coordinating agency responsibilities, programs, and budgets required for implementing the plan; and

(5) identify opportunities for private sector and international contributions to implementing the plan.

(b) **STUDY ON PREDICTION.**—The Director of OSTP shall enter into an arrangement with the National Academies to assess the status of capabilities for space weather prediction and recommend the highest priority basic research, infrastructure, and operational needs required to improve the Nation’s ability to predict space weather events. The study should also address the benefits of space weather prediction. The Director shall transmit the results of the study to the Congress not later than 18 months after the date of enactment of this Act.

SEC. 906. USE OF OPERATIONAL COMMERCIAL SUBORBITAL VEHICLES FOR RESEARCH, DEVELOPMENT, AND EDUCATION.

(a) **PLAN.**—The Administrator shall prepare a plan describing the processes required to support the use of commercial reusable suborbital flight vehicles for carrying out competitively selected scientific and engineering investigations and educational activities. The plan shall—

(1) describe NASA, space flight operator, and supporting contractor responsibilities for developing standard payload interfaces and conducting payload safety analyses, payload integration and processing, payload operations, and safety assurance for NASA-sponsored space flight participants, among other functions required to fly NASA-sponsored payloads and space flight participants on commercial suborbital vehicles;

(2) identify NASA-provided hardware, software, or services that may be provided to space flight operators on a cost-reimbursable basis, through agreements entered into under section 203(c)(5) of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2473(c)(5)), or on a contractual basis; and

(3) describe the United States Government and space flight operator responsibilities for liability and indemnification with respect to commercial suborbital

vehicle flights that involve NASA-sponsored payloads or activities, NASA-supported space flight participants, or other NASA-related contributions.

(b) **COMMERCIAL REUSABLE SUBORBITAL CAPABILITIES AND RISKS.**—The Administrator shall assess and characterize the potential capabilities and performance of commercial reusable suborbital vehicles for addressing scientific research, including research requiring access to low gravity and microgravity environments, for carrying out technology demonstrations related to science, exploration, or space operations requirements, and for providing opportunities for educating and training space scientists and engineers, once those vehicles become operational. The assessment shall also characterize the risks of using potential commercial reusable suborbital flights to NASA-sponsored researchers, investigators, and scientific investigations and flight hardware. The Administrator shall make a determination on the need to enter into arrangements with commercial reusable suborbital service providers for flights or flight services to acquire analytical data to inform the assessment.

(c) **TRANSMITTAL.**—The plan and assessment described in subsections (a) and (b) shall be transmitted to the Congress not later than 1 year after the date of enactment of this Act.

(d) **IN GENERAL.**—The report of the National Academy of Sciences entitled “Revitalizing NASA’s Suborbital Program: Advancing Science, Driving Innovation and Developing Workforce” found that suborbital science missions were critical to building an aerospace workforce capable of meeting the needs of current and future human and robotic space exploration.

(e) **MANAGEMENT.**—The Administrator shall designate an officer or employee of the Space Technology Program to act as the responsible official for the Commercial Reusable Suborbital Research Program in the Space Technology Program. The designee shall be responsible for the development of short-term and long-term strategic plans related to the use of commercial reusable suborbital vehicles to support NASA’s requirements for competitively-selected science, technology demonstration, and educational activities.

(f) **ESTABLISHMENT.**—The Administrator shall establish a Commercial Reusable Suborbital Research Program within the Space Technology Program that shall fund the development of competitively selected payloads for scientific research, technology development, and education, and shall provide flight opportunities for those payloads to microgravity environments and suborbital altitudes that meet the requirements of such investigations. The Commercial Reusable Suborbital Research Program may fund engineering and integration demonstrations, proofs of concept, or experiments for commercial reusable vehicle flights, once the vehicles have met the requirements consistent with subsection (h). The program shall coordinate with NASA’s Mission Directorates to help achieve NASA’s research, technology, and education goals.

(g) **REPORT.**—The Administrator shall submit a report annually to the Congress describing progress in carrying out the Commercial Reusable Suborbital Research program, including the number and type of suborbital missions planned in each fiscal year. The plan and assessment described in subsections (a) and (b) shall be transmitted to the Congress not later than 1 year after the date of enactment of this Act, before the transmittal of which the Administrator shall not be constrained in the execution of this section.

(h) **INDEMNIFICATION AND LIABILITY.**—The Administrator shall not proceed with a request for proposals, award any contract, commit any United States Government funds, or enter into any other agreement for the provision of a commercial reusable suborbital vehicle launch service of a NASA-sponsored payload or spaceflight participant until all indemnification and liability issues associated with the use of such systems by the United States Government shall have been addressed and the Administrator has provided to the Congress a report describing the indemnification and liability provisions that are planned to be included in such contracts or agreements.

SEC. 907. STUDY ON EXPORT CONTROL MATTERS RELATED TO UNITED STATES ASTRONAUT SAFETY AND NASA MISSION OPERATIONS.

(a) **ESTABLISHMENT.**—The Director of OSTP, in consultation with the Administrator and other relevant Federal agencies, shall conduct a study to examine the need for a process for granting real-time, limited waivers to export control license restrictions or regulations that are necessary for United States Government entities and contractors to enter into technical discussions and to share technical data with foreign government entities and contractors to resolve anomalies that may—

- (1) threaten the safety of United States astronauts aboard cooperative crewed spacecraft such as the ISS; or
- (2) impair the operations of international civil research and other spacecraft that involve the national interests of the United States.

(b) TRANSMITTAL.—The results of the study shall be transmitted to the Congress not later than 1 year after the date of enactment of this Act.

SEC. 908. AMENDMENT TO THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958.

Section 202 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2472) is amended by adding at the end the following new subsection:

“(d) The Administrator and the Deputy Administrator may be retired commissioned military personnel.”.

SEC. 909. NEAR-EARTH OBJECTS.

(a) RESPONSIBLE OFFICIAL.—The Administrator shall designate a responsible official for coordinating NASA’s near-Earth object observation activities and NASA’s interactions with other Federal agencies and international entities on near-Earth object surveys, defense, and efforts related to addressing any threats to the United States posed by near-Earth objects. The responsible official shall report directly to the Administrator.

(b) REAFFIRMATION OF POLICY ON NEAR-EARTH OBJECT SURVEY.—The Congress reaffirms the direction set forth in section 321(d)(1) of the National Aeronautics and Space Administration Authorization Act of 2005 (42 U.S.C. 16691(d)(1)) that directed the Administrator “to plan, develop, and implement a Near-Earth Object Survey program to detect, track, catalogue, and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter in order to assess the threat of such near-Earth objects to the Earth”.

(c) REAFFIRMATION OF POLICY WITH RESPECT TO THREATS POSED BY NEAR-EARTH OBJECTS.—The Congress reaffirms the direction set forth in section 804 of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17794) that directed the Director of OSTP by October 15, 2010, to—

(1) develop a policy for notifying Federal agencies and relevant emergency response institutions of an impending near-Earth object threat, if near-term public safety is at risk; and

(2) recommend a Federal agency or agencies to be responsible for—

(A) protecting the United States from a near-Earth object that is expected to collide with Earth; and

(B) implementing a deflection campaign, in consultation with international bodies, should one be necessary.

(d) ARECIBO OBSERVATORY.—Congress reiterates its support for the use of the Arecibo Observatory for NASA-funded near-Earth object-related activities. The Administrator shall coordinate with the Director of the National Science Foundation to ensure the availability of the Arecibo Observatory’s planetary radar to support these activities.

(e) PLAN.—Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit to the Congress a plan for carrying out the direction reaffirmed by subsection (b).

(f) AUTHORIZATION OF APPROPRIATIONS.—From the funds authorized for Planetary Science in title I, \$1,000,000 in fiscal year 2012 and \$1,000,000 in fiscal year 2013 shall be for supporting competitively awarded grants for investigation of innovative approaches to carrying out the congressionally mandated survey of near-Earth objects equal to or greater than 140 meters in diameter.

SEC. 910. SENSE OF CONGRESS.

It is the sense of Congress that NASA shall endeavor to carry out, to the extent feasible and technologically possible, the top recommendation from the decadal survey in each mission area.

SEC. 911. ETHICS PROGRAMS IN THE OFFICE OF GENERAL COUNSEL.

(a) REAFFIRMATION OF RESPONSIBILITIES OF COUNSEL.—The legal staff of the Office of General Counsel of NASA is reminded that as Government attorneys they have a special obligation to instruct NASA staff to comply with applicable Federal law and regulations.

(b) BIENNIAL ETHICS TRAINING FOR COUNSEL.—All NASA counsel shall be required to receive ethics training in the legal obligations of Government attorneys on a biennial basis.

(c) CERTIFICATION OF TRAINING.—Certification of participation in such a program shall be included in each counsel’s personnel record.

(d) DESIGNATED ETHICS OFFICER.—The General Counsel of NASA may not serve as NASA’s designated ethics officer.

II. PURPOSE

The purpose of the bill is to reauthorize the science, aeronautics, and human space flight and exploration programs of the National Aeronautics and Space Administration (NASA) for the fiscal years 2011, 2012, and 2013, and address space and aeronautics policy and programmatic issues.

III. BACKGROUND AND NEED FOR THE LEGISLATION

The NASA Authorization Acts of 2005 and 2008 provided policy and programmatic guidance for NASA that made clear that NASA is and should remain a multi-mission agency with a balanced portfolio of programs in science, aeronautics, and human space flight, including human and robotic exploration beyond low Earth orbit. The NASA Authorization Act of 2010 reaffirms the basic principles espoused in the earlier NASA Authorizations while emphasizing the need to reinvigorate NASA's capability to undertake innovative space technology R&D, replenish our Earth observations assets and capabilities, and restructure NASA's existing exploration program so that it can be both executable and productive in spite of a very challenging budgetary environment. It also reaffirms the 2008 Authorization's support for a healthy commercial space sector and includes provisions to foster its growth. The need for the legislation at this time is due to the expiration of the previous authorization and the fact that major changes to NASA's programs have been proposed by the Administration and debated by Congress over the past year. Without a clear statement of congressional priorities and policies for NASA, the nation runs the risk of serious drift in our space program, with a resultant cost in time and resources and loss of critical capabilities.

IV. HEARING SUMMARIES

The House Committee on Science and Technology and its Subcommittee on Space and Aeronautics have held 18 hearings relevant to the issues covered in the NASA Authorization Act of 2010 during the 111th Congress.

On Wednesday, February 25, 2009, the Honorable Bart Gordon presiding, at 10:00 am in room 2318 Rayburn House Office Building, the Committee on Science and Technology held a hearing to review the impacts of current export control policies on U.S. science and technology activities and competitiveness and to examine the findings and recommendations of the National Academies study, *Beyond "Fortress America": National Security Controls on Science and Technology in a Globalized World*. There were five witnesses: (1) Lieutenant General Brent Scowcroft, Co-chair of the National Academies Committee on Science, Security and Prosperity; (2) Mr. A. Thomas Young, Co-chair of the Strategic and International Studies Working Group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls; (3) Dr. Claude R. Canizares, Vice President for Research and Associate Provost at Massachusetts Institute of Technology; (4) Maj. General Robert Dickman, Executive Director of the American Institute of Aeronautics and Astronautics.

Lieutenant General Scowcroft provided testimony on the National Academies report, "Beyond 'Fortress America': National Se-

curity Controls on Science and Technology in a Globalized World.” Lt. General Scowcroft pointed out that current export controls were outdated, and their regulations were more applicable to the Cold War era. Lt. General Scowcroft added that there was a better way to manage export controls and suggested that “we need to turn to an open mindset and export unless there is a reason not to.” Mr. Young agreed with Lt. General Scowcroft’s assessment of current export controls. He expanded in greater detail about their negative effects on the space commercialization industry, and specifically on the second and third tier space industrial base. Dr. Canizares discussed the diminishing effects that export controls levied on America’s once dominant scientific leadership. Major General Dickman agreed with much of what had been said by the previous panelist, but added a sobering statement that described the real effects of export controls on the state of America’s aerospace professionals: “In a very real sense, we the American taxpayer, are subsidizing the development of the technical workforce that is building the systems that are taking business away from U.S. companies and threatening our security.”

On Thursday, March 5, 2009, the Honorable Gabrielle Giffords presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the status of the National Aeronautics and Space Administration’s (NASA) efforts to improve the cost management of its acquisitions and programs. The hearing focused on (1) the results of the Government Accountability Office’s (GAO) recently completed assessments of selected large-scale NASA projects and its designation of NASA acquisition management as a “high-risk” area, (2) the causes of cost growth and schedule delays in NASA acquisitions and (3) the agency’s progress in addressing them. There were three witnesses: (1) Christopher Scolese, Acting Administrator of the National Aeronautics and Space Administration; (2) Ms. Christina T. Chaplain, Director of Acquisition and Sourcing Management for the Government Accountability Office; (3) Gary P. Pulliam, Vice President of the Civil and Commercial Operations at The Aerospace Corporation.

Acting Administrator Scolese testified about internal and external factors that affect NASA’s cost and schedule growth, and stated that some factors were outside of the administration’s control. However, he was pleased to report that NASA had made improvements in standards for project lifecycle milestones and accountability for their stakeholders.

Ms. Chaplain testified that NASA had a history of failing to address and correct its poor cost estimating practices. However, Ms. Chaplain stated that in the most recent assessment of NASA’s large-scale projects, GAO found that “improvements have been made, but problems still exist.” Mr. Pulliam’s testimony described four main causes of NASA’s cost growth and schedule delays, and offered a rationale for why some of those problems still existed.

On Thursday, March 26, 2009, the Honorable Gabrielle Giffords presiding, the House Committee on Science and Technology’s Subcommittee on Space and Aeronautics convened a hearing to review the status of federal and industry research and development (R&D) efforts to develop and demonstrate the safe and cost-effective use of biofuels in civil aviation. The hearing focused on (1) what research was needed to determine the optimal characteristics of both

aircraft engine technologies and biofuels to minimize harmful emissions while maintaining aircraft safety and reliability and maximizing performance? (2) What were the most realistic aviation biofuel options over the long term, and what will be required to achieve widespread use of biofuels in aviation? (3) What steps, if any, was the federal government taking to assess the viability of biofuels for aviation or to facilitate their widespread use in aviation? (4) What were the results of the recently completed aviation biofuels demonstrations?

There were three witnesses: (1) Dr. Jaiwon Shin, Associate Administrator of Aeronautics Research Mission Directorate at the National Aeronautics and Space Administration; (2) Dr. Lourdes Q. Maurice, Chief Scientist of the Federal Aviation Administration and Environmental Lead for the Commercial Aviation Alternative Fuels Initiative; (3) Dr. Alan H. Epstein, Vice President of Technology and Environment at Pratt & Whitney, United Technologies Corporation; (4) Mr. Billy M. Glover, Managing Director of Environmental Strategy at Boeing Commercial Airplane Company; and (5) Mr. Holden E. Shannon, Senior Vice President of Global Real Estate and Security at Continental Airlines.

Dr. Shin testified that “NASA has initiated a modest research effort in 2007 that builds upon the existing expertise in fuel chemistry and processing, combustion, and gas turbine engines to address some of the challenges associated with the application of these fuels for aviation.” Dr. Shin stated that it would take a concerted effort by multiple government agencies, aerospace industries, academia, and biofuel producers to successfully implement widespread use of biofuels in aviation.

Dr. Maurice testified that the FAA had “identified a number of options that can replace petroleum jet fuel without the need to modify aircraft, often referred to as drop-in fuels.” However, she was quick to admit that biofuels in aviation still faced challenges in certification, quantification of environmental impacts, and infrastructure and deployment.

Dr. Epstein testified that testing had shown “an engine can be designed to reduce fuel consumption if it can be assured that all aircraft fuel was largely bio-jet fuel.” In his conclusion, Dr. Epstein proclaimed that the remaining challenges were not in the realm of propulsion engineering but rather belonged to the business community, biological and chemical engineers, ecologists, and lawmakers.

Mr. Glover testified that Boeing’s main goal was to facilitate rapid commercialization of the biofuel industry and capture the opportunities it offered the aviation industry. He voiced Boeing’s shared sentiment with the other witnesses that government played a role in supporting the commercialization and development of aviation biofuels in order to make a successful transition.

Mr. Shannon testified on behalf of Continental that airlines have a strong economic incentive to reduce their fuel consumption and resulting greenhouse gas emissions.

On Tuesday, April 28, 2009, the Honorable Gabrielle Giffords presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the challenges space traffic management and orbital debris posed to civil and commercial space users. The Subcommittee explored potential measures to improve information available to civil and commercial users to avoid in-space collisions as well as

ways to minimize the growth of future space debris. The hearing focused on the following questions and issues: (1) What were the current and projected risks to civil and commercial space users posed by other spacecraft and space debris? (2) What information and services were available to civil and commercial space users in terms of real-time data and predictive analyses? (3) What could be done to minimize the growth of space debris? (4) What was the level of coordination among military, civil, and commercial space users in the sharing of space situational awareness information? (5) Have shortcomings been identified by civil and commercial space users with regards to the availability of situational awareness information they need? (6) How were these shortcomings being addressed? (7) Have civil and commercial space users identified their long-term situational awareness needs? What options were being considered to address them?

There were four witnesses: (1) Lt. Gen. Larry D. James, Commander, 14th Air Force, Air Force Space Command, and Commander, Joint Functional Component Command for Space, U.S. Strategic Command; (2) Mr. Nicholas Johnson, Chief Scientist for Orbital Debris, National Aeronautics and Space Administration; (3) Mr. Richard DalBello, Vice President of Government Relations Intelsat General Corporation; (4) Dr. Scott Pace, Director of the Space Policy Institute, George Washington University.

During the opening testimonies, General James explained what the Joint Functional Component Command (JFCC) for Space was doing in terms of tracking orbital objects. He also stated that the Air Force Space Command “will continue to work closely with the commercial and foreign space communities to understand their evolving needs and desires for space situational awareness...”

Mr. Johnson stated the U.S. needed to limit space debris because the debris remains in low-Earth orbit for long periods of time. He also spoke about NASA’s role in the matter.

Mr. Dalbello talked about what the commercial satellite industry was doing in terms of tracking and the process of inter-company and government cooperation.

Dr. Pace spoke about the need for international and industry cooperation and concerns about the need for improving tracking data accuracy.

On Tuesday, May 19, 2009, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing on the National Aeronautics and Space Administration’s (NASA) Fiscal Year (FY) 2010 Budget Request, NASA’s proposed FY 2009 Operating Plan, and use of funds provided through the Recovery Act.

There was one witness: (1) Mr. Christopher Scolese, Acting Administrator, National Aeronautics and Space Administration.

Mr. Scolese began his testimony by noting the increase in NASA’s budget in the regular appropriation along with allocated funds from the Recovery Act. He commented on the status of currently planned missions related to science, including the James Webb Space Telescope. Mr. Scolese also gave the current plans and budget for NASA’s human space flight operations. He then discussed the independent review of the U.S. human space flight program and NASA’s role in the review.

On Thursday, June 18, 2009, the Honorable Gabrielle Giffords presiding, the Subcommittee on Space and Aeronautics heard from

advisory and other stakeholder bodies on issues relevant to the National Aeronautics and Space Administration (NASA).

There were six witnesses: (1) Mr. John C. Marshall, member of the Aerospace Safety Advisory Panel (ASAP); (2) Dr. Kenneth M. Ford, Chair of the NASA Advisory Council (NAC); (3) Mr. Robert M. Hanisee, Chair of the Audit and Finance Committee of NAC; (4) Dr. Raymond S. Colladay, Chair of the National Academies' Aeronautics and Space Engineering Board (ASEB); (5) Dr. Berrien Moore III, member of the National Academies' Space Studies Board (SSB); (6) Mr. J.P. Stevens, Vice-President for Space Systems at the Aerospace Industries Association (AIA).

Mr. Marshall spoke first, and told the subcommittee that from the perspective of the ASAP, priority in the NASA budget ought to be given to making sure safety was not sacrificed due to reduced funding. In his view, allocating sufficient resources to extend the shuttle program without compromising safety would leave NASA with insufficient resources to fulfill its other directives, and endanger the future of the entire space program. Mr. Marshall also called for a redefinition of NASA's exploration missions, since recent budget cuts made the current exploration program unsustainable. He announced that while ASAP was pleased with NASA's compliance with the recommendations of the Columbia Accident Investigation Board, there were still risks that could not be mitigated without extensive redesign of the shuttle. Mr. Marshall also discussed Commercial Orbital Transportation Services. He then listed a few areas ASAP believed NASA could pay more attention to in fostering a culture of safety.

Dr. Ford focused on three areas critical to the future of America's space program: developing new space transportation architecture, reestablishing a technology R&D program, and, most importantly, securing stable funding linked to a stable purpose. Dr. Ford saw the accelerated development of a heavy-lift launch vehicle as a crucial first step in modernizing space transportation, and ensuring access to the International Space Station (ISS), since commercial transport and the Ares I project would not be available for many years to come.

Mr. Hanisee began his remarks with a discussion of NASA's past managerial and financial tangles. He said that although problems like the anarchic accounting systems of ten autonomous centers have been reined in, the intractable issue of property accounting continued to muddy the fiscal waters. Legacy assets like the Space Shuttle, and the ISS were particularly problematic from an accounting point of view. One possible solution would be to write off the troublesome assets as Research and Development.

Dr. Colladay focused his testimony on technology development. He thought that R&D programs at NASA were driven too much by the needs of the moment. While there have been significant advances from technology developed to fill known program needs, especially in environmentally responsible aviation, a long-term, research-driven technology development program would reinvigorate the agency's capabilities. Moreover, such a program should be organized so as to support not just NASA, but also commercial space programs and other government agencies. However Dr. Colladay also expressed concern that NASA lacked sufficient funds to prop-

erly pursue new technologies, or even to accomplish preexisting program goals.

Dr. Moore spoke of the need to balance NASA's disparate priorities. While he felt that the 2010 budget was a distinct improvement over 2009, Dr. Moore stated that NASA should still try to clamp down on costs, to do more with less, or simply try to do less. He reported that the Earth Science Decadal missions in particular were in dire financial straits. The agency ought to cut back on its programs, and be more careful about selecting programs in the first place, in order to avoid the excessively expensive and focus on the possible. Cutting back on the number of NASA Centers and National Labs would be a good start.

Mr. Stevens expressed concern over the insufficient funding of the Ares V and the Lunar Lander in the current NASA budget, and the imminent loss of jobs associated with those projects. He also urged the Subcommittee to continue funding ISS without taking funds away from other critical programs. Mr. Stevens said that another great disappointment in the FY 2010 budget was the decrease in funding for NASA education initiatives, which he hoped the Subcommittee would correct in future budgets. Mr. Stevens also recommended that commercial space launch indemnification be extended for at least another 5 years, as its elimination would drive even more launch business overseas.

The hearing was adjourned due to votes.

On Thursday, July 16, 2009 the Subcommittee on Space and Aeronautics held a hearing on enhancing the relevance of space activities to address national needs. The hearing (1) examined how recent reports by the National Research Council and The Space Foundation characterized the relevance of space-related activities, particularly their role in improving the health, economic well-being, and the quality of life of all Americans; (2) reviewed what should be done to maintain and enhance that relevance; and (3) analyzed whether enhanced awareness of the contributions from space-related activities would result in inspiring future generations of Americans.

There were four witnesses: (1) General [U.S. Air Force, retired] Lester L. Lyles, Chair of the Committee on the Rationale and Goals of the U.S. Civil Space Program, Aeronautics & Space Engineering Board of the National Research Council; (2) Ms. Patti Grace Smith, Board of Directors of the Space Foundation; (3) Ms. Deborah Adler Myers, General Manager, Science Channel, Discovery Communications; and (4) Mr. Miles O'Brien, Journalist.

General Lyles testified that the US still has the preeminent civil space program. He then mentioned that his team generated six goals, such as to sustain and expand our leadership in science.

Ms. Smith followed and said that space was relevant in every American's life and that the U.S. needed to acquire more civilian and national security space systems. She added that not taking the initiative will require the U.S. to be more reliant on foreign space systems.

Ms. Myers indicated that the space community struggled against the cliché that science was dry and boring. At the Science Channel, Ms. Myers noted that they developed television programming and reached out to their audience on Facebook and Twitter.

Mr. O'Brien testified that the engineers at NASA lack communication skills. He proposed that NASA missions should all have a public relations requirement where the message should be part of the mission, and not an afterthought. Mr. O'Brien also proposed that there needed to be money set aside for such operations.

On Tuesday, September 15, 2009, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to examine the summary report of the Review of U.S. Human Space Flight Plans Committee that was established by NASA under the direction of the Office of Science and Technology Policy, and to consider implications and related issues for NASA.

There were two panels of witnesses: on the first panel was (1) Mr. Norman R. Augustine, Chair of the Review of U.S. Human Space Flight Plans Committee; on the second panel there were (2) Vice-Admiral Joseph W. Dyer USN (Ret.), Chair of the Aerospace Safety Advisory Panel (ASAP) at NASA; and (3) Dr. Michael D. Griffin, Eminent Scholar and Professor of Mechanical and Aerospace Engineering at the University of Alabama in Huntsville.

Mr. Augustine began by emphasizing that his panel was asked to offer opinions and alternatives, not to make recommendations. He announced that while many look to Mars as the ultimate destination of the Human Spaceflight Program, safety concerns made any trip to Mars in the near future improbable. Mr. Augustine included four alternatives to NASA's baseline program in his written testimony. He told the Committee that the imbalance between tasks to be performed and funds available made it impossible to execute the current program of record. Moreover, the panel determined that NASA's budget would need to linearly increase to \$3 billion above the FY 2010 budget guidance by FY 2014 and then increase by an estimated annual inflation rate of 2.4 percent to conduct any viable human space flight and exploration program. Mr. Augustine summed up his remarks by telling the Committee that the great risk involved in human space flight made it irresponsible to cut corners on funding.

The Committee then granted Mr. Augustine's request to be joined by another member of his panel, Dr. Edward F. Crawley, to help answer any questions the Committee might have.

Vice-Admiral Dyer opened the second panel by focusing on safety and safety-related opportunities and issues. While he observed that canceling existing programs and starting over would only lengthen the period of time in which the U.S. would be incapable of transporting humans into space, he reiterated that ASAP did not support extending the Space Shuttle program. Vice-Admiral Dyer added to the previous critiques of commercial solutions to the gap, saying that the Commercial Orbital Transportation Services Project (COTS) was not subject to the same human-ratings standards as NASA itself. He observed that NASA would do well to develop a better process for integrating manned and unmanned systems. Vice-Admiral Dyer also urged the Committee to undertake a broader and more transparent discussion of the great risks inherent in human spaceflight.

In his opening statement, Dr. Griffin focused on the recent history of NASA's budget. He said that the budget cuts of 1994 had obviously not worked out. Dr. Griffin pointed out that while \$3 billion sounds like a lot of money, if NASA funding had been kept at

the same level from 1993 to the present, there would be even more money in the NASA budget than that requested by the Augustine committee. He concluded that in order to follow through on the directives laid out in the 2005 and 2008 NASA Authorization acts, Congress must increase NASA's budget. As President Kennedy said, better not to go to the Moon at all than to go halfway.

On Thursday, October 22, 2009, the Honorable Gabrielle Giffords presiding, the Subcommittee on Space and Aeronautics held a hearing on NASA's efforts to define advanced concepts and develop innovative technologies. The hearing examined (1) the opportunities, challenges, and issues identified in external reviews associated with NASA's analysis of advanced concepts and long-term development of technology; (2) NASA's progress in responding to the provisions in NASA Authorization Acts and recommendations from external reviews associated with technology development; and (3) NASA's efforts to collaborate and coordinate with other federal agencies on technology development issues.

There were three witnesses: (1) Dr. Robert D. Braun, Co-Chair of the National Research Council's Space Engineering Board Committee to Review the NASA Institute for Advanced Concepts; (2) Dr. Raymond S. Colladay, Vice-Chair of the National Research Council's Aeronautics and Space Engineering Board Committee on the Rationale and Goals of the U.S. Civil Space Program; (3) Mr. Christopher Scolese, Associate Administrator of NASA.

Dr. Braun began his testimony by asserting that the original organization of the NASA Institute of Advanced Concepts (NIAC) was effective. However Dr. Braun allowed that modifications to both NIAC and NASA would improve NIAC's effectiveness, especially the reestablishment of aeronautics and space systems technology development enterprise within NASA. In his view, NASA ought to focus its efforts on short-term, mid-range missions and long-term, strategic technology investments. To this end, Dr. Braun recommended that NASA establish a formal program to direct the development of a selected set of technologies.

Dr. Colladay started off by observing that long-term advanced research and development (R&D) did not happen in industry, because the pay-off was too distant, or in academia in the absence of sustained government funding. To revitalize NASA's long-term technology development, Dr. Colladay recommended technology R&D be independent of NASA's other major programs, with an organizational structure modeled along the lines of the Defense Advanced Research Projects Agency (DARPA). This hypothetical technology mission area ought to reach outside NASA, to engage with commercial space companies as well as other government agencies and departments. Moreover, before embarking on this new program, there should be a comprehensive assessment of the current state of the art advanced space technology. Dr. Colladay concluded by asserting the importance of technology relevance and transition.

Mr. Scolese began by reporting that recent National Academy reviews of NASA suggested that NASA ought to shift its emphasis from technologies for flight to the development of game-changing technology. The timeframe for such technology investment should be 10–20 years. An independent management structure would be best suited to the early stages of these projects. Mr. Scolese added that NASA did invest in technological development in a limited

way through its partnership program, as well as through its mission and engineering programs, despite its lack of a long-term development program. He said that NASA has also increased its outreach efforts to outside groups, joining with other government organizations to fund life science research on the International Space Station.

On Thursday, November 19, 2009, the Honorable Gabrielle Giffords presiding, the House Subcommittee on Space and Aeronautics held a hearing on the growth of global space capabilities, and why they matter.

There were five witnesses: (1) Mr. Marty Hauser, Vice President for Research and Analysis at the Washington Operations of the Space Foundation; (2) Mr. J.P. Stevens, Vice President for Space Systems at the Aerospace Industries Association; (3) Dr. Scott Pace, Director of the Space Policy Institute at George Washington University; (4) Dr. Kai-Uwe Schrogl, Director of the European Space Policy Institute; (5) Dr. Ray A. Williamson, Executive Director of the Secure World Foundation.

Mr. Hauser began his testimony by reporting that most space-faring nations now had the same space capabilities as the U.S. He said that more than 60 countries had space agencies, and many of them were increasingly willing to share their expertise with countries not as far along. He added that America was losing its competitive position in launch, manufacturing, and service capabilities. He further noted that while there were commercial opportunities in the expansion of launch capabilities, there was also the threat of competition. Mr. Hauser told the Subcommittee that if America wished to retain its primacy in space, Congress would have to bite the financial bullet, and give NASA the funds it needs to succeed.

Mr. Stevens identified three areas in which the U.S. was losing its leadership in space: satellites, human spaceflight, and launch systems. He was especially concerned that the U.S. commercial space launch industry only had 15% of the global market. Mr. Stevens reminded the Subcommittee that space capabilities, especially launch systems, could easily be translated into military capabilities; in other words, the loss of U.S. superiority in space was a threat to national security as well as to national pride. He agreed with the Chairwoman's emphasis on international cooperation, but added that any such deals should avoid threatening America's industrial base or national security. For Mr. Stevens, the International Space Station (ISS) was an example of a successful cooperation, and therefore should be extended through 2020.

Dr. Pace used his opening statement to remind the Subcommittee that the geosynchronous arc gets more crowded every year. He laid out the Chinese government's plans for the next decade, which culminated with a three-man space station in 2020. Dr. Pace said that if the U.S. did not make plans beyond the ISS, America would essentially be bowing out of the human spaceflight business. He explained that space tourism and commercial spaceflight, though valuable, could hardly sustain a major international cooperative human spaceflight effort. Dr. Pace believed that the NASA Authorization Acts of 2005 and 2008 still offered the clearest and most practical way forward for the U.S. space program.

Dr. Schrogl provided European perspectives on the expansion of space-faring capabilities around the world, and the implications of that expansion on trans-Atlantic relations. In his view, space-based security concerns were a promising area of trans-Atlantic cooperation. A similar cooperation was highly necessary in the regulation of space as a strategic economic area. Dr. Schrogl also hoped that future years would see more trans-Atlantic cooperation on the less-urgent but equally vital area of space exploration.

Dr. Williamson shared the Secure World Foundation's insights on the growth of world space capabilities, and why those changes were vital to U.S. interests. Like previous panelists, he noted the scientific and commercial opportunities created by the nascent space programs of other nations. Dr. Williamson added that an increasing amount of space debris made the lack of any effective governance of the global commons of outer space a more acute problem every day. In his view, the U.S. could best ensure its own orbital security by engaging with emerging space states regarding adherence to international best practices. Dr. Williamson said that assisting new space states was also an opportunity for the U.S. to flex its soft power, to use its technological and economic capabilities to influence foreign policymakers. He also added that working with states to build space capacity would create a larger market for U.S. goods as well as a long-term sustainable security climate in space based on cooperation rather than competition and that ITAR reform would go a long way in this regard as well.

On December 2, 2009, the Honorable Gabrielle Giffords presiding, the Subcommittee on Space and Aeronautics held a hearing focused on issues related to ensuring the safety of future human space flight in government and non-government space transportation systems. The hearing examined (1) the steps needed to establish confidence in a space transportation system's ability to transport U.S. and partner astronauts to low Earth orbit and return them to Earth in a safe manner, (2) the issues associated with implementing safety standards and establishing processes for certifying that a space transportation vehicle is safe for human transport, and (3) the roles that training and experience play in enhancing the safety of human space missions.

There were six witnesses: (1) Mr. Bryan D. O'Connor, Chief of Safety and Mission Assurance at the National Aeronautics and Space Administration (NASA); (2) Mr. Jeff Hanley, Program Manager of the Constellation Program at NASA; (3) Mr. John C. Marshall, member of the Aerospace Safety Advisory Panel (ASAP); (4) Mr. Bretton Alexander, President of the Commercial Spaceflight Federation; (5) Dr. Joseph R. Fragola, Vice President of Valador, Inc; and (6) Lt. Gen. Thomas P. Stafford, USAF (ret.).

Mr. O'Connor began by explaining the mission of the Office of Safety and Mission Assurance. He said that many of the programs planned by his office were being implemented at the new NASA Safety Center in Cleveland. In his view, working with NASA's Russian counter-parts on Apollo-Soyuz, Shuttle-Mir and the International Space Station (ISS) had been an invaluable learning experience on different safety procedures. Mr. O'Connor added that his office was also investing 2009 Recovery Act funds in supplementing activities related to technologies that enable commercial human spaceflight capabilities.

Mr. Hanley focused on outlining how the Constellation Program had sought to improve crew safety above and beyond the features of previous crewed aircraft. He said that the design goal of the program was a 10-fold increase in astronaut safety relative to the shuttle missions. He also reported that NASA was developing a new integrated test and verification plan as part of its design review process.

Mr. Marshall criticized the Augustine Report for its oversimplified approach to safety issues. Mr. Marshall believed that because commercial providers had no reason to develop strong safety guidelines on their own, NASA had to lay down and police a set of guidelines on their behalf. He insisted that safety was the greatest weakness of the COTS program, and NASA would have to oversee construction carefully to ensure that companies did not take on undue risks in an effort to cut costs or speed up production.

Mr. Alexander spoke for the 20 member organizations of the Commercial Spaceflight Federation. He regarded commercial crew transport as complementary, not competitive, with NASA's mission. Mr. Alexander claimed that since low-Earth orbit was an easier and more focused destination than those intended for the Orion Crew Exploration Vehicle, the commercial program would be more cost-effective. He agreed with previous speakers that safety was the paramount concern of all those involved in spaceflight programs, commercial or otherwise. He suggested that the FAA should retain its licensing authority over aircraft, while NASA would have oversight in its capacity as customer.

Dr. Fragola described his four laws for a safe space launcher design. To begin with, the design must be as inherently safe as possible. Secondly, the crew should be put at the top of the rocket, as far away from the source of failure as possible. There must also be a credible abort trigger set, and finally, the design should include a tested abort system that allows for a safe crew escape and recovery. Dr. Fragola said that under these criteria, the Ares I was the safest vehicle around, 2 to 3 times safer than the alternatives. This was because of its reliability and its benign abort conditions.

General Stafford stated that while he strongly agreed with the majority of the findings of the Augustine Report, there were a few he objected to. His disagreements with the report began with its recommendation that the responsibility for transportation of crew and cargo to the ISS be given to commercial contractors exclusively. First of all, commercial cargo transport would require the construction of costly, time-consuming autonomous transfer vehicles. Secondly, safe delivery of a crew to the ISS required the successful combination of a human-rated launch vehicle, the spacecraft itself, and the launch abort system. The Augustine Report lacked an in-depth analysis of these vital safety issues. General Stafford did not see what entity other than NASA could credibly establish and verify appropriate standards for human spaceflight.

On Thursday, December 3, 2009 the Subcommittee on Investigations and Oversight, together with the Subcommittee on Space and Aeronautics, held a hearing on the independent audit of the National Aeronautics and Space Administration (NASA). The Hon. Brad Miller, Chairman of the Subcommittee on Investigations and Oversight, presided. Each year, federal agencies are required to obtain an audit of their consolidated financial statements from inde-

pendent auditing firms. NASA received the report of Ernst & Young evaluating the Fiscal Year 2009 (FY09) financial statements on November 13, 2009. Ernst & Young determined that “the scope of our work was not sufficient to enable us to express, and we do not express, an opinion on the consolidated balance sheets . . .” This constituted a “disclaimed opinion”—one in which the auditing firm finds a material weakness in the accounting processes of the agency so severe that they cannot reliably verify the agency’s financial accounts. The Subcommittees met to determine what NASA needed to do to continue improving its financial control and accounting system.

There were three witnesses: (1) Hon. Paul Martin, Inspector General of NASA, accompanied by the Deputy Inspector General, the Hon. Tom Howard; (2) Mr. Dan Murrin, Partner in Assurance and Advisory Business Services at Ernst & Young LLP; (3) Hon. Elizabeth Robinson, Chief Financial Officer of NASA.

In his opening statement, Mr. Martin recalled that for most of the past decade, improving financial management was at the top of the Office of the Inspector General’s (OIG’s) list of performance challenges. He told the Subcommittees that the 2009 audit identified three significant deficiencies in internal controls. To begin with, NASA’s inability to ensure that the value of legacy property, plants and equipment was fairly stated in financial disclosures was a serious material weakness. The other two deficiencies involved NASA’s process for estimating its environmental liabilities and its compliance with the Federal Financial Management Improvement Act of 1996. Mr. Martin concluded that NASA’s Office of the Chief Financial Officer was currently acting on suggestions from Ernst & Young and the OIG to improve its monitoring and remediation efforts, and should be able to improve on its financial management process and systems during FY 2010.

Mr. Murrin shared the results of the FY 2009 audit conducted by his firm, the sixth such audit for which he was the engagement partner. Together with the audit report, Ernst & Young issued a Report on Internal Controls listing specific weaknesses in NASA’s internal controls and a third report on compliance with the Federal Financial Management Improvement Act. Mr. Murrin reported that the main reason the auditors chose to disclaim was related to assets capitalized in previous years which were not susceptible to audit. In their second report, the auditors made two recommendations: first, that NASA should continue to implement the new standards, especially those regarding legacy assets; and secondly, that NASA should develop an overarching, key control activity. Mr. Murrin also acknowledged the significant progress made since Ernst & Young’s first audit of NASA in 2004.

Ms. Robinson focused her remarks on three points. The first was the progress NASA had made. Ms. Robinson testified that it was the 2003 consolidation of the financial systems of its ten centers and headquarters that led to the first of the now seven disclaimed opinions. Since then, NASA had eliminated all but one material weakness, and Ms. Robinson assured the Subcommittees that NASA was now able to track and control its funds, account for the cost related to individual programs and projects, and manage the agency’s day-to-day operations. Her second point touched on explaining the material weakness. Ms. Robinson said that NASA’s

processes and contracts were designed to comply with annual expense accounting requirements, and thus struggled to fulfill the new requirement for asset depreciation accounting. The agency began implementing significant reforms in 2002, but it could not recreate records that did not exist before that date. She added that the scheduled retirement of the shuttle and space station would make the net asset balances plummet to levels immaterial for financial purposes. Ms. Robinson's third point was that the new standard published by the Financial Accounting Standards Advisory Board (FASAB) on October 14th provided a clear way forward for NASA.

On Thursday, December 10, 2009, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing on the future direction and funding for NASA, and what that future held for the U.S. aerospace workforce and industrial base.

There were four witnesses: (1) Mr. David Thompson, President of the American Institute of Aeronautics and Astronautics (AIAA); (2) Ms. Marion C. Blakey, President and CEO of the Aerospace Industries Association (AIA); (3) Mr. A. Thomas Young, retired Executive Vice-President of the Lockheed Martin Corporation; and (4) Dr. Richard Aubrecht, Vice-Chairman and Vice-President of Strategy and Technology at Moog Inc.

Mr. Thompson spoke on behalf of the AIAA, representing more than 36,000 aerospace scientists and engineers. He explained that there were insufficient new aerospace engineers and scientists to take the places of the increasing number of retirees. He claimed that the aerospace sector would therefore experience a dramatic decline in its technical workforce over the next decade. Mr. Thompson also pointed out that although U.S. human spaceflight programs employed less than 20% of the country's aerospace workers, they had an enormous influence on motivating young people to enter the field of aerospace science and engineering in the first place. He concluded from this that cuts to U.S. human spaceflight programs would stress an already weak sector of the economy. Cutbacks to human spaceflight programs could also weaken the industrial base of the entire space and national security sector.

Ms. Blakey began by saying that aerospace talent and facilities lost to other industries would be irretrievable. Without the inspirational power of NASA programs, it would become even more difficult to attract students to the study of STEM fields. A commitment to a robust human spaceflight program could have an enormous influence in attracting and retaining new workers. Ms. Blakey added that the constantly fluctuating budgets that have been a staple of the last decade adversely affected the production and maintenance of a skilled workforce. Moreover, such interruptions or cancellations were catastrophic to small firms, whose expertise would then be lost forever.

Mr. Young remarked that without significant experience and continuity of participation, intellectual capability was not enough by itself to maintain a successful spaceflight program. He thought that the attempt to move faster and go cheaper was punching holes in the safety net necessary to prevent human errors from warping into catastrophes. Mr. Young insisted that the kind of uncompromising discipline necessary for safe spaceflight required a permanent investment.

Dr. Aubrecht, an engineer for the precision motion control company Moog, spoke of his company's work on fly-by-wire flight control technology. He told the Committee that NASA programs gave Moog the opportunity to develop the core technologies and core knowledge that it eventually transferred to commercial applications. Dr. Aubrecht explained it was common for NASA contracts that accounted for only a small percentage of a company's sales to form a majority of its research and development. He concluded that consistent funding of the Constellation program was necessary to carry on this system.

On February 3, 2010, the Honorable Gabrielle Giffords presiding, the Subcommittee on Space and Aeronautics held a hearing on the key issues and challenges facing the National Aeronautics and Space Administration (NASA) as seen by the agency's "watchdogs"—the NASA Inspector General, the Government Accountability Office (GAO), and the Aerospace Safety Advisory Panel (ASAP). Leveraging the unique perspectives these organizations developed in the course of their work at NASA in the areas of management, mission execution, and security and safety oversight, the hearing examined (1) the critical issues and challenges facing NASA that warrant congressional attention and (2) the corresponding commitment, initiatives, and policies needed by NASA to successfully address these issues and challenges. Separate hearings would address NASA's Fiscal Year 2011 budget request as well as the administration's human space flight strategy after they are announced.

There were three witnesses: (1) Hon. Paul K. Martin, Inspector General, NASA; (2) Ms. Cristina T. Chaplain, Director, Acquisition and Sourcing Management, GAO; (3) Vice-Admiral Joseph W. Dyer [U.S. Navy, Ret.], Chair, ASAP.

Mr. Martin identified five critical challenges facing NASA: (1) transitioning from the Space Shuttle to a new generation of space vehicles; (2) enhancing risk management techniques; (3) improving the agency's financial management; (4) addressing systemic weaknesses in acquisition and contracting processes; and (5) ensuring the security and integrity of NASA's information technology (IT) systems.

Ms. Chaplain concurred with Mr. Martin on the issues facing NASA, listing as NASA's main challenges retiring the Space Shuttle, completing and operating the International Space Station (ISS), acquiring complex systems for research, improving financial management and protecting IT systems. She added that however broad the changes proposed in the President's new budget, they did not alter these basic concerns. However, Ms. Chaplain also noted that previous commercial approaches did not succeed because they lacked sound government insight and oversight.

Vice-Admiral Dyer quoted the conclusion of his panel's 2009 report, emphasizing that the Ares I was designed with an emphasis on safety, and any new approach would have to guarantee an equal or greater safety level. He called on NASA to create clear Human Rating Requirements (HRR) for potential commercial contractors. Vice-Admiral Dyer added that managing the transition of the shuttle workforce would now be doubly important.

On Thursday, February 25, 2010 at 10:00 am, the Committee on Science and Technology held a hearing on the National Aeronautics

and Space Administration's (NASA) Fiscal Year (FY) 2011 Budget Request and Issues.

There was one witness: Charles F. Bolden, Administrator of the National Aeronautics and Space Administration (NASA).

Mr. Bolden began his testimony by explaining that NASA's future exploration effort would focus not just on our Moon, but also on near-Earth asteroids, Lagrange points, Mars and its moons—with Mars as the ultimate destination. By investing in the right technology, NASA would be able to map out a more realistic path to that final goal. Mr. Bolden said that the budget's renewed focus on R&D would produce new opportunities for U.S. industry and spur the creation of new businesses. He highlighted the sustainability and affordability of the new approach. Mr. Bolden said that the lessons NASA had learned in the course of the Constellation program would inform the Agency's future flagship technology development and demonstration program. He further noted the presence of investments in heavy-lift R&D, climate change observations, aeronautics and education initiatives.

On March 24, 2010 the Subcommittee on Space and Aeronautics held a hearing on the administration's proposed changes to the National Aeronautics and Space Administration's (NASA) exploration program.

There were two witnesses: (1) Mr. Douglas Cooke, Associate Administrator for the Explorations Systems Mission Directorate at NASA; and (2) Mr. A. Thomas Young, Lockheed Martin (Ret.).

Mr. Cooke began by confirming that the ultimate destination in human spaceflight remained Mars. He said that to further this goal, the FY 2011 budget would fund three new programs aimed at expanding the capabilities of America's human spaceflight program. While commending those who worked so diligently on the Constellation program, Mr. Cooke affirmed the need for commercial groups to take over transit to and from LEO, leaving NASA free to go beyond.

In oral testimony, Mr. Young strongly condemned the proposed cancellation of the Constellation program. He said that neither Soyuz nor industry provided a long term solution to the problem of American access to LEO. While commercial industry should be encouraged, it was still a long way from being able to satisfy human space transportation needs. Therefore, the U.S. ought to commit instead to developing a heavy-lift capability along the lines of the Ares I. Mr. Young added that what NASA needed was a Plan A, such as could not be found in the budget proposal. If enacted, the proposed budget would lead to an irreversible deterioration of America's aerospace workforce.

On May 5, 2010, the Honorable Gabrielle Giffords presiding, the Subcommittee on Space and Aeronautics held a hearing on the research needed to improve our understanding of the impact of volcanic ash clouds on aircraft and aircraft operations and what could be done to mitigate that impact. Last year, when the Mount Redoubt volcano erupted southwest of Anchorage, one of the operating airlines grounded its fleet, diverted flights and wrapped the engines of its parked planes in plastic sealant. More recently, the eruption of Iceland's Eyjafjallajökull volcano paralyzed air travel in Europe for six days, inconveniencing hundreds of thousands of pas-

sengers around the world and causing airline revenue losses of at least \$1.7 billion.

There were five witnesses: (1) Dr. Tony Strazisar, Senior Technical Advisor for NASA's Aeronautics Research Mission Directorate [Substituting for Associate Administrator Jaiwon Shin]; (2) Dr. Jack A. Kaye, Earth Science Division at NASA; (3) Ms. Victoria Cox, Senior VP for NextGen and Operations Planning at the FAA's Air Traffic Organization; (4) Captain Linda M. Orlady, Executive Air Safety Vice Chair of the Air Line Pilots Association, International; and (5) Mr. Roger Dinius, Flight Safety Director at GE Aviation.

Dr. Strazisar testified regarding NASA's past experience with the impact of volcanic ash on aircraft. He said that volcanic ash ingestion is rare because the established practice is to avoid flight in the vicinity of volcanic debris. Dr. Strazisar shared with the committee the experience of a NASA DC-8 research plane that in February of 2000 flew through the edge of an ash cloud produced by Iceland's Heckla volcano. Even though that encounter only lasted seven minutes, disassembling the engines revealed significant damage invisible to the naked eye. Improving forecasts and operational procedures could go a long way towards providing a solution for air traffic management.

Dr. Kaye said that NASA's Earth Science program, through its 13 earth-observing missions, fed critical information on volcanic debris to NOAA and other agencies. The new satellites the Earth Science division would be launching over the next year would further augment this data stream. Since volcanic eruptions are the only sources of sulfur dioxide large enough to be detected by satellite, NASA and NOAA could then provide accurate, near real-time information on the location of sulfur dioxide emissions, which can be particularly useful in the first few days after an eruption.

Ms. Cox reiterated that accidents and incidents caused by encounters with volcanic ash are quite rare. She said the FAA treats volcanic ash much like a major weather event. According to Ms. Cox, the relatively constrained airspace over Europe limited the options available to the European Union (EU) in its response to the Eyjafjallajökull eruption. Since NextGen focuses on quality and delivery of information, it would aid operators and flight traffic controllers in getting the necessary data.

Capt. Orlady observed that in addition to engine and windshield damage, volcanic gases also pose a serious threat to the health of crew and passengers alike. She said that a lack of standardization of available forecasts complicated European handling of the recent air travel disruption. She added that her organization, ALPA, advocated complete avoidance of volcanic ash until a deeper understanding of engine tolerance was achieved. Better detection mechanisms, more vigorous certification processes, and new procedural training exercises will also help.

Mr. Dinius said that ash clouds had three significant effects on airplane engines: (1) corrosion of compressor blades; (2) plugging of cooling holes; and (3) accumulation on hot parts. He added that GE recommended avoiding flight into visible ash, but further research into ash clouds and their impact on commercial engines could reduce the risk of flying through one.

On May 26, 2010, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing on the proposed National Aeronautics and Space Administration (NASA) Human Spaceflight Plan. The purpose of the hearing was to continue the examination of the proposed NASA human spaceflight plan and to review issues related to the budget, cost, schedule and potential impacts of the plan.

The hearing examined: (1) the Administration's proposed goals, strategies and plans for NASA's human spaceflight and exploration programs, including the revisions announced by the president on April 15, 2010; (2) the assumptions, basis, feasibility and sustainability of those plans within the FY 2011 budget plan and outyear funding plan; (3) the key challenges and risks involved in implementing the proposed change of course for NASA; and (4) what outstanding questions and issues needed to be addressed, and what information was needed for Congress' consideration of the proposed future direction for NASA's human spaceflight and exploration programs.

There were four witnesses: (1) Mr. Charles Bolden, Administrator of NASA; (2) Mr. Neil Armstrong, Commander of Apollo 11; (3) Capt. Eugene Cernan, Commander of Apollo 17; and (4) Mr. Thomas Young, Lockheed Martin.

Administrator Bolden testified that the new budget set the agency on a sustainable path, progressing step by step from a mission to an asteroid by 2025 to a mission to Mars orbit by the 2030s. He said that NASA would build on its work on the Orion to develop a Crew Rescue Vehicle which could in the future be leveraged into spacecraft for deep-space missions. Meanwhile in the present, the construction of a rescue vehicle would preserve critical high-tech-industry jobs.

Chairman Gordon then called in the second panel. In his testimony, Mr. Armstrong enumerated the reasons to return to the Moon. He said that the lunar vicinity was an exceptional location to learn about traveling to more distant and more difficult destinations. He also cited the many scientific challenges to address regarding Helium-3, platinum group metals and how to survive on the lunar surface. Mr. Armstrong added that his priorities for the human space program were maintaining American leadership, access to low-Earth orbit and capability to explore.

Captain Cernan referred to a letter he wrote along with Mr. Armstrong and Mr. Lovell in which they expressed their concerns regarding the new plan. He said it would take the private sector as long as ten years to access low-Earth orbit safely and cost-effectively. Relying solely on the commercial sector could thus lead to abandoning American involvement in the ISS entirely. Constellation, on the other hand, had already been debated and vetted by Congress and federal agencies from OMB to DoD. He said that exploration was necessary to drive technology innovation, not the reverse.

Mr. Young concluded that NASA's success stemmed from its meld of institutional continuity and expertise with industry capability. He thought that the Administration's proposal abandoned this model, leaving NASA with a purely advisory role. If implemented, this would be similar to the failed acquisition reform the Air Force undertook in the 1990s. Mr. Young also said that the pro-

posed FY 2011 budget could not support both an adequate ISS program and exploration beyond low-Earth orbit.

V. COMMITTEE ACTIONS

On July 20, 2010, H.R. 5781, a bill to reauthorize the National Aeronautics and Space Administration for fiscal years 2011 through 2015, was introduced by Chairman Gordon and referred to the Committee on Science and Technology. On July 22, 2010, the Full Committee met to consider H.R. 5781 and ordered the bill reported, as amended, by a voice vote.

VI. SUMMARY OF MAJOR PROVISIONS OF THE BILL

Authorizes funding for the National Aeronautics and Space Administration for fiscal years 2011, 2012, and 2013. Funding for fiscal year 2011 is \$19.0 billion. Funding for fiscal year 2012 is \$19.45 billion. Funding for fiscal year 2013 is \$19.96 billion. Provides for a balanced set of programs in human space flight and exploration, aeronautics research and development, and scientific research, including Earth observations and research. Provides a contingent authorization for an additional Space Shuttle mission if the NASA Administrator certifies it is needed and that all required safety reviews have been completed. Extends the operation and utilization of the International Space Station (ISS) through at least 2020 and includes provisions to enhance research utilization of the ISS, including establishment of an independent ISS research management institution and reinvigoration of NASA's life and physical sciences microgravity research and technology program. Establishes a Space Technology program to pursue innovative technology research and development. Restructures NASA's exploration program to provide for the development of low-Earth orbit crew transportation system for assured access to the ISS, as well as initiation of a heavy lift launch vehicle program to enable crewed missions beyond low-Earth orbit. Contains provisions related to institutional capabilities, education, commercial crew services, acquisition management, space weather, suborbital research, preservation and management of lunar sites, post-Shuttle workforce transition, and Shuttle orbiter disposition. Also establishes a number of reporting and study requirements.

VII. SECTION-BY-SECTION ANALYSIS

Sec. 1. Short title

The "National Aeronautics and Space Administration Authorization Act of 2010".

Sec. 2. Findings

Congress finds that the agency is and should remain a multimission agency, and 16 other findings.

Sec. 3. Definitions

The terms "Administrator", "ISS", "NASA", "NOAA", and "OSTP" are defined.

TITLE I. AUTHORIZATION OF APPROPRIATIONS

Sec. 101. Fiscal Year 2011

Authorizes NASA at \$19,000,000,000 for FY 2011. That amount is the same as that in the President's FY 2011 request.

The authorization includes the following breakdown:

Science: \$5,015,700,000, of which
 \$1,801,800,000 is for Earth Science
 \$1,485,700,000 is for Planetary Science
 \$1,076,300,000 is for Astrophysics
 \$646,900,000 is for Heliophysics of which
 \$5,000,000 is for the Explorers program augmentation,
 and
 \$5,000,000 is for Suborbital Augmentation
 Aeronautics: \$579,600,000
 Space Technology: \$572,200,000
 Exploration: \$4,535,300,000 of which
 \$215,000,000 is for Human Research
 \$14,000,000 is for the commercial cargo COTS demonstration program
 \$50,000,000 is for commercial crew transportation-related activities
 \$4,156,300,000 is for the restructured exploration program
 \$100,000,000 is for the loan and loan guarantee program established in Sec. 243
 Space Operations: \$4,594,300,000, of which
 \$989,100,000 is for the Space Shuttle program
 \$2,804,800,000 is for the International Space Station of which
 \$75,000,000 is for fundamental space life science and physical sciences and related technology research
 \$60,000,000 is for the Post-Shuttle Workforce Transition Initiative
 \$740,400,000 is for Space and Flight Support of which
 \$50,000,000 is for the 21st Century Space Launch Complex Initiative Education, \$145,800,000
 Cross-Agency Support Programs: \$3,111,400,000
 Construction and Environmental Compliance and Restoration: \$407,300,000 of which \$10,000,000 is for the laboratory revitalization augmentation
 Inspector General: \$38,400,000

Sec. 102. Fiscal Year 2012

Authorizes NASA at \$19,450,000,000 for FY 2012. That is the same amount as is projected for FY 2012 in the President's FY 2011 budget request. The authorization includes the following breakdown:

Science: \$5,278,600,000 of which
 \$1,944,500,000 is for Earth Science
 \$1,547,200,000 is for Planetary Science
 \$1,109,300,000 is for Astrophysics,
 \$672,600,000 is for Heliophysics of which
 \$25,000,000 is for the Explorer program augmentation
 \$5,000,000 is for the Suborbital Augmentation

Aeronautics: \$598,700,000 of which
 \$78,900,000 is for the aviation safety program
 \$80,400,000 is for the aeronautics test program
 \$83,900,000 is the airspace systems program
 \$233,500,000 is for fundamental aeronautics research,
 and
 \$122,000,000 is for integrated systems research
 Space Technology: \$1,012,200,000
 Exploration: \$4,881,800,000 of which
 \$215,000,000 is for Human Research
 \$50,000,000 is for commercial crew transportation-re-
 lated activities
 \$4,516,800,000 is for the restructured exploration pro-
 gram
 \$100,000,000 is for the loan and loan guarantee program
 established in Sec. 243
 Space Operations: \$3,930,300,000, of which
 \$86,100,000 is for the Space Shuttle program
 \$3,033,600,000 is for the International Space Station of
 which
 \$100,000,000 is for fundamental space life science and
 physical sciences and related technology research
 \$40,000,000 is for the Post-Shuttle Workforce Transition
 Initiative
 \$770,600,000 is for Space and Flight Support of which
 \$50,000,000 is for the 21st Century Space Launch Com-
 plex Initiative
 Education: \$145,800,000
 Cross-Agency Support Programs: \$3,189,600,000
 Construction and Environmental Compliance and Restora-
 tion: \$373,800,000 of which \$10,000,000 is for the laboratory
 revitalization augmentation
 Inspector General: \$39,200,000

Sec. 103. Fiscal Year 2013

Authorizes NASA at \$19,960,000,000 for FY 2013. That is the
 same amount as is projected for FY 2013 in the President's FY
 2011 budget request. The authorization includes the following
 breakdown:

Science: \$5,569,500,000, of which
 \$2,089,500,000 is for Earth Science
 \$1,591,200,000 is for Planetary Science
 \$1,149,100,000 is for Astrophysics
 \$734,700,000 is for Heliophysics of which
 \$55,000,000 is for the Explorer program augmentation,
 and
 \$5,000,000 is for Suborbital Augmentation
 Aeronautics: \$609,400,000 of which
 \$81,200,000 is for the aviation safety program
 \$79,600,000 is for the aeronautics test program
 \$87,300,000 is for the airspace systems program
 \$239,000,000 is for fundamental aeronautics, and
 \$122,300,000 is for integrated systems research
 Space Technology: \$1,059,700,000
 Exploration: \$4,888,500,000 of which

\$215,000,000 is for Human Research
 \$5,000,000 is for the Exploration Technology and Demonstration program
 \$5,000,000 is for the Exploration Precursor Robotic Missions program
 \$50,000,000 is for commercial crew transportation-related activities
 \$4,513,500,000 is for the restructured exploration program
 \$100,000,000 is for the loan and loan guarantee program established in Sec. 243
 Space Operations: \$3,993,300,000, of which
 \$3,179,400,000 is for the International Space Station of which
 \$100,000,000 is for fundamental space life science and physical sciences and related technology research
 \$40,000,000 is for the Post-Shuttle Workforce Transition Initiative
 \$773,900,000 is for Space and Flight Support of which
 \$50,000,000 is for the 21st Century Space Launch Complex Initiative
 Education: \$145,800,000
 Cross-Agency Support Programs: \$3,276,800,000
 Construction and Environmental Compliance and Restoration: \$376,900,000 of which \$10,000,000 is for the laboratory revitalization initiative
 Inspector General: \$40,100,000

TITLE II. HUMAN SPACE FLIGHT

SUBTITLE A. EXPLORATION

Sec. 201. Reaffirmation of Exploration Policy

Reaffirms the support of the Congress for the exploration policy articulated in Secs. 401 and 402 of Public Law 110–422.

Sec. 202. Restructured Exploration Program

Directs the Administrator to develop a plan to restructure the current exploration program and develop, test, and demonstrate a government-owned crew transportation system and evolvable heavy lift transportation system in a manner that enables a challenging exploration program, minimizes the human space flight “gap”, seeks efficiencies in program management and reductions in fixed and operating costs, requires a high level of crew safety, contains a robust flight and ground test program, facilitates the transition of shuttle personnel, invests in improvements in infrastructure and launch operations at Kennedy Space Center, makes maximum practicable use of the work completed to date on the Orion crew capsule and associated pad abort flight data; Ares I and Ares I–X flight data; heavy lift studies, analysis and design; ground support and exploration enabling projects, including space suit development and related life support technology among other projects; and all existing contracts, and is phased in a manner consistent with available and anticipated resources.

Sec. 203. Space radiation

Directs the Administrator to develop a space radiation mitigation and management strategy and implementation plan, and to transmit the strategy and plan no later than 12 months after the date of enactment of the Act. Directs the Administrator to carry out a report on the usefulness of radiation research on non-human primates.

SUBTITLE B. INTERNATIONAL SPACE STATION

Sec. 211. Extension of ISS operations

Directs the Administrator to take all necessary measures to support the operation and full utilization of the International Space Station (ISS) through at least the year 2020, to seek to reduce ISS operating costs and to conduct an assessment of essential components required for future utilization of the ISS.

Sec. 212. ISS Research Management Institution

Directs the Administrator to designate an independent, not-for-profit U.S. institution for the management of research carried out on the ISS.

Sec. 213. ISS Research Management Plan

Directs the Administrator to have the designated institution prepare a management plan and transmit the plan no later than 2 years after the date of enactment of the Act.

Sec. 214. Outreach plan for U.S. ISS research

Directs the Administrator to have the institution prepare a plan for broadening and enhancing the outreach to potential U.S. government, academic, and commercial users of the ISS no later than 2 years after the date of enactment of the Act.

Sec. 215. ISS cargo resupply requirements and contingency capacity through 2020

Directs the Administrator to conduct an assessment of the ISS Cargo Resupply capacity required to support extended operations of the ISS through 2020 and explore options with its partners for ensuring upmass and downmass needs are addressed in the event that adequate U.S. commercial cargo resupply capabilities are not available during any extended period after the Shuttle is retired and to certify that no United States or commercial capability can offer upmass or downmass services before relying on ISS partners for upmass or downmass services.

Sec. 216. Centrifuge

Directs the Administrator to assess innovative options, including international collaborations, for deploying a variable-gravity centrifuge and to transmit the assessment no later than one year after the date of enactment of the Act.

Sec. 217. Exploration technology development using the ISS

Directs the Administrator to develop a plan for carrying out prioritized activities that support NASA's long-term plans for exploration beyond low-Earth orbit that require the capabilities of the

International Space Station and to transmit the plan no later than 270 days after the date of enactment of this Act.

Sec. 218. Fundamental space life science and physical sciences and related technology research

Requires the Administrator to designate a responsible official and to develop a strategic plan for carrying out fundamental, i.e., basic and applied research in space life and physical sciences and technology consistent with the priorities and recommendations established by the National Academies in its decadal survey of life and microgravity sciences and to transmit the plan within one year of the enactment of the Act.

SUBTITLE C. SPACE SHUTTLE

Sec. 221. Contingent authorization of additional Space Shuttle mission

Authorizes the Administrator to conduct one additional Space Shuttle mission to the ISS if it is determined to be necessary to reduce risk for ISS operations and utilization, and if certain safety conditions are met and to offset the additional cost by taking funds from the ISS and Exploration accounts.

Sec. 222. Expanded scope of Space Shuttle Transition Liaison Office

Renames Space Shuttle Transition Liaison Office to Post-Shuttle Transition Liaison Office and extends life to 2 years after the last grant is awarded.

Sec. 223. Post-shuttle workforce transition initiative grant program

Authorizes the Administrator to make grants for the establishment, operation, coordination, and implementation of aerospace workforce and community transition strategies.

Sec. 224. Disposition of orbiter vehicles

Provides for the disposition of the remaining Space Shuttle orbiter vehicles upon the termination of the Space Shuttle program through a competitive procedure that takes into account geographical diversity and provides for priority consideration being given to eligible applicants to display the orbiters at locations with the best potential value to the public, including where the location can advance STEM disciplines.

SUBTITLE D. SPACE AND FLIGHT SUPPORT

Sec. 231. 21st Century Space Launch Complex Initiative

Directs that the Administrator, in carrying out the 21st Century Space Launch Initiative, give priority to activities supporting the restructured exploration program. Also calls out specific activities that can be undertaken as part of the Initiative.

SUBTITLE E. COMMERCIAL CREW TRANSPORTATION

Sec. 241. Affirmation of policy

Reaffirms the policy of making use of United States commercially provided International Space Station crew transport and crew rescue services; limiting the use of the government system to non-ISS

missions once commercial crew transport and crew rescue services meeting safety requirements become operational; and facilitating the transfer of NASA-developed technologies to United States commercial orbital human space transportation companies.

Sec. 242. Commercial crew and related commercial space initiatives

Directs NASA to seek opportunities to make use of commercially available crew transportation services provided that service providers meet applicable NASA safety requirements, have completed crewed flight demonstrations, and per-seat cost is not greater than the crew transportation system of the restructured exploration program.

Directs the Administrator to establish requirements for the human-rating of space transportation systems that are equivalent to NASA safety processes and procedures and requires the Administrator to make available NASA-developed technologies and NASA facilities and equipment to assist in the testing and demonstration of commercial crew transportation systems.

Requires that any company seeking to provide commercial crew transport services to NASA enter into an arrangement with NASA that allows NASA to obtain ongoing insight into the design methodologies, processes, technologies, and other information employed in the development and production of a commercial crew transportation system.

Requires the Administrator, before entering into any contracts for the use of commercially available commercial crew transport or crew rescue services, to certify that each commercial provider has demonstrated the safety and reliability of its systems.

Prohibits the Administrator from proceeding with a procurement award for a commercial crew transport and rescue services until sufficient flight experience has been demonstrated and accrued; directs the Administrator to develop and communicate NASA's human-rating requirements to commercial space companies; and directs the Aerospace Safety Advisory Panel to conduct a review.

Prohibits the Administrator from entering into any agreement for a U.S. commercial ISS crew transport or rescue service until all indemnification and liability issues associated with the use of such systems by the U.S. government have been addressed and the Administrator has provided a report describing the indemnification and liability provisions.

Directs the Administrator not to proceed with a procurement award for a commercial ISS crew transport system service if the provider's crew transportation system has a predicted level of safety that is less than that predicted for the restructured exploration program's crew transportation system.

Sec. 243. Federal assistance for the development of commercial orbital human space transportation services

Directs the Administrator to establish a program to provide financial assistance in the form of loans or loan guarantees to commercial entities for the costs of development of orbital human space transportation systems.

SUBTITLE F. GENERAL PROVISIONS

Sec. 251. Use of program funds

Directs that all funding for programs authorized under Title II, authorized funds may be obligated only for performance of the programs.

TITLE III. SCIENCE

SUBTITLE A. EARTH SCIENCE

Sec. 301. Earth science applications

Directs the Administrator to develop a process for entering into arrangements with other government agencies that seek to benefit from ongoing NASA capabilities related to Earth science applications and decision support systems.

Sec. 302. Essential space-based earth science and climate measurements

Directs the Administrator to enter into an arrangement with the National Academies for a study, to be completed within 18 months after the enactment of this Act, to develop a prioritized list of essential earth science and climate measurements that can be collected with space-based means.

Sec. 303. Commercial remote sensing data purchases pilot project

Directs the Administrator to initiate a pilot project for purchasing commercial remote sensing data to address state, local, regional, and tribal needs.

Sec. 304. Report on temperature records

Directs the Administrator to issue a report on the extent to which NASA's temperature records overlap with the records of the Climate Research Unit at the University of East Anglia.

SUBTITLE B. SPACE SCIENCE

Sec. 311. Suborbital programs

Directs the Administrator to designate an individual responsible for leading near-term and long-term strategic planning for the suborbital and airborne program; and provide, within one year after the date of enactment of this Act, a strategic plan to support the full and productive use of NASA's suborbital and airborne assets.

Sec. 312. Explorer program

Directs the Administrator to enter into an arrangement with the National Academies to conduct a review of the Explorer Program not later than 120 days after the date of enactment of the Act and to submit a plan for responding to the recommendations of the review no later than 16 months after the date of enactment of the Act.

Sec. 313. Radioisotope thermoelectric generator material requirements and supply

Directs the Administrator to conduct an analysis of NASA requirements for radioisotope power system material needed to carry

out planned, high priority robotic missions in the solar system and other surface exploration activities beyond low-Earth orbit; and to transmit the results of the analysis no later than 180 days after the date of enactment of the Act.

TITLE IV. AERONAUTICS

Sec. 401. Environmentally friendly aircraft research and development initiative

Amends Sec. 302 of P.L. 110–422 by directing the Administrator to develop a plan and associated timetable for this initiative, including projected flight test demonstrations, and to transmit the plan within 270 days after the date of enactment of this Act.

Sec. 402. Research on NextGen airspace management concepts and tools

Directs the Administrator to review at least annually the alignment and timing of NASA’s research and development activities in support of the NextGen airspace management modernization initiative.

Sec. 403. Research on aircraft cabin air quality

Directs the Administrator to initiate research on aircraft cabin air quality, including research on innovative aircraft cabin air quality sensors, that complements research conducted by FAA.

Sec. 404. Research on on-board volcanic ash sensor systems

Directs the Administrator to conduct a study to assess the feasibility of establishing a project focused on the development of a low-cost, on-board volcanic ash sensor system.

Sec. 405. Aeronautics test facilities

Directs the Administrator to develop an agency-wide plan to stabilize and where possible reverse the deterioration of the agency’s aeronautics ground test facilities.

Sec. 406. Expanded research program on composite materials used in aerospace

Directs the Administrator to expand NASA’s research program on composite materials used in aerospace applications to address such topics as progressive damage analysis and ways to mitigate how the environment interacts with composite materials over time.

TITLE V. SPACE TECHNOLOGY

Sec. 501. Space technology program

Directs the Administrator to establish a space technology program to enable research and development on advanced space technologies and systems that are independent of specific space mission flight projects, including such areas as in-space propulsion, power generation and energy storage, liquid rocket propulsion, avionics, structures, and materials, and including research, development, and demonstration of enabling technologies in support of future exploration missions; enter into an arrangement with the National Academies for a “decadal survey” study to make recommendations

on research and development priorities for NASA's space technology program over the next decade; and transmit the results of the study no later than 20 months after the date of enactment of the Act.

TITLE VI. EDUCATION AND OUTREACH

Sec. 601. STEM education and training

Directs the Administrator to develop, conduct, support, promote, and coordinate formal and informal educational and training activities that leverage NASA's unique content expertise and facilities and enhance opportunities for minority and underrepresented groups, including rural students and students from a high need local education agency; consult with other officials regarding activities to improve STEM education and training and recruit minorities that are underrepresented in STEM teaching; and designate a Director to oversee and coordinate all NASA programs and activities in support of STEM education and training.

Sec. 602. Assessment of impediments to space science and engineering workforce development for minority and underrepresented groups at NASA

Directs the Administrator to enter into an arrangement for an independent assessment of impediments to space science and engineering workforce development for minority and underrepresented groups at NASA and transmit a report of the assessment not later than 15 months after the date of enactment of this Act.

Sec. 603. Independent review of the National Space Grant College and Fellowship Program

Directs the Administrator to enter into an arrangement with the National Academies for a review of the National Space Grant College and Fellowship Program and to transmit the results of the review no later than 18 months after the date of the enactment of the Act.

Sec. 604. Hands-on space science and engineering education and training

Directs the Administrator to establish a program of pilot projects for hands-on space science and engineering education and training.

TITLE VII. INSTITUTIONAL CAPABILITIES REVITALIZATION

Sec. 701. Institutional management

Directs the Administrator to develop a strategy for the maintenance, repair, upgrading, and modernization of the agency's laboratories, facilities and equipment and to transmit the strategy and an implementation plan no later than 180 days after the date of enactment of the Act.

Authorizes the Administrator to establish a capital fund at each of NASA's Centers for modernization of facilities and laboratories.

Sec. 702. James E. Webb Cooperative Education Distinguished Scholar Program

Authorizes the Administrator to establish a national Cooperative Education Program that will complement existing NASA Center-administered cooperative education initiatives. As the “best of the brightest”, ten finalists will be selected annually as James E. Webb Cooperative Education Distinguished Scholars.

TITLE VIII. ACQUISITION MANAGEMENT

Sec. 801. Prohibition on expenditure of funds when 30 percent threshold is exceeded

The National Aeronautics and Space Administration Authorization of 2005 is amended to clarify the starting point of the period at the end of which NASA is prohibited from expending further funds on a project.

Sec. 802. Project and program reserves

Directs the Administrator to transmit not later than 180 days after enactment of this Act a report describing NASA’s criteria for establishing the amount of reserves at the Project and Program levels.

Sec. 803. Independent reviews

Directs the Administrator to transmit not later than 270 days after the date of enactment of this Act a report describing internal entities that conduct independent reviews of projects and programs at life cycle milestones and how NASA ensures the independence of members prior to their assignment.

Sec. 804. Avoiding organizational conflicts of interest in major NASA acquisition programs

Directs the Administrator to revise the NASA Supplement to the Federal Acquisition Regulation not later than 270 days after the date of the enactment of this Act to provide uniform guidance and tighten existing requirements for organizational conflicts of interest by contractors in major acquisition programs.

Sec. 805. Report to Congress

Directs the Administrator to transmit a report to Congress on April 30th of each year that provides an estimate of the total termination liability as of the end of the second quarter of the fiscal year for all NASA contracts with a total value in excess of \$200 million.

TITLE IX. OTHER PROVISIONS

Sec. 901. Cloud computing

Directs the Comptroller General to transmit a report detailing whether sensitive but unclassified and classified NASA information was processed on a non-Federal cloud computing facility and if so, how NASA ensured the safeguarding of NASA’s scientific and technical information.

Sec. 902. Review of practices to detect and prevent the use of counterfeit parts

Directs the Comptroller General to transmit the results of its review of NASA's processes and controls to detect and prevent the use of counterfeit parts in NASA mission projects and related assets no later than one year after the date of enactment of this Act.

Sec. 903. Preservation and management of lunar sites

Directs the OSTP Director, in cooperation with the Administrator and others, to enter into an international dialogue to identify the questions and research needed to understand the potential adverse impacts of various uses of the Moon on scientific activities and on lunar areas of historical, cultural, or scientific value, and how to prevent or mitigate the impacts. Directs the Administrator, in cooperation with other relevant Federal agencies and stakeholders, to establish a grants program and to provide a report on the results of the international dialog and the establishment of an international framework within two years after the date of the enactment of this Act.

Sec. 904. Continuity of moderate resolution land imaging remote sensing data

Reaffirms the finding in Section 2 of the Land Remote Sensing Policy Act of 1992, Public Law 102-555, regarding the continuous collection and utilization of land remote sensing data from space.

Requires the Director of OSTP to take steps to ensure the continuous collection of space-based medium resolution observations of the Earth's land cover and that data are made available to facilitate the widest possible use.

Sec. 905. Space weather

Directs the Director of OSTP to prepare a long-term strategy for a sustainable space weather program and develop a plan to implement the strategy, to enter into an arrangement with the National Academies to assess the status of capabilities for space weather prediction, and transmit the results of these activities no later than 18 months after the date of enactment of the Act.

Sec. 906. Use of operational commercial suborbital vehicles for research, development, and education

Directs the Administrator to prepare a plan describing the use of commercial reusable suborbital flight vehicles for carrying out scientific and engineering investigations and educational activities; assess and characterize the potential capabilities and performance of commercial reusable suborbital vehicles for addressing scientific research; and transmit the plan and assessment within one year after the date of enactment of this Act. Prohibits the Administrator from proceeding with a procurement award for the provision of a commercial reusable suborbital vehicle launch service of a NASA-sponsored payload or spaceflight participant until all indemnification and liability issues have been addressed and the Administrator has provided a report describing the indemnification and liability provisions that are planned to be included in such contract(s).

Sec. 907. Study on export control matters related to U.S. astronaut safety and NASA mission operations

Directs the Director of OSTP to conduct a study to examine the need for a process for granting real-time, limited waivers to export control license restrictions or regulations on matters related to U.S. astronaut safety and NASA mission operations and to transmit the results of the study no later than one year after the date of enactment of this Act.

Sec. 908. Amendment to the National Aeronautics and Space Act of 1958

Amends section 202 to permit the Administrator and Deputy Administrator to be retired commissioned military personnel.

Sec. 909. Near-Earth objects

Reaffirms the direction codified in P.L. 110-422 and directs the Administrator to designate a responsible official for coordinating NASA's near-Earth object observation activities; directs the Administrator to transmit a plan for carrying out the reaffirmed direction within 270 days after enactment; reiterates Congressional support for the use of Arecibo Observatory for near-Earth object activities; and authorizes funding for specific activities.

Sec. 910. Sense of Congress

Puts forth a Sense of Congress that NASA shall endeavor to carry out, to the extent feasible, the top recommendations from decadal surveys in each mission area.

Sec. 911. Ethics programs in the Office of General Counsel

Requires legal staff of the Office of General Council of NASA to receive ethics training and prohibits the General Counsel of NASA from serving as NASA's designated ethics officer.

VIII. COMMITTEE VIEWS

Sec. 201. Reaffirmation of exploration policy

The Committee believes that steadfastness of commitment is critical to the successful conduct of a meaningful program of human and robotic exploration of the solar system. Congress in the NASA Authorization Acts of 2005 and 2008 expressed its commitment to a step-by-step program of exploration beyond low Earth orbit, including cislunar space, the Moon, Lagrangian points, Near Earth Objects, and ultimately Mars and its moons—a program that could be enhanced by international cooperation under U.S. leadership. The Committee expresses its continued support for such a commitment.

Sec. 202. Restructured exploration program

The Committee believes NASA's human space flight program should have three main elements: (1) extension and enhanced utilization of the International Space Station (ISS), including the option for an additional Space Shuttle mission if the Administrator determines that it is needed and can be done safely; (2) development of the capability to provide assured access to low Earth orbit and the ISS at a pace that minimizes the human space flight "gap" that

will occur after the retirement of the Space Shuttle, as well as providing a testbed, including a robust flight test program for demonstrating technologies and operational concepts needed for exploration beyond low-Earth orbit, as was done in the Gemini program prior to the Apollo missions; and (3) development and demonstration of capabilities for exploration beyond low-Earth orbit at as rapid a pace as funding will allow, including the expeditious development of an evolvable heavy lift launch vehicle that makes maximum practicable use of the systems, technologies, and test activities of the assured access crewed transportation system. While the Committee supports the growth of a self-sustaining commercial crew transportation industry, it is not willing to make U.S. access to low-Earth orbit (LEO) and the ISS dependent on the emergence by a date certain of certifiable and sustainable commercial crew transportation systems; the Committee believes it is in the national interest to maintain a government capability for crewed access to LEO and the ISS, whether it serves as primary or backup means of access.

The assured access and heavy lift launch systems should be designed and implemented in a manner that seeks to reduce NASA and contractor fixed and operating costs and eliminate unnecessary infrastructure, supports the transition of shuttle workforce to the new program in a timely manner to minimize workforce disruption and ensure that essential human space flight skills are maintained, and can carry out the missions called out in the Act. It is critically important for NASA and the contractors to work together to get infrastructure and other fixed costs down so that scarce funds can be utilized to design, build, and fly systems, rather than to carry unnecessary overhead costs. With respect to operating costs, working to minimize them should be an important program goal, and should be given consideration early in the design phase, for the assured access crew transportation system to low Earth orbit. If NASA has more than one possible approach available to developing a government assured access crew transportation system that is consistent with NASA being able to make maximum practicable use of its systems, technologies, and test activities in the development of the heavy lift launch vehicle authorized in this Act, the Committee expects that NASA would adopt the approach that is best matched to ISS crew transfer requirements and that will have the lower marginal cost for operations to LEO and the ISS unless there is a compelling reason to do otherwise.

With respect to the heavy lift launch vehicle development authorized in this Act, the Committee believes that NASA should pursue as efficient a development path as possible to the attainment of a heavy lift launch vehicle that can support the full complement of human exploration missions called for in this Act and the NASA Authorization Acts of 2005 and 2008. The very constrained budgetary outlook NASA is facing leaves no room for dead-end design approaches—the design should be evolvable on a continuous development path to meet the full range of exploration mission requirements. In that regard, previous NASA analyses have indicated that the heavy lift vehicle should be sized to be consistent with a design goal of being able to launch on the order of 150 metric tons to low Earth orbit and have appropriate volumetric capacity in order to support missions ranging from missions to establish a sustained

human presence on the Moon to missions to NEOs and Mars and its Moons.

Finally, the Committee recognizes the negative impact of budgetary instability on NASA's ability to execute its restructured exploration program in an efficient manner. The Committee has attempted to provide "stretch" goals for the desired availability of both the LEO system and the heavy lift launch vehicle in order to make clear that the Committee wants NASA to move expeditiously to carry out a meaningful and sustainable exploration program, while recognizing that available funding will necessarily determine the pace at which the program can proceed.

Flagship technology demonstrations and Precursor Robotic Missions

The Committee supports a robust advanced technology program that is separate from NASA's mission projects, as authorized in the NASA Authorization Act of 2008. As discussed in the Committee view on the Space Technology Program, the Committee views that program as the highest priority at this time, because of its focus on innovative and early technology concepts that are shepherded through concept study, development, and demonstration phases, if they prove ready, are selected, and if users support their demonstration. Given the constraints of the fiscal environment, the Committee views a program requiring significant investments in flagship technology demonstration missions as premature until the requirements for those demonstrations and the priorities for the investments have been established. The Space Technology Program is an appropriate program in which to identify those technologies that may merit further investment as potential flagship demonstration missions. In addition, the Committee views the Robotic Precursor Missions program as a "nice-to-have" until the mission objectives to justify a robotic reconnaissance mission in advance of planned human exploration are established. Until such time, NASA's Science Mission Directorate has mission expertise in sending robotic missions to near-Earth asteroids, Lagrange points, lunar orbit, among other sites and a body of data and knowledge about those sites that should be explored. Synergies with the Science Mission Directorate should also be considered before initiating and expending resources on a new program. With respect to the flagship demonstration, precursor robotic programs and other space technology activities, the Committee directs a Decadal Survey to establish priorities to guide the nation's investments for the future.

Subtitle B—International Space Station

After decades of the nation's investment in the development and assembly of the International Space Station, one of the most complex engineering endeavors ever achieved, NASA, the private sector, and universities can now turn to utilizing this on-orbit laboratory and seeking a return on the long-term investments made to date. In 2005, Congress designated the U.S. portion of the International Space Station as a national laboratory and directed the increased utilization of the station by non-NASA entities. National Academies reports have reiterated the need for ISS utilization plans and have also stressed the importance of cross-disciplinary priorities and well-defined programmatic goals to guide the deci-

sions and trade-offs related to ISS research activities. Along these lines, the Committee includes provisions directing the Administrator to develop a research strategy, to establish an ISS research management entity and plan, and to designate a responsible official to lead an ISS integrated research program. These steps need to be taken to guide the effective use of increases in resources for ISS utilization and to ensure the optimal research and development benefits of the ISS.

Sec. 216. Centrifuge

A variable-gravity centrifuge has long been cited by the scientific community as an important on-orbit research facility requirement for space life sciences research. Until its cancellation in 2005, such a centrifuge was included in the International Space Station (ISS) program. The Japanese Space Agency (JAXA) was tasked to provide the Centrifuge to NASA as part of the offset of NASA's provision of the shuttle launch services for the launch of the Japanese Experimental Module (Kibo). The Centrifuge Accommodation Module (CAM) flight model and the engineering model of the centrifuge rotor were manufactured by JAXA at the time the project was cancelled by NASA in 2005.

A centrifuge capability would significantly increase the utility of the ISS as an orbiting laboratory. In light of the extended utilization of the ISS until at least 2020, the Committee believes that an assessment of innovative options for deploying a variable-gravity centrifuge on the ISS is needed and should include provisions for its initiation, including an estimate of the potential cost and timeline for developing and deploying the centrifuge capabilities evaluated as part of the assessment, as well as the status of previous work on development of an in-flight centrifuge for the ISS.

Sec. 218. Fundamental space life science and physical sciences and related technology research

National Academies' reports have reiterated the importance of basic and applied research on microgravity life and physical sciences and technology carried out on the ground, on free-flying spacecraft, and on the International Space Station to understand and overcome the fundamental challenges and issues related both to requirements-driven and strategic research for complex future exploration missions and to understanding of phenomena that may have important terrestrial applications. Over the last several years, the capacity for basic, applied, and exploration-related research and technology development has declined significantly as a result of budget cuts. The number of researchers performing active investigations in these disciplines has declined significantly as have opportunities to train the next generation of researchers prepared to address key challenges in space life and physical science and technology research and development. According to a recently released National Academies report on *Life and Physical Science Research for a New Era of Space Exploration: An Interim Report*, "The scientific community engaged in space exploration research has dwindled as a result of marked reductions in budget funding levels, from approximately \$500 million shared equally between life and physical sciences in 2002 to the current level of about \$180 million, and the concomitant reduction in the ISS research portfolio, from

966 investigations in 2002 to 285 in 2008.” The Committee is augmenting the investment in fundamental space life science and physical sciences and related technology research that would make use of ground-based, free-flyer, and ISS facilities to reinvigorate the capabilities and workforce in these disciplines and to ensure progress on the research needed to support the nation’s goals in human exploration of outer space as well as potentially provide terrestrial benefits.

Sec. 221. Contingent authorization of additional Space Shuttle mission

The Committee believes that it is very important, in view of the extension of the life of the ISS until at least 2020, for the Shuttle fleet to leave the ISS in the best possible configuration for the post-Shuttle era. Consequently, the Committee is providing contingent authorization for one additional Space Shuttle mission to the ISS, to be carried out if the NASA Administrator determines that such a mission is necessary to reduce risk for ISS operations and utilization, and if certain safety conditions are met. However, NASA will have to offset the incremental cost of such a mission, if it decides to undertake it, through corresponding cuts to funding for the ISS and for the restructured exploration program.

Sec. 242. Commercial crew and related commercial space initiatives

The Committee believes that NASA can assist the development of commercial space capabilities that could aid NASA in carrying out future missions. There are four main forms of useful assistance: (1) financial and technical support for the development and utilization of commercially-provided cargo services to support ISS operation and utilization; (2) conduct of a fundamental research and technology program in crewed space transportation and related fields as part of the NASA Space Technology program and the dissemination of the results of that research, along the lines of the program established under the National Advisory Committee for Aeronautics and later under NASA’s Aeronautics research program that has had such a significant impact on the development of commercial aviation; (3) an initiative in cooperation with would-be commercial providers to allow NASA to obtain insight into and familiarity with the design approaches, technologies, and production processes for planned commercial crew vehicles and to enable NASA to provide early warning to commercial providers of conditions that could impede certification of the vehicles for use by NASA astronauts, while prohibiting NASA from imposing design changes on the commercial providers during the development process; and (4) a program of federal loans and loan guarantees. NASA should provide information and technical assistance on NASA’s human-rating standards and processes and methods of compliance with those standards and processes at no cost to any developers of commercial orbital human space flight services that seek it. However, NASA should not enter into any contract or agreement for the transport of NASA astronauts on a commercially provided crew transport and rescue service until all indemnification and liability issues have been addressed and sufficient flight experience has been accrued by the service provider’s system to allow NASA to

have the safety- and reliability-related data and information needed to fly its astronauts on that system.

Sec. 243. Federal assistance for the development of commercial orbital human space transportation services

The program in this bill provides federal assistance in the form of loans or loan guarantees. The Committee believes the program will enhance would-be commercial crew transportation providers' abilities to secure financing.

Even under normal economic conditions, companies can face obstacles in securing enough affordable financing to survive the "valley of death" between developing innovative technologies and commercializing them. Because the risks that lenders must assume to support new technologies can put private financing out of reach, companies may not be able to commercialize innovative technologies without government assistance. In this constrained economic environment, even companies that might ordinarily rely on private financing are turning to the federal government for assistance.

Combined with technical assistance from NASA, the Committee believes that the loan and loan guarantee provisions in this bill provide significant resources to would-be commercial crew transportation providers. While allowing the amount of federal funding allocated for loans and loan guarantees to potentially leverage a significantly greater amount of loan money, the financial commercial crew provisions in this bill also expose the taxpayer to minimum risk and cost in contrast to the direct funding of about \$5.8 billion proposed by the Administration.

With respect to loan guarantees, the program would help companies obtain affordable financing because the federal government would agree to reimburse lenders for the guaranteed amount if the borrowers default. This encourages lending by reducing the lenders' financial risks. In addition, because the federal loan guarantee would signal confidence in a project, the loan guarantee program in this bill can help companies raise capital from other sources, for example by selling equity.

The subsidy rate [i.e., the amount of leverage that a given amount of funds provided for loan guarantees can provide] for the loan guarantees will be established by OMB, which will have to assess the risk involved. However, since OMB is providing such large amounts to commercial providers in the president's request and planning on the operational availability of commercial providers by 2016, the Committee must assume that OMB considers the risk to be low. Therefore, OMB should be willing to provide a subsidy rate that allows a large amount of leverage from the available funding.

The bill includes safeguards for the use of the loans and loan guarantees. Loans or loan guarantees will not be provided to any companies unless—among a whole series of conditions—the Administrator determines that there is a "reasonable prospect of repayment of the principle and interest by the borrower"; and that the amount of the obligation, when combined with amounts available to the borrower from other sources is sufficient to carry out the total development cost. Furthermore, the Administrator will charge fees sufficient to cover the costs of administering the program.

Title III, Subtitle A—Earth Science

NASA's Earth science programs support the development of new knowledge of our Earth system, address societal needs, advance our understanding of climate change, adaptation, and mitigation, and help inform U.S. policy and responses on climate change. The data collected from NASA's Earth observation systems are being applied to address societal challenges such as natural resource management, land use, and natural hazard events, and environmental monitoring. NASA's Earth observing satellites have acquired imagery used to monitor the offshore oil spill in the Gulf Coast of the United States and to measure the plume from the recent eruption of an Icelandic volcano that spewed volcanic ash into the atmosphere and wreaked havoc on international air traffic.

The National Academies has found that the nation's environmental satellite system is at risk of collapse. Most of the satellites in NASA's Earth observing fleet are all well beyond their intended lifetimes. Within the last year, NASA lost two Earth observing spacecraft. However, during the time in which the National Academies issued its warnings and recommended priorities for the next generation missions, the funding for NASA's Earth Science Program was projected to decline. This decline in purchasing power has had a direct impact on NASA's ability to develop the replacement satellites and carry out a robust and balanced program. The amounts authorized in this Act are intended to help restore that purchasing power and help mitigate the risk to the future viability of the nation's space-based Earth observations system.

Recognizing the broad impact that NASA's Earth science and climate research activities have in addressing both scientific priorities and national and societal challenges, the Committee encourages NASA to increase its efforts to make the results of its science-based missions and research activities available to address societal needs.

Sec. 302. Essential space-based earth science and climate measurements

The Committee believes that the nation needs to make a commitment to sustaining key environmental and climate measurements on a continuous basis. There are several studies, both national and international, on priority environmental and climate measurements. In questions to hearing witnesses—leading climate and Earth science experts—there was some consensus but not universal consensus on climate and environmental measurements, and the list of measurements is quite long. The science community knows these studies, but the broader policy community needs a clear, concrete list that represents the national consensus going forward. This provision is intended to ensure that a consistent list is available to both researchers and policymakers.

The Committee believes that the U.S. needs to explore opportunities for addressing some of the measurements through international or commercial partnerships. That said, the U.S. may not want to give up scientific, technological or other relevant capabilities and leadership on some of the critical measurements, and there may be measurements for which the government does not want to rely on partnerships to provide. The study directed in this provision should determine those essential environmental and climate measurements that should be obtained through U.S. Federal

government assets and to which the U.S. Federal government should commit to obtain on a long-term, continuous basis and include in Federal government data archives. The intent of the provision is not to redo existing studies and priorities but to establish the list that is to be the basis of our Federal government's commitment for long-term, continuous measurements of the Earth's climate and environment.

Sec. 303. Commercial remote sensing data purchases pilot project

The Committee views the availability of commercial high resolution remote sensing data as an opportunity to enhance Earth science research and address research and application needs that may not be met with government-provided data. High resolution commercial remote sensing imagery provide information at the scales often needed for State, local, regional, and tribal government uses. NASA carried out a science data purchase project with commercial remote sensing imagery in the past. The Committee believes it is time to apply the lessons learned from those experiences and to again seek to leverage the capabilities of both government and private sector remote sensing assets through a new pilot project to facilitate and enhance the uses of the data for scientific research and applications that address State, regional, local and tribal needs.

Sections 311 and 312. Space science—Suborbital and explorers

Reports of the National Academies including, *Revitalizing NASA's Suborbital Program* and *A Performance Assessment of NASA's Heliophysics Program* have identified the importance of the suborbital and Explorer programs as part of a balanced and robust space science program. Both programs provide flexibility to focus on targeted or faster opportunities for scientific investigations, provide critical hands-on training for scientists and engineers, and build on scientific discoveries made with "flagship" science missions. The suborbital programs also offer a means to demonstrate new technologies or reduce technology risk for future space flight missions, and several instruments that have flown on space science missions trace their heritage to suborbital flight experiments. Building scientific instruments is an art as much as an engineering development process. Reducing and slowing Explorer and suborbital programs affects the industrial experience base in developing scientific instruments and can have implications for the capability to build future instrumentation within schedule and on budget in the future. Given the stresses that the fiscally constrained environment imposes on research and development programs, the Committee views additional investments in the suborbital and Explorer programs as prudent for enabling high-value science, technology demonstration and risk reduction, and workforce and development and for ensuring the foundational strength and success of the nation's space science programs into the future.

Sec. 401. Environmentally friendly aircraft research and development initiative

Research associated with the Environmentally Friendly Aircraft R&D initiative explores and assesses technologies that will simultaneously reduce fuel burn, noise, and emissions and thus reduce

the impact of aviation on the environment. As such, the Committee believes that accelerating this research through increased use of flight demonstrations will enable earlier receipt of these benefits. NASA needs to start planning and budgeting for flight test demonstrations and the platforms it will need to carry them out.

Sec. 501. Space technology

The Committee believes that a reinvigorated program of investments in space technology at NASA will provide the innovation and transformational technologies that will benefit NASA's future space and Earth science and human space flight and exploration missions, as well as provide new capabilities that can benefit our economy as a whole. In addition, technology transfer is a critical aspect of NASA's overall mission as an agency and one that Congress encourages NASA to continue to support. NASA's ability to bring the technology it develops through all of its mission activities to the marketplace strengthens our economy and encourages economic development. The Committee believes that a space technology program to enable research and development on advanced space technologies and systems that are independent of specific space mission flight projects is a high priority, particularly in a constrained budgetary environment. To realize the "seed corn" potential of the space technology program, NASA should focus on developing innovative technologies in areas such as in-space propulsion, power generation and storage, liquid rocket propulsion, avionics, structures, and materials that may enable new approaches to human and robotic space missions, including exploration enabling research, development, and demonstration activities.

While acknowledging the need for appropriately phased technology demonstrations to support the nation's future exploration activities, the Committee believes it important to ensure that we first develop the most innovative approaches to meeting NASA's future technology need and have a clear understanding of future exploration mission requirements before attempting expensive Flagship Demonstration missions and robotic precursor missions.

Sec. 701. Institutional management

Congress directed an assessment of NASA's laboratory facilities in its NASA Authorization Act of 2008 [P.L. 110-422]. That assessment showed that NASA's deferred maintenance has continued to grow. NASA needs to address the decline in its laboratory capabilities, including equipment, maintenance, and facilities, which have affected the ability of NASA's scientific workforce to carry out the basic research and technology development needed to support NASA's space and aeronautics programs, along with other programs of national importance. The agency's annual spending on facilities maintenance, repairs, and upgrades falls short of comparable industry guidelines as a percentage of the current replacement value of active facilities. The augmentation above the President's request and the establishment of a Capital Fund at each of the NASA Centers are intended to help address the deferred maintenance problem and the need to upgrade and modernize NASA's research laboratories and facilities. Those actions, coupled with its authorization of augmented funding for aeronautics test facilities,

signals the Committee's view that these assets are critical for sustaining the nation's leadership in space and aeronautics.

Sec. 903. Preservation and management of lunar sites

The Committee believes that the United States, emerging spacefaring nations, and private and other non-governmental entities will seek to explore the Moon for scientific, commercial, and other purposes in the coming years. There are currently no clear guidelines establishing how a government, commercial, or private entity should treat lunar sites of high scientific or historical interest, such as the Apollo landing sites. This provision directs the government to take the initial steps, in cooperation with the international community, to consider the issues related to the preservation and management of significant lunar sites of high scientific, historical, and cultural interest and develop a path forward for dealing with those issues.

Sec. 904. Continuity of moderate resolution land imaging remote sensing data

NASA is developing the Landsat Data Continuity Mission (LDCM), which is slated for launch in late 2012 or 2013; however there is no long-term strategy for the collection of moderate resolution space-based land imagery. The Government Accountability Office, in a report on Environmental Satellites, found that "*there is no commitment to ensure continuity after that mission [LDCM]. Without Landsat or a similar satellite program, there will be a significant gap in land cover images and other important global climate data ranging from water management to agriculture.*" The Committee considers continuity of moderate resolution land imaging data, which have been collected since the 1970s to be critically important due to their use in measuring urban sprawl, studying deforestation, informing decisions related to agriculture, forestry, land change, water resource management, climate change, and geology, among other applications. The long data record established in the Landsat program enables multidecadal studies of changes to the Earth's land cover. This provision directs the Office of Science and Technology Policy to take the steps, in consultation with other Federal agencies, to ensure the continuous collection of moderate resolution land imaging remote sensing data and ensure that they are made available in a manner that will ensure their widest possible use.

Sec. 905. Space weather

The Committee is aware of that the National Academies is preparing to undertake the next decadal survey in solar and space physics and that the research and missions considered and prioritized in the survey will contribute to our understanding of space weather and our capability to predict it. The Committee recognizes the serious implications that space weather events can have on our national infrastructure and believes that steps to improve our predictive capabilities are in the nation's interest. The Committee fully expects that the study directed in this provision will be coordinated with the National Academies' decadal survey in solar and space physics, but that a stand-alone study is needed that provides an in-depth assessment of our capability in space

weather prediction and that recommends the priorities for basic research and infrastructure to help strengthen the nation's space weather program and predictive capabilities.

Sec. 906. Use of operational commercial suborbital vehicles for research, development, and education

The Committee views the potential development of commercial reusable suborbital research and development platforms as an area to monitor, consistent with the recommendations of the National Academies report, published in 2010, on *Revitalizing NASA's Suborbital Program: Advancing Science, Driving Innovation, and Developing a Workforce*. The Committee believes that those systems may offer significant promise for selected research areas. In order for their potential research applications to be better understood and assessed, it will be important for such commercial systems to enter operational service so that their capabilities for meeting the requirements for suborbital scientific and technology research investigations can be demonstrated. In addition, issues related to risks and liability and indemnification associated with flying NASA-supported research payloads or spaceflight participants on the vehicles need to be defined and addressed before NASA supports their use for NASA-related research and other objectives, including for supporting NASA-sponsored tests and demonstration flights or for flying NASA-provided engineering test units or other payloads.

IX. COMMITTEE COST ESTIMATE

With respect to requirements of clause 3(d) of House rule XIII, the Committee anticipates that a CBO cost estimate letter on H.R. 5781 will address these issues when the bill proceeds to consideration on the House floor.

X. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

With respect to the requirements of clause 3(c)(2) of House rule XIII and section 308(a) of the Congressional Budget Act of 1974 and with respect to requirements of clause 3(c)(3) of House rule XIII and section 402 of the Congressional Budget Act of 1974, the Committee anticipates that a CBO cost estimate letter on H.R. 5781 will address these issues when the bill proceeds to consideration on the House floor.

XI. COMPLIANCE WITH PUBLIC LAW 104-4

H.R. 5781 contains no unfunded mandates on State or local governments. The Committee anticipates that this issue will be further addressed in a CBO cost estimate letter for the bill when it proceeds to consideration on the House floor.

XII. COMMITTEE OVERSIGHT FINDINGS AND RECOMMENDATIONS

The oversight findings and recommendations of the Committee on Science and Technology are reflected in the body of this report.

XIII. STATEMENT ON GENERAL PERFORMANCE GOALS AND
OBJECTIVES

Pursuant to clause 3(c) of House rule XIII, the goals of H.R. 5781 are to reauthorize the activities of the National Aeronautics and Space Administration, and provide direction for the future of human spaceflight.

XIV. CONSTITUTIONAL AUTHORITY STATEMENT

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 5781.

XV. FEDERAL ADVISORY COMMITTEE STATEMENT

H.R. 5781 does not establish nor authorize the establishment of any advisory committee, although the bill does provide additional direction to existing advisory committees.

XVI. CONGRESSIONAL ACCOUNTABILITY ACT

The Committee finds that H.R. 5781 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the *Congressional Accountability Act* (Public Law 104–1).

XVII. EARMARK IDENTIFICATION

H.R. 5781 does not contain any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in clause 9 of Rule XXI.

XVIII. STATEMENT ON PREEMPTION OF STATE, LOCAL, OR TRIBAL
LAW

This bill is not intended to preempt any state, local, or tribal law.

XIX. CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

In compliance with clause 3(e) of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AUTHORIZATION ACT OF 2008**

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TITLE III—AERONAUTICS

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**SEC. 302. ENVIRONMENTALLY FRIENDLY AIRCRAFT RESEARCH AND
DEVELOPMENT INITIATIVE.**

[The Administrator]

(a) *IN GENERAL.*—*The Administrator shall establish an initiative involving NASA, universities, industry, and other research organizations as appropriate, of research, development, and demonstration, in a relevant environment, of technologies to enable the following commercial aircraft performance characteristics:*

(1) * * *

* * * * *

(b) *PLAN.*—

(1) *IN GENERAL.*—*The Administrator shall develop a plan and associated timetable for this initiative identifying key milestones, including projected flight demonstrations to validate vehicle and technology concepts in a relevant environment.*

(2) *SUBMISSION.*—*Not later than 270 days after the date of enactment of the National Aeronautics and Space Administration Authorization Act of 2010, the Administrator shall transmit the plan to the Congress.*

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TITLE VI—SPACE OPERATIONS

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Subtitle B—Space Shuttle

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SEC. 613. SPACE SHUTTLE TRANSITION.

(a) * * *

(b) *SPACE SHUTTLE TRANSITION LIAISON OFFICE.*—

(1) *ESTABLISHMENT.*—*The Administrator shall develop a plan and establish a [Space Shuttle Transition Liaison Office] *Post-Shuttle Transition Liaison Office* within the Office of Human Capital Management of NASA to assist local communities affected by the termination of the Space Shuttle program in mitigating the negative impacts on such communities caused by such termination. The plan shall define the size of the affected local community that would receive assistance described in paragraph (2).*

* * * * *

(3) *TERMINATION OF OFFICE.*—*The office established under paragraph (1) shall terminate [2 years after the completion of the last Space Shuttle flight] 2 years after the award of the final grant under section 223 of the National Aeronautics and Space Administration Authorization Act of 2010.*

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT OF 2005

* * * * *

TITLE I—GENERAL PRINCIPLES AND REPORTS

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SEC. 103. BASELINES AND COST CONTROLS.

(a) * * *

* * * * *

(e) **THIRTY PERCENT THRESHOLD.**—If the Administrator determines under subsection (d) that the development cost of a program will exceed the estimate provided in the Baseline Report of the program by more than 30 percent, then, [beginning 18 months after the date the Administrator transmits a report under subsection (d)(1)] *beginning 18 months after the Administrator makes such determination*, the Administrator shall not expend any additional funds on the program, other than termination costs, unless the Congress has subsequently authorized continuation of the program by law. An appropriation for the specific program enacted subsequent to a report being transmitted shall be considered an authorization for purposes of this subsection. If the program is continued, the Administrator shall submit a new Baseline Report for the program no later than 90 days after the date of enactment of the Act under which Congress has authorized continuation of the program.

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NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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TITLE II—COORDINATION OF AERONAUTICAL AND SPACE ACTIVITIES

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SEC. 202. (a) * * *

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(d) The Administrator and the Deputy Administrator may be re-tired commissioned military personnel.

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XX. COMMITTEE RECOMMENDATIONS

On July 22, 2010, the Committee on Science and Technology by voice vote favorably reported the bill, H.R. 5781, as amended, to the House with the recommendation that the bill, as amended, do pass.

XXI. ADDITIONAL VIEWS

ADDITIONAL VIEWS OFFERED BY REPRESENTATIVES RALPH HALL, LAMAR SMITH, ROSCOE BARTLETT, FRANK LUCAS, TODD AKIN, MICHAEL McCAUL, MARIO DIAZ- BALART, ADRIAN SMITH, PAUL BROUN AND PETE OLSON

The National Aeronautics and Space Administration Authorization Act of 2010 strikes a good balance between space science, aeronautics, and human space flight.

Clearly the greatest challenges addressed by this legislation fall within the realm of human space flight, and rightly so. Earlier this year the Administration proposed canceling the Constellation program. It did so without seemingly giving any consideration to past Congressional support for the program; without consulting with Congress prior to unveiling its plans; and without providing a credible follow-on system.

Over five years and \$10 million of effort has been expended on Constellation. Designs for the Ares 1 launch vehicle and the Orion crew exploration vehicle were well along, bolstered by several successful systems tests and flight demonstrations. The Ares-1X flight in October 2009 met virtually all performance goals, as did the PAD Abort Launch test flown late this spring in New Mexico. These were not insignificant achievements, and more importantly, they demonstrated the feasibility and safety of the Ares 1/Orion architecture.

H.R. 5781 represents a bipartisan rejection of the Administration's plan for human spaceflight. We are pleased that the bill builds on the existing Constellation system architecture, but allows for updates and modifications where needed. The bill directs NASA to use these proven designs and capabilities to the greatest extent practicable, in part because they've been demonstrated to be safe and effective, in part to maximize the benefits resulting from the investment of resources and intellectual capital, and because these technologies could be transferred to a follow-on heavy lift launch vehicle.

The bill is very clear that once Shuttle is retired, NASA must give first priority to developing a government-owned crew launch system to assure crew access to the International Space Station (ISS) by 2015 because it has the smallest degree of technical risk, it can be developed sooner, and it will meet NASA's rigorous safety

and performance standards. Having said that, in several sections the bill makes clear that Congress desires and supports having commercial crew launch companies take on the task of ferrying astronauts to and from low-Earth orbit once they have proven their ability to routinely fly cargo missions to ISS.

Since 2005, NASA has awarded \$606 million to private launch companies through the Commercial Orbital Transportation Services (COTS) and Cargo Resupply Services contracts to help in the design, development, and testing of their new vehicles to deliver cargo to the ISS beginning next year. The bill provides an additional \$450 million in loan, loan guarantee and technical assistance funding to help these and other companies begin the hard work of building human rated launch systems.

This bill fully funds the President's request for the Space Technology Program at \$2.64 billion to revitalize NASA's long-term, high-risk research and development capability. This program will span the entire breadth of NASA's enterprise, helping produce new sensors, materials, propulsion systems, and other cutting-edge technologies necessary to enable the next generation of missions. Much of the program's funding will go to industry and academia in the form of competitive grants. It is vitally important Congress restore a strong R&D culture at our nation's civil space agency.

In the areas of Space Science and Aeronautics, H.R. 5781 continues Congress' strong support for the agency's programs. Much of the work they do directly supports the Federal Aviation Administration's NextGen program to increase capacity in our national air-space system, as well as enabling quieter, more fuel efficient and safer aircraft.

We are pleased that several amendments offered by Republicans were adopted with bipartisan support. One amendment reduced the authorization length from five to three years, thereby cutting the bill's cost from \$100 billion total outlay to \$58.41 billion and increasing congressional oversight of the agency. We believe that this amendment, as well as others, strengthens the authorization. We look forward to working with the Majority to continue to improve the bill as it moves through the process.

We believe this bill will allow NASA to accomplish many important national goals—it reaffirms Congress' support for a balanced portfolio of agency programs, and it directs the agency to continue building a government-owned human space launch system as our near-term solution for developing a successor to Shuttle. It endorses a commercial crew system but chooses to wait until commercial cargo flights are demonstrated to be flown in a safe and routine manner.

We do not support a commercial-only approach as proposed by the Administration, remaining unconvinced by the little evidence provided to us in hearings and briefings that the commercial launch industry is anywhere near ready to perform this vital role. While their PowerPoint presentations assert an ability to begin

production, they cannot assure enough of a finished product to justify abandoning the 5 years of legislative cooperation by both Republicans and Democrats embodied in the Constellation program. That said, we do back the industry's development both in policy and with taxpayer investment, and remain optimistic that commercial crew will one day be our primary source of ferrying astronauts to and from low Earth orbit.

RALPH HALL.
LAMAR SMITH.
ROSCOE BARTLETT.
FRANK LUCAS.
TODD AKIN.
MICHAEL MCCAUL.
MARIO DIAZ-BALART.
ADRIAN SMITH.
PAUL BROUN.
PETE OLSON.

ADDITIONAL VIEWS OFFERED BY HONORABLE DANA ROHRBACHER

Although I agree with much of the National Aeronautics and Space Administration Authorization Act of 2010, there are some specific areas on which I wish to state a different view.

CHINA AND FOREIGN RELATIONS

It was recently revealed that NASA received, or thought it received, direction from the President to pursue a diplomacy strategy in the Middle East. Protections are necessary to make certain that NASA does not engage in foreign relations with China without the explicit authorization of Congress. Such foreign relations activities are potentially dangerous for our nation, because there is no difference between China's military and space ambitions.

While there may be arguable benefits of one kind or another to cooperation with the Chinese, it is clear that such benefits should not come at the expense of U.S. national security and human rights interests. In particular, such cooperation should not undermine the U.S. commitment to important nonproliferation, labor, environmental, trade, and safety standards. The history of cooperation with China on space issues has been a particularly one-sided benefit to China at the expense of America's security.

TECHNOLOGY DEVELOPMENT

Appropriate investments in research and development are critical to the future of every American, of our economy, and of our position of strength in the world. The President's budget request for Fiscal Year 2011 for NASA called for increased research and technology development so that America could be more competitive and NASA could explore the solar system more affordably. While some of these R&D funds remain, this bill removes most of that funding, and abandons the efforts that can enable a new era of exploration in the solar system.

Our research and development programs are critical, both to create long-term jobs and to enable NASA to continue to explore even as we work to control deficit spending. Some technological goals should be supported, such as on-orbit fueling depots, which can then be operated by private ventures once the development is done. These programs are our investment in the future, and by abandoning them, as this legislation does, we are risking our long-term prospects for the temporary appearance of leadership.

CONSTELLATION

I applaud the courage in cancelling of the Constellation program. Constellation, according to our nation's best experts, is unsustainable and would not have fulfilled the goal of putting America back

on the Moon by 2020 or even 2025, and we must be better trustees of America's public resources than continuing to spend funds on a program that cannot succeed. Instead, by choosing to invest in commercial launch options to low Earth orbit, an effort strongly supported in language, though not resources, throughout this legislation, our nation will invest in multiple projects to enable and stimulate access to Earth orbit, commercial human access to Earth orbit and more affordable NASA exploration beyond Earth orbit. I am strongly in support of these goals; I always have been. I therefore strongly support and endorse the key human spaceflight and technology elements outlined in the President's budget for NASA and supported here.

COMMERCIAL CARGO

This legislation praises the virtues of the Commercial Cargo efforts which have been supported time and again by Congress, while cutting more than 95% out of the NASA request for this program for FY11. The rationale for these cargo expenditures is two-fold: (1) to reduce risk through additional work performed by the COTS participant companies, and thereby improve the chance of mission success; (2) to accelerate agreed upon milestone tasks, including launch schedules. Critically, these payments would only be made for the successful completion of milestones or tasks not contemplated in the original agreements between the COTS providers and NASA.

Through the COTS program, NASA invests financial and technical resources to stimulate efforts within the private sector to develop and demonstrate safe, reliable, and cost-effective space transportation capabilities. Under COTS, NASA is helping commercial industry develop and demonstrate its own cargo space transportation capabilities to serve the U.S. government and other potential customers. The companies lead and direct their own efforts, with NASA providing technical and financial assistance. A unique aspect of the COTS program is that the companies are paid incrementally as they reach certain milestones that are critical to their ability to meet the needs of NASA, thus leveraging private resources. This encourages steady progress toward their goals and accountability—payment for performance. This allows NASA greater control over the program and total program costs if a specific company fails to meet the necessary milestones and timelines.

Beyond existing, previously agreed COTS milestones, NASA desired to further reduce risk and improve the chance of mission success by supporting additional milestones. Consistent with the COTS approach, private company expenditures would exceed the value of the payments made for the completion of particular milestones, thus further leveraging private resources for public needs. This program should have been funded at the full \$312 million—a relatively small price to support the \$100 billion that has been invested in the International Space Station.

COMMERCIAL CREW

This legislation cuts more than 95% out of the NASA request for FY11 Commercial Crew efforts, while “restoring” less than one-

tenth of that in a previously unheard of and wholly unexamined loan guarantee program.

The reasoning and program structure for Commercial Crew follows closely with that of Commercial Cargo—it is the best way to achieve long-term safe, reliable, inexpensive transportation to low Earth orbit. By providing funding to meet certain milestones, and capabilities, NASA can make certain that these commercial companies are both reliable and up to the task. NASA would continue to be responsible for assuring astronaut safety.

Without clear statements by NASA, with some funding to back the milestones up, the development of these systems to the standards required by NASA becomes much less market-friendly. By encouraging this development, we can create an American commercial human spaceflight industry that will lower costs while increasing safety and reliability. This will give NASA greater access to space, and ultimately, lead to greater opportunities for our nation to explore the solar system and beyond—NASA's first and most critical function.

EXPLORATION

While I applaud the cancellation of the Constellation program, I fear that it is a cancellation in name only, as the funding removed from R&D, Commercial Cargo, and Commercial Crew is being used to establish a "Restructured Exploration Program," or, as it appears to be, Constellation Lite. This program has even less money than the unsustainable Constellation did, but the ultimate goals haven't changed enough for this to be sustainable or successful.

This bill calls for NASA to immediately start building towards a heavy-lift rocket, but heavy-lift as envisioned might not be needed if we can create and implement on-orbit fuel depots, other technologies, and proper design. By forcing NASA to begin an underfunded heavy-lift program now, we are undermining any opportunity to achieve the groundbreaking technologies that could enable long-term sustainable exploration and the ancillary spinoff benefits that have been a hallmark of NASA throughout its history.

DANA ROHRBACHER.

ADDITIONAL VIEWS OF REPRESENTATIVE PETE OLSON

I am a proud original cosponsor of the National Aeronautics and Space Administration Authorization Act of 2010. This bill reaffirms the commitment of Congress to maintain America's leadership in human space flight. It builds upon the investments we have already made in development of the Orion spacecraft, Ares rocket system, spacesuit development, and enabling systems that are being designed to put us back on the course of exploration.

The budget put forth by the President in February of this year was not only misguided, but ceded our hard earned leadership in space. This legislation corrects that course. I support the bill overall, but there are a couple of specific points I would like to reiterate.

I'm very pleased that the Launch on Need (LON) flight has been authorized, contingent on the NASA Administrator determining such a flight would be safe and is needed to enable full utilization of the ISS. However, I am concerned that the funds for this flight, as amended by the full committee, will come out of the Space Operations and ISS accounts which are already stretched too thin. I had an alternate proposal that would have funded this flight in part from the proposed increase in earth science funds by redirecting \$500 million. Earth Sciences received a robust increase in the President's FY2011 budget proposal. Taking a small portion of this increase would be much more prudent than cutting into another portion of the human space flight account.

My amendment to provide funding for the LON flight would have also stripped funds from workforce training efforts. I do not disparage the need to help the workforce transition upon completion of the shuttle program, but using limited NASA funds to do so seems counterintuitive to me. There are funds within other government agencies, unspent stimulus funds to be exact, at the Departments of Commerce and Labor that would be better suited for this purpose.

Upon completion of the shuttle program, the question of where the orbiters should be housed was a topic of considerable debate during the markup. I strongly feel that Houston has earned the right to become the permanent home of an orbiter. The people of Houston have managed every mission and trained every crew throughout the life of the program, thus bringing an orbiter to a location near the Johnson Space Center seems a fitting testament to their efforts, dedication, and sacrifice.

Finally, as we work toward ensuring the future of human space flight, it is imperative that the Administration stop forcing contractors to assess termination liability costs. To date, forcing companies to do so has led to the layoffs of thousands of workers, with many more to come. It is clear that this Congress, both in the House and Senate, will not approve of the President's proposal to fully cancel

Constellation. As such, we must not let a workforce go that will be needed going forward. These layoffs should be stopped immediately.

It has been an honor to work with Chairman Bart Gordon, Ranking Member Ralph Hall, and Subcommittee Chairwoman Gabrielle Giffords on this bill and I look forward to its consideration and passage by the full House.

PETE OLSON.

XXII. PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 5781, THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT OF 2010

THURSDAY, JULY 22, 2010

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Committee met, pursuant to call, at 10:00 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Bart Gordon [Chairman of the Committee] presiding.

Chairman GORDON. Good morning. The Committee will come to order. Pursuant to notice, the Committee on Science and Technology is here to consider the following measures, H.R. 5781, *the National Aeronautics and Space Administration Authorization Act of 2010*. But before we get started, I would like to introduce one of our guests. Mr. Saggese is the president of the Italian Space Agency, here in the front row, and we welcome you here, Mr. Saggese. Italy has been an important partner with us in space in many other ways, and we look forward to continuing to work with you, and glad you are here to see sausage being made right up front.

All right. We will now proceed with the markup. This has been a challenging road to get to today's markup because the issues we are addressing go to the core of what we want from NASA and from nation's space and aeronautics program. This committee, and in particular the Space and Aeronautic Subcommittee, under the able leadership of Chairwoman Giffords and Ranking Member Olson have tried to take the time needed to explain those issues and examine them carefully and to get as much information as we could from the administration about its proposed plans for NASA. As a result, the bill before us today reflects the constructive input of the many witnesses who testified at 19 hearings at the committee and subcommittee level and have held to date on this issue during the 111th Congress. We have also heard from a variety of experts and stakeholders from the government, commercial sector, the science community, the Aerospace Safety Advisory Panel and other advisory committees, and numerous organizations and individuals. We have benefited from all their views. And let me be clear, the bill before us today is not perfect. I believe that there are a number of amendments that will be offered today that will improve it. That is what the legislative process is all about.

However, I think it is a good bill that makes the hard choices that need to be made, and we are in tough economic times, and we could not do it all. While I believe it is important that NASA remain a multi-mission agency with challenging initiatives in science, aeronautics and human space flight and exploration, I also want to ensure that NASA's missions are matched to the available resources. As a result, some of the nice-to-haves have had to be deferred, and worthy activities have been funded at lower levels than some of us would like. Nevertheless, I think the legislation before us sets a clear, sustainable and executable path for NASA, especially in the areas of human space flight.

That has been a part of the lemon that we had been confronted with. For all of us, and for all of its accomplishments, the Constellation program was not executable as planned, given the budgetary outlook facing the agency. Unfortunately, it has become clear that the administration's proposed human space flight program is not executable under that budgetary outlook either. As a result, we have had to craft an alternative approach that is executable, and that has taken some time, but I believe that the bill before us today provides the Nation with a productive future for its human space flight program, one that can be sustained even in the midst of budgetary uncertainty. It is in the interest of time that I will not re-state what is in the bill. Instead, I will simply say that this bill represents a balanced, fiscally responsible and bipartisan approach to authorizing NASA's programs.

I want to emphasize the fact that it is a bipartisan bill, and that in that regard I am gratified that Ranking Member Hall and Ranking Member Olson have joined Chairwoman Giffords and I as original co-sponsors of this legislation. They have made thoughtful and constructive contributions to the bill, and I thank them for that. I imagine that there will be amendments before us today on which of the four of us may disagree, but no one should construe that to mean that we are not united on the need for a strong, robust and innovative space and aeronautics program for the United States. The bipartisan nature of this bill sends an important message to Congress as a whole, as well as to the administration that NASA is a national resource worthy of our support.

Let me just quickly conclude by saying that what—in all candor, the Constellation program was brought to us by people that had a very sincere interest. We found, though, that as it moved along that it resulted in a balloon mortgage that we could not afford now. Once again, the program that the administration put forth was done in all good faith, but once again we found that balloon mortgage. We really have to work within our means here. Even looking at the Senate bill, we are afraid that it is not within those budgetary guidelines. And I am afraid that the passion that we all have on this committee for NASA may not be shared across the board. And as we start getting into tough budgetary times, we really need to, I think, be responsible in coming in with a good budget. And the reason this is so important is that NASA really is, I think, the best brand in the world. It is the statement that the United States is a leader in technology and innovation. And so we have a responsibility on this committee, I think, to nurture it and to move it forward.

We all know that we are getting close to election time. We all know that peoples' trigger finger gets a little bit itchy at that time, but I have been so impressed with the cooperation on the staff level, on the member level to try to pull these things together. Folks have parochial interests. I know that there are going to be some, you know, some tough issues today that will be very heartfelt, but we are going to, you know, we need to work through those. Working together we are going to come out with the kind of bill that we can all be proud of.

And again, I thank you.

[The prepared statement of Chairman Gordon follows:]

PREPARED STATEMENT OF CHAIRMAN BART GORDON

Good morning. Today the Committee is meeting to mark up H.R. 5781, *the NASA Authorization Act of 2010*. It has been a challenging road to get to today's markup, because the issues we are addressing go to the core of what we want from NASA and our nation's space and aeronautics program.

This Committee, and in particular the Space and Aeronautics Subcommittee under the able leadership of Chairwoman Giffords, have tried to take the time needed to examine those issues carefully and to get as much information as we could from the Administration about its proposed plans for NASA.

As a result, the bill before us today reflects the constructive input of the many witnesses who testified at the 19 hearings that the Committee and Subcommittee have held to date on those issues in the 111th Congress.

We have also heard from a variety of experts and stakeholders from government, the commercial sector, the science community, the Aerospace Safety Advisory Panel, other advisory committees, and numerous organizations and individuals.

We have benefited from all of their views.

Let me be clear. The bill before us is not perfect.

I believe that there are a number of amendments that will be offered today that will improve it. That's what the legislative process is all about.

However, I think it is a good bill that makes the hard choices that need to be made.

We are in tough economic times, and we cannot do it all.

While I believe it is important that NASA remain a multi-mission agency with challenging initiatives in science, aeronautics, and human space flight and exploration, I also want to ensure that NASA's missions are matched to available resources.

As a result, some of the "nice-to-haves" have had to be deferred, and worthy activities have been funded at lower levels than some of us would like.

Nevertheless, I think the legislation before us sets a clear, sustainable, and executable path for NASA, especially in the area of human space flight.

That has been part of the dilemma that we have been confronting.

For all of its accomplishments, the Constellation program was not executable as planned, given the budgetary outlook facing the agency.

Unfortunately, it has become clear that the Administration's proposed human space flight program is not executable under that budgetary outlook either.

As a result, we have had to craft an alternative approach that *is* executable, and that's taken some time, but I believe that the bill before us today provides the Nation with a productive future for its human space flight program—one that can be sustained even in the midst of budgetary uncertainty.

In the interests of time, I will not restate what is in the bill; I know that Members are familiar with the provisions.

Instead, I will simply say that this bill represents a balanced, fiscally responsible, and bipartisan approach to authorizing NASA's programs.

I want to emphasize the fact that it is a *bipartisan* bill, and in that regard I am gratified that Ranking Member Hall and Ranking Member Olson have joined Chairwoman Giffords and I as original cosponsors of this legislation.

They have made thoughtful and constructive contributions to the bill, and I thank them for that.

I imagine there will be amendments before us today on which four of us may disagree, but no one should construe that to mean that we are not united on the need for a strong, robust, and innovative space and aeronautics program for America.

The bipartisan nature of this bill sends an important message to Congress as a whole, as well as to the Administration, that NASA is a national resource worthy of our support.

With that, I urge my colleagues to support this bill, and I now turn to Mr. Hall for his opening statement.

Chairman GORDON. And I would like to then yield to Ms. Giffords, as Chairwoman of the Committee, for a brief statement.

Ms. GIFFORDS. Thank you, Mr. Chairman, Ranking Member Hall. I appreciate this opportunity. Truly for the members who have been on my subcommittee and in the full committee, this really is at a point where we are at a crossroads. Our job here in this committee is to determine the future of America's space flight program, and our job is to determine whether or not America will continue to have a human space flight program second to none or not. We will determine whether America will continue to push the forefront of space science and technology or not. We will determine whether America will continue to foster innovation and drive our 21st century economy or not, and today we will determine whether America will continue to inspire the youth of America or not.

Of course, we didn't arrive at this crossroads suddenly. Over the last year and a half my subcommittee held 15 oversight hearings on NASA, exploring these and the many issues facing today's space flight program. And over the last year and a half we have had to face an unsettling reality after the Augustine Committee made clear our exploration program of record was unexecutable under the current budget. So, in response to this report, the President introduced his 2011 budget, which included a number of serious changes to NASA programs. We then had four hearings with witnesses from NASA, as well as outside experts, to delve into these proposals and to the effects on our space flight program. Unfortunately, many of our questions remained unanswered, so the leadership of the committee twice reached out to NASA to get a better justification of the President's proposals, and twice we were rebuffed. Even to this day we have yet to receive a budget that reflects the changes to the new plan that the President announced on April 15. Our hope is in the future that we will be able to work closely with the administration and with NASA to make sure that we have the information so that we can move forward in a clearer manner.

So when we set out our task to determine the future of America's space flight program, our goal was paramount in our minds to develop a sustainable program that will guarantee America's access to Low-Earth orbit [LEO], but more importantly a path to explore beyond LEO, something we have not done for 37 years. And the result is a bill that provides a pragmatic path forward. It gives NASA a clear sense of purpose and a direction in a way that will recognize these—the nation's need for fiscal restraint. And I have said many times before the President's requests contains very—a lot of good proposals, which this bill, in fact, has retained.

And Mr. Chairman, of course, I know you will get into this, but our legislation authorizes NASA's programs and activities for five years, with total annual funding of \$19 billion in fiscal year 2011, rising modestly to \$20.99 billion in fiscal year 2015. It extends through at least 2020 the life of the International Space Station, a premier laboratory that should be considered a modern wonder

of the universe. And it continues, and in fact expands, our commitment to science and aeronautics. However, our approach differs from the President's proposal on a number of levels, most notably on the development of human space flight programs. And the bill directs the NASA administrator to restructure the current exploration program to develop and demonstrate a governmentally owned crew transportation system to provide assured access to LEO, as well as heavy lift transportation systems to provide the backbone for exploration missions. As we have often stated, our role in Congress is not to pick winners and losers. We are not trying to design a rocket in this committee. We know that the best and brightest minds in the country are in the NASA centers around the country, and they should be designing the architecture. So this bill requires NASA to bring those minds to bear on this issue.

NASA will tell us in the following months how they will fly to the ISS by 2016 in a crew vessel evolvable to one day explore the solar system. NASA will tell us how they will build a heavy lift vehicle that will begin flying by the end of this decade to prepare us to once again leave LEO. The restructured exploration program will ensure that America will continue to play a leadership role in human space flight and exploration, in spite of challenging economic times. The bill also recognizes the value of encouraging the growth of a healthy, self-sustaining U.S. commercial space sector by providing the nascent commercial crew industry with access to NASA technologies and facilities and assistance in the form of loans and loan guarantees. Additionally, this bill reinforces that NASA will turn over crew transportation to commercial providers when they have proven that they can accomplish the task successfully. The prize is out there. It is up for the American entrepreneurs to seize it.

This bill also contains a number of great pieces I know that we are going to get into a little bit later today, but I want to again thank you, Mr. Chairman. I know that you have worked very hard with Ranking Member Hall and Congressman Olson as well, and so many Members of this Committee who are directly involved with NASA's human space flight programs and NASA centers around the country, or have constituents that are really interested in human space flight. The fact is that, as you said, Mr. Chairman, the clock is ticking. We don't have a lot of time, and this is our opportunity for this committee to put its best foot forward.

Thank you. I yield back.

[The prepared statement of Ms. Giffords follows:]

PREPARED STATEMENT OF REPRESENTATIVE GABRIELLE GIFFORDS

Thank you Mr. Chairman.

We stand now at a crossroads. What we decide today, and in this Congress, will determine the future of America's space program.

We will determine whether America will continue to have a human spaceflight program second to none, *or not*.

We will determine whether America will continue to push the forefront of space science and technology, *or not*.

We will determine whether America will continue to foster the innovation that will drive our 21st century economy, *or not*.

And we will determine whether America will continue to inspire the youths of America and the citizens of the world, *or not*.

But we didn't arrive at this crossroad suddenly.

Over the last year and a half, this committee, and my subcommittee, have held 15 oversight hearings on NASA, exploring these and the many other issues facing America's space program today.

And over this last year and a half, we have had to face an unsettling reality.

As the Augustine Committee made clear, our exploration program of record was unexecutable within the current budget.

In response to this report, the President introduced his 2011 budget, which included a number of serious changes to NASA programs.

We have held four hearings with witnesses from NASA as well as outside experts to delve into these proposals and their effects on our spaceflight program.

Unfortunately, many of our questions remained unanswered.

So, the leadership of this committee twice reached out to NASA to get a better justification of the President's proposals—and twice we were rebuffed.

The unfortunate truth is that the administration did not provide this committee with the depth of information necessary to justify many of its proposals.

To this day, we have yet to receive a budget that reflects the changes to the new plan that the President announced on April 15th.

Nor have we received any technical assessment performed by NASA to support this plan.

I find this most disappointing.

I hope that in the future the administration will work more closely with this committee to better inform this very important process.

When we set upon our task to determine the future of America's human spaceflight program, one goal was paramount in our minds: develop a *sustainable* program that will guarantee American access to space and put us on a path to explore beyond low-earth orbit—something we have not done for 37 years.

The result is a bill that provides a pragmatic path forward and gives NASA a clear sense of purpose and direction in a way that also recognizes the nation's need for fiscal restraint.

As I have said before, the President's request contained many good proposals, which this bill has retained:

- It authorizes NASA's programs and activities for five years, with total annual funding of \$19 billion in FY 2011, rising modestly to \$20.99 billion in FY 2015.
- It extends, through at least 2020, the life of the International Space Station (ISS), a premier laboratory that should be considered a modern wonder of the universe.
- And it continues, and in fact expands, our commitment to science and aeronautics.

However, our approach differs from the President's proposal on a number of issues—most notably on the development of human spaceflight systems.

This bill directs the NASA Administrator to restructure the current exploration program to develop and demonstrate a government-owned crew transportation system to provide assured access to low-Earth orbit, as well as a heavy lift transportation system to provide the backbone for exploration missions.

As I have often stated, our role in Congress is not to pick winners and losers. We aren't trying to design a rocket in this committee.

We know that the best and brightest minds in the country are in NASA centers around the country and *they* should be designing this architecture.

So this bill requires NASA to bring those minds to bear on this issue.

NASA will tell us in the following months how they will fly to the ISS by 2016 with a crew vessel evolvable to one day explore the solar system.

NASA will tell us how they will build a Heavy Lift Vehicle that will begin flying by the end of this decade and prepare us to once again leave low-earth orbit.

The restructured exploration program will ensure that America will continue to play a leadership role in human space flight and exploration, in spite of challenging economic times.

The bill also recognizes the value of encouraging the growth of a healthy, self-sustaining U.S. commercial space sector by providing the nascent commercial crew industry with access to NASA technologies and facilities as well as assistance in the form of loans and loan guarantees.

Additionally, this bill reinforces that NASA will turn over crew transportation to commercial providers when they have proven they can accomplish the task safely.

The prize is out there; it's up to American entrepreneurs to seize it.

This bill contains a number of other great pieces:

- Supporting the operation and full utilization of the ISS through at least 2020 and establishing an ISS research management entity
- Augmenting funding to revitalize fundamental space life and physical science research
- Establishing a grants program to assist workers and communities affected by the end of the Shuttle Program
- Providing a modest increase to smaller space science projects including sub-orbital science and scientist-led Explorer programs that demonstrate cutting-edge scientific concepts and technological approaches, and offer hands-on opportunities for students and young researchers to ensure that our nation's space science program has a robust and vibrant foundation to continue these discoveries in the decades to come
- Taking steps to ensure progress is being made on NASA's environmentally friendly aircraft research and development
- Reinvigorating NASA's long-term space technology research and development activity

So, we stand at a crossroad for America's space program.

We will create our own path with changes we make today and I know that what will emerge will produce an executable and sustainable program that will get us exploring the heavens again soon.

The clock is ticking, and it is important that Congress complete its work on the NASA reauthorization so that the nation's space program can once again have a clear direction.

I want to thank you and Ranking Members Hall and Olson for all of your efforts as well as the rest of this committee.

It is a pleasure to serve on a committee with such engaged members. The nation needs just such engagement at this critical time.

With that, I yield back the balance of my time.

Chairman GORDON. Thank you, Ms. Giffords, and—for the work you and Mr. Olson did, and the many hearings that you had, and I now yield to Mr. Hall.

Mr. HALL. Mr. Chairman, I thank you, and I thank you—I think I thank you for scheduling this morning's markup. I sit here thinking about the Hippocratic Oath that doctors take of first do no harm, and from the devastation we all felt when the President ran a line through the word Constellation, that has been our goal and my goal. I am on this bill as a co-sponsor in an effort to do less harm than I think the bill across the hall is going to do. But we need to get the best of both, and work together and try to work this thing through because a lot depends on our actions here, and I want to begin by commending your leadership, and that of your subcommittee, Chairwoman Gabrielle Giffords, and Ranking Subcommittee Member Pete Olson—for the excellent oversight hearings conducted during this Congress on NASA's management and execution of its programs, we heard from an impressive array of industry, government and academic witnesses, and I want to especially note the compelling testimony we heard from former astronauts Neil Armstrong, Gene Cernan, Tom Stafford. These extraordinary men bring a lifetime of experience and wisdom to the debate, and I appreciate the time and effort that they took to appear before the committee. The work for the Space Committee and full committee was very aggressive and very thorough and helped all members gain good insight into the agency's science, aeronautics and human space flight programs.

The hearings and briefings also revealed that NASA was unable to provide convincing reasoning for its decision to cancel Constellation. Despite a repeated request by this committee, NASA failed to provide credible schedules, cost estimates and a coherent rationale

as to why it was necessary to wipe away \$10 billion in taxpayer investment in Constellation to start anew with an ill-defined plan that risked taxpayers' money on a commercial-only solution. NASA also failed to offer convincing evidence that its proposed \$6 billion investment in a commercial crew initiative would have any reasonable chance of succeeding, or even that careful thought had been given to the basic assumptions about safety, marketability, liability, indemnification and intellectual property considerations.

Mr. Chairman, the bipartisan bill before us today directs NASA to build on key components of Constellation to ensure a robust human space exploration program. It emphasizes that NASA should rely on their investments in the Aries One and Orion launch systems to the maximum extent practicable, and that work should be phased to begin a gradual buildup of a heavy lift launch vehicle. This bill also—the bill also includes important policy provisions directing NASA to transition low Earth orbit crew ferry flights to the commercial industry when it demonstrates a capability to NASA's satisfaction. Until that day, however, the least risky path to minimize our reliance on the Russians is to continue to build a low Earth orbit launch system, such as was envisioned by the Constellation program.

This bill before us takes the right approach for NASA's other important missions. It sustains a strong and vibrant space science program, enabling new missions to help scientists better understand the evolution of our solar system and universe. It provides funding for important aeronautics research designed to increase the capability and the capacity of our national aerospace system to make aircraft quieter, safer and more fuel efficient. This bill also fully funds the administration's request for NASA's space technology program. This initiative is designed to revitalize NASA's long term high risk research and development activity with the goal of enabling a broad set of new capabilities ranging from propulsion systems, material sensors and other technologies we will need to extend our reach into the deep space.

Mr. Chairman, given that our members received a copy of the text just three days ago, I ask that we continue to work together between now and consideration on the House floor to improve the bill so that all of us can enthusiastically support it. I also want to recognize the hard work done by your staff in crafting this bill in the bipartisan manner by which they have worked with our staff throughout the course of the Congress, with special kudos extended to Dick Obermann. He has been very open with us, and he is—we are appreciative of all of his efforts. I also want to thank Ken Monroe and Ed Feddeman on my staff for their excellent work and guidance through this process.

Given the budget constraints, as well as the turmoil surrounding the direction of our human space flight program, it is vitally important that this good piece of legislation be enacted as soon as possible. I support this bill. I urge all members to lend their support to it as well. And I thank the other members of my staff who have worked day and night to help me. It is important that we get this legislation through Congress, get a bill, and get it to the President.

And at that time—this time, Mr. Chairman, I yield what time I have left and what time he has to consume to Subcommittee Chairman Pete Olson.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

Mr. Chairman, thank you for scheduling this morning's markup of the *NASA Authorization Act of 2010*.

I want to begin by commending your leadership and that of Subcommittee Chairwoman Gabrielle Giffords and Ranking Subcommittee Member Pete Olson for the excellent oversight hearings conducted during this Congress on NASA's management and execution of its programs. We heard from an impressive array of industry, government and academic witnesses, and I want to especially note the compelling testimony we heard from former astronauts Neil Armstrong, Gene Cernan and Tom Stafford. These extraordinary men bring a lifetime of experience and wisdom to the debate, and I appreciate the time and effort they took to appear before our Committee.

The work of the Space Subcommittee and full Committee was aggressive and thorough, and helped all Members gain good insight into the agency's science, aeronautics, and human space flight programs.

The hearings and briefings also revealed that NASA was unable to provide convincing reasoning for its decision to cancel Constellation. In spite of repeated requests by this Committee, NASA failed to provide credible schedules, cost estimates, and a coherent rationale as to why it was necessary to wipe away \$10 billion in taxpayer investment in Constellation and to start anew with an ill-defined plan that risks taxpayer money on a commercial-only solution. NASA also failed to offer convincing evidence that its proposed \$6 billion investment in a commercial crew initiative would have any reasonable chance of succeeding, or even that careful thought had been given to basic assumptions about safety, marketability, liability, indemnification and intellectual property considerations.

Mr. Chairman, the bipartisan bill before us today directs NASA to build on key components of Constellation to ensure a robust human space exploration program. It emphasizes that NASA should rely on our investments in the Ares 1 and Orion launch systems to the maximum extent practicable, and that work should be phased to begin a gradual build-up of a heavy lift launch vehicle.

The bill also includes important policy provisions directing NASA to transition low-Earth orbit crew ferry flights to the commercial industry when it demonstrates the capability to NASA's satisfaction. Until that day, however, the least risky path to minimize our reliance on the Russians is to continue developing a low-Earth orbit launch system such as was envisioned by the Constellation program.

This bill before us takes the right approach for NASA's other important missions. It sustains a strong and vibrant space science program, enabling new missions to help scientists better understand the evolution of our solar system and universe. It provides funding for important aeronautics research designed to increase the capacity of our national airspace system, to make aircraft quieter, safer and more fuel efficient.

This bill also fully funds the Administration's request for NASA's Space Technology Program. This initiative is designed to revitalize NASA's long-term, high-risk research and development activities with the goal of enabling a broad set of new capabilities ranging from propulsion systems, materials, sensors, and other technologies we'll need to extend our reach into deep space.

Mr. Chairman, given that our members received a copy of the text just three days ago, I ask that we continue to work together between now and consideration on the House floor to improve the bill so that all of us can enthusiastically support it.

I also want to recognize the hard work done by your staff in crafting this bill and the bipartisan manner with which they have worked with our staff throughout the course of this Congress, with special kudos extended to Dick Obermann. He has been very open with us, and we appreciate all his efforts. I also want to thank Ken Monroe and Ed Feddeman on my staff for their excellent work and guidance throughout this process.

Given the budget constraints as well as the turmoil surrounding the direction of our human space flight program, it is vitally important that this good piece of legislation be enacted as soon as possible. I support this bill and I urge all Members to lend their support as well. It's important we get this legislation through Congress and to the President. Thank you.

Mr. OLSON. Well, I want to thank my great friend and fellow Texan Mr. Hall for yielding to me a little time.

I am pleased to be here today to discuss the National Aeronautics and Space Administration Authorization Act of 2010. We promised a NASA authorization bill this year, and I am proud to say we are delivering on that promise here today in committee. I want to extend a very special thanks to our Chairman, Mr. Gordon, and our Ranking Member, Mr. Hall, as well as the distinguished Chairwoman of the Space and Aeronautics Subcommittee, Ms. Giffords, along with the very dedicated and hard working staff at the full committee.

This authorization bill is very important to me personally. It is also important to the district I represent, Houston, Texas. But above all else, this authorization bill is important to our nation. And so I thank my colleagues again for bringing this to the committee and for exhibiting that, in the spirit of doing what is right for America, bipartisan solutions exist in Washington, D.C.

I yield back the balance of my time. Thank you.

[The prepared statement of Mr. Olson follows:]

PREPARED STATEMENT OF REPRESENTATIVE PETE OLSON

I am very pleased that we are here today to discuss *the National Aeronautics and Space Administration Authorization Act of 2010*. We promised a NASA Authorization this year, and I'm proud to be discussing this bill in committee today.

I want to extend a very special thanks to our Chairman, Mr. Gordon, and Ranking Member, Mr. Hall, as well as the distinguished Chairwoman of our Space and Aeronautics Subcommittee, Ms. Giffords of Arizona, along with the very impressive and hardworking staff at the full and subcommittee.

This Authorization is very important to me personally, as well as to the district I represent in Houston, Texas, but above all else, this authorization is important to our nation. And so I thank my colleagues again for bringing this to the committee and for exhibiting in word and deed, that in the spirit of doing what's right for America, bipartisan solutions are possible.

Thank you and I yield back the remainder of my time.

Chairman GORDON. Additional opening statements will be placed in the record at this time. I think we have something like 30 something amendments, so I believe everybody's going to have a chance to have their say on this bill today. So I ask unanimous consent that the bill be considered as read, and open amendments at the—and open for amendment at any point, and that members proceed with the amendments in the order of the roster. Without objection, so ordered.

[The prepared statement of Mr. Wu follows:]

PREPARED STATEMENT OF REPRESENTATIVE DAVID WU

Thank you, Mr. Chairman.

I would like to voice my strong support for the NASA reauthorization bill this committee is considering today.

The space program inspires us to reach for the stars in both our dreams and our actions. More importantly, it helps drive our nation's technological innovation.

I am particularly glad to see that today's NASA bill reflects the concerns that I and many of my colleagues voiced with the President's proposal to cancel the human spaceflight program.

I am deeply concerned with the idea of privatizing space exploration. While I believe we should do all that we can to foster and encourage a healthy, competitive commercial spaceflight industry, I believe the core functions should remain a public enterprise.

Simply put, the President's plan to privatize American human spaceflight heads in the wrong direction and has been poorly executed to boot.

The space program has inspired a generation of scientists and engineers, and I believe we ought to preserve this source of inspiration for future generations.

The Constellation Program is not perfect. But putting all of our eggs in a private-sector basket is simply too risky a gamble. We would be jeopardizing our lead in space exploration, and we would be jeopardizing our nation's future.

I am pleased that this committee was able to craft a bill that balances our need to develop a robust commercial spaceflight sector with our responsibility to ensure the continued viability of the national human spaceflight program.

The bill before us today restructures the existing exploration program to ensure a viable, public human spaceflight program which will build on existing expertise and keep our astronauts flying.

America's leadership in space exploration is a national treasure. We, as the stewards of that resource, have an obligation to maintain the commitment to space exploration that began with President Kennedy's challenge to the American people that we land a man on the moon and return him safely to Earth.

I commend the chairman on bringing this legislation up for consideration today, and I look forward to working with my colleagues to ensure future generations are able to enjoy the innumerable benefits that only a public-sector human spaceflight program can provide.

Thank you, Mr. Chairman, for your hard work on this vital legislation. I yield back the balance of my time.

Chairman GORDON. The first amendment on the roster is an amendment offered by the gentlelady from Florida, Ms. Kosmas. Are you ready to proceed with your amendment?

Ms. KOSMAS. Thank you, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 039, amendment to H.R. 5781 offered by Ms. Kosmas of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentlelady for five minutes to explain the amendment.

Ms. KOSMAS. Thank you, Mr. Chairman. I and many of my colleagues here in the room have always maintained that a NASA led vehicle is essential in order for us to maintain, I would say, our U.S. leadership, and perhaps supremacy in space, and this bill strongly supports that premise. However, I think it is important that we consider other aspects. The development of commercial crew and cargo is an important component to our ensuring domestic access to the space station and to continuing to preserve our unique work force through commercial and public/private partnerships that spur job creation. The level of a commercial investment can be debated, whether it is Augustine's recommendation of \$4.5 billion, the President's request of \$6 billion, or the Committee's level of less than a billion. However, we do know that the Senate authorizers and the appropriators have both now approved a level of funding that will help to develop this essential service.

This amendment proposes to match the levels already approved by Senate authorizers and appropriators and to continue the development method which is currently in place for the commercial industry, based on meeting milestone requirements. In addition, my amendment would replace provisions in the bill with language from the bill that I introduced in March with Senator Hutchison which was adopted in the Senate compromise bill. This language would ensure that, before allowing NASA to procure commercial crew services, we require that the agency meet a number of requirements, including human rating requirements, commercial market assessments, procurement system reviews, evaluation of govern-

ment supplied capabilities, and infrastructure, flight demonstration and readiness requirements and commercial crew rescue capabilities.

With this criteria in place, we recognize that public/private commercial space holds promise for the space coast and many other communities across the country. We must provide a level of support that will encourage the development of this creative industry. I urge my colleagues to support this amendment, and I yield back.

Chairman GORDON. Would anybody like to be heard on this amendment?

Mr. HALL. I would like to be heard.

Chairman GORDON. Mr. Hall.

Mr. HALL. Mr. Chairman, I oppose the gentlelady's amendment. Her amendment would take roughly \$2 billion out of the exploration program and redirect it to the commercial crew account. It would also zero out the loan and loan guarantee provisions in the bill. For the last several years we have heard witnesses and expert panels complain about NASA being starved for funds needed to build an assured launch system. And as it now stands, once the shuttle is retired, we will be relying on the Russians for at least four years to get astronauts to and from the space station. Stripping away two billion to invest in a commercial crew system is not the answer.

NASA is being tasked in this bill to get us a low Earth orbit launch system as soon as is practicable. We are also directing NASA to begin design and development of a heavy lift launch system in a carefully planned concurrent approach. \$2 billion will delay our ability to get a new system into place. Further, investing two billion with a commercial provider may or not be sufficient. No engineering and market studies have been done that conclusively demonstrate the viability of a commercial space tourist market. We have been working hard to direct all the funds we can to get the U.S. back into space. Expert witnesses have told us that the fastest, least risky and most assured path is to build a government system. Now, let us not start down the same path, draining funds from NASA's best hope of assured launch. I oppose this amendment.

Chairman GORDON. Ms. Giffords is recognized.

Ms. GIFFORDS. Thank you, Mr. Chairman. Like I said in my opening statements, we have some real issues being able to understand the development of the commercial systems that have been proposed by the administration, and I think that comes over into the, you know, the amendment here. The aerospace corporations, on analysis, raise some serious questions about the credibility of the administration's funding plan for commercial crew development, and my concern is that this amendment would make some significant cuts to the restructured exploration program, ultimately weakening its viability. And I respectfully would oppose this amendment because we have crafted a pretty important balance for the funding of this bill, and this amendment would disrupt that balance.

Chairman GORDON. Any further discussion? Oh, Mr. Rohrabacher is recognized.

Mr. ROHRABACHER. Yes. I move to strike the last words. They are—I guess that is what we need to say here, but I move to support the gentlelady's amendment. Let us just take a look at what we are deciding here. I mean, you know, basically the gentlelady's deciding to give—at least let us give commercial space a chance. Without her amendment what we are saying is we are going to put all of our eggs in the government run space transportation basket. We need to make sure that there is at least an alternative to having everybody who provides space transportation being a government employee and cutting out these—the entrepreneurial and commercial sector. The lady wants to at least give that a chance.

Now, I have two amendments later on that actually go a lot further, and obviously if the lady's amendment passes, I will be withdrawing my—or passes or fails I will probably be withdrawing my amendment, because if we—what she is proposing is a compromise position that permits us to move forward with commercial and doesn't just cut the legs out from under those people in the commercial sector that would like to build an industry somewhat like, perhaps, the industry of the airline industry. We have breached the threshold. We are going to have to make a decision. Is space transportation going to be something that is nothing more than a government enterprise run by—paid for by the taxpayers and run by government employees. Or do we believe that the airline industry in the United States was a good idea, when we reach the threshold that the private sector could provide transportation to the public on jets and other type of vehicles? It is time for us to at least give the commercial enterprise a chance, and I would hope that all of us would support this position, because it is a compromise position. What she is talking about is not just fully accepting what the President had in mind.

But let me just note, Mr. Chairman, one of the reasons why there is some confusion here, we haven't had the hearings on this that we need to have, and I am—I have worked well with you and with the Democrat majority, but let us face it, we haven't had one hearing that went to this idea which is—which the gentlelady is actually amending that would talk about the loan guarantee program. Now, where is loan guarantees—where does that fit in? How come we haven't had any hearings on that? Do we know the loan guarantees are going to work better than what the program now is designed for, in terms of working with the development of commercial space alternative? We don't know that.

So I think the gentlelady's amendment is a compromise, it is responsible, and people on both sides of this issue, whether it should just be a government run enterprise, or whether we should get the private sector involved, should be supporting this as a compromise position.

Thank you very much, Mr. Chairman.

Chairman GORDON. Thank you, Mr. Rohrabacher. I would ask Mr. Olson or Ms. Giffords to correct me if I am wrong, but it is my understanding that you did have hearings, and there were witnesses from the commercial space industry, and that these things were discussed.

Mr. ROHRABACHER. On the loan guarantee issue, Mr. Chairman? Not—

Chairman GORDON. Not on the loan guarantee itself, but rather on the——

Mr. ROHRBACHER. That is an integral part of what we are talking about here.

Chairman GORDON. Well, let me say that I am philosophically attuned with Mr. Kosmas and Mr. Rohrabacher, but I am not fiscally attuned to that. I would like to see us have alternatives. I think that we have left the options within this bill in other areas for a commercial option, which I hope that can move forward, but this is—this comes with a \$2.3 billion price tag, and it is going to slow down, as Mr. Hall pointed out, other programs. So, again, as I say, I am philosophically but not fiscally attuned to this, and for that reason I will have to oppose the amendment.

Are there any other—anyone else would like to be heard? If not, if there is no further discussion, the vote occurs on the amendment. All in favor of the amendment say aye. Those opposed no. The no's have it, the amendment is not agreed to.

The next amendment on the roster is the amendment offered by the gentleman from Wisconsin. Mr. Sensenbrenner, are you ready to proceed with——

Mr. SENSENBRENNER. I am, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 040, amendment to H.R. 5781, offered by Mr. Sensenbrenner of Wisconsin.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentleman for five minutes to explain the amendment.

Mr. SENSENBRENNER. Mr. Chairman, this amendment is kind of a truth in statistics and truth in data amendment. What it does is it refers to the overlap between the climate data at the University of East Anglia in the United Kingdom and the climate data that NASA has assembled. Climategate has been something that has been discussed extensively in the global warming climate change community since the November 19, 2009 release of more than 1,000 e-mails and 2,000 documents from climate scientists associated with the Climate Research Institute at the University of East Anglia. It revealed a pattern of suppression, manipulation and obstruction that pushed climate science toward pre-determined outcomes in order to promote hysteria, and, in my opinion, justify heavy-handed regulatory response. The scandal was not confined to one British university, as it is widely acknowledged that there is substantial overlap between the CRU's temperature records and the temperature records at NASA. Therefore, if the Climate Research Unit's records are suspect, NASA's might very well be too.

This amendment isn't about whether climate change is real. It is about the integrity of the scientific process and the scientific records that we use to set life altering policies. This amendment would require NASA to investigate and report to Congress on the degree to which its temperature records overlap with the CRU's in the potential that those records may be flawed.

As we continue with the debate on climate science, I think it is important that we clear the air on whether NASA's records ended up being polluted as a result of the scandal that arose in England.

And all I am asking for is a report to Congress about whether the records were intermingled, and the potential that the records may be flawed. And that way, when we deal with this issue in the next Congress, I think we can have more confidence in the records that are set before us. So that way, I urge the adoption of this amendment. All it does is require a report to Congress, which is a report that I think is necessary, and I yield back the balance of my time. [The prepared statement of Mr. Sensenbrenner follows:]

PREPARED STATEMENT OF REPRESENTATIVE F. JAMES SENSENBRENNER JR.

“Climategate” refers to the November 19, 2009 release of more than 1,000 e-mails and 2,000 documents from climate scientists associated with the Climatic Research Unit (CRU) at the University of East Anglia in the U.K. It revealed a pattern of suppression, manipulation and obstruction that pushed climate science towards predetermined outcomes in order to promote hysteria and justify a heavy-handed regulatory response.

The scandal was not confined to the one British university, as it is widely-acknowledged that there is substantial overlap between the CRU’s temperature records and the temperature records at NASA. Therefore, if CRU’s records are suspect, NASA’s might very well be too.

This isn’t about whether climate change is real. It’s about the integrity of the scientific process and the scientific records that we use to set life-altering policies. This Amendment would require NASA to investigate and report to Congress on the degree to which its temperature records overlap with the CRU’s, and the potential that those records may be flawed.

Chairman GORDON. Thank you, Mr. Sensenbrenner. Would anyone like to—Dr. Baird is recognized.

Mr. BAIRD. Thank the Chairman. As my colleagues know, I am often—consistently a strong advocate for openness in data, and I have read many of the reports on this over—since the issue first emerged. The—I have two concerns. First of all, I find that the scrutiny of data—if we are going to be open about analyzing data, we need to be—and critical of data sets, we need to be equally critical on both sides at the very least. I note that the—my colleagues in the majority have previously heard from a punitive scientist who claims to have been awarded a Nobel Prize, and he had no such thing, and there is very little scrutiny that comes from the other side on that.

But on the matter at hand, the problem I have with the particular language, and I would ask the author of the amendment if he would willing—be willing to consider this, there is a somewhat conclusory statement that I am not comfortable putting into this legislation, and the conclusory statement begins on line three. “The integrity of the CRU’s data set was compromised by the Climategate e-mail scandal.” That is not an open objective request for information, that is a conclusory statement about the integrity of a data set, and—

Mr. SENSENBRENNER. Will the gentleman yield?

Mr. BAIRD. I would be happy to.

Mr. SENSENBRENNER. Will the gentleman support this amendment if we strike the word “the” in lines three and all of lines four and five? That eliminates—

Mr. BAIRD. I would be—I personally would be. I can’t speak for my colleagues on that.

Mr. SENSENBRENNER. I ask unanimous consent that the amendment be thus modified.

Mr. BAIRD. Mr. Chairman, I appreciate the gentleman's willingness to do that, but I want to underscore this point. I think we need to look at this, but I would hope that we show equal scrutiny to the so-called skeptics of climate change research. We have got abundant data, I believe, on ocean acidification and global overheating that suggests that the bulk of the data is solid, the phenomenon is real, and we need to take action. But I think actually adding a level of analysis of the data may help put this issue to bed, and we can get back to the true overall findings. And with that I yield back. I thank the gentleman for removal of that passage of concern.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, thank you. I support the gentleman's amendment, and I support all sound science on climate change. This amendment's in line with a resolution that I introduced and we passed sometime last year. We introduced and we debated, I am just told. It didn't pass. They didn't see the good judgment in it, I guess. Use of sound science in the climate debate, but that is what the gentleman is suggesting here, and I certainly support that amendment and any other amendment along that line. I yield back my time.

Chairman GORDON. Thank you, Mr. Hall. Ms. Woolsey is recognized.

Ms. WOOLSEY. Thank you, Mr. Chairman. Climate change clearly is one of the most serious threats that our nation and our planet is facing, and Mr. Sensenbrenner's amendment would instruct NASA to conduct a report that it has already written. I really worry that—and would speculate this amendment might be mischievous in its motives, hoping to create a paper trail among NASA scientists that outside critics could get through FOIA and use selectively, like the CRU e-mails, to further inflame passion on climate science.

I fear this would only further the burden already harassing NASA climate scientists. I oppose this amendment. I see it as putting a burden on NASA that is already transparent on its data and its methods. So I just think we are going nowhere with this but backwards. We ought to be going forward. We can't continue to slow down what we need to be dealing with right now, and that is climate change and the effects of what it is having on our planet.

With that, I yield back.

Chairman GORDON. Thank you, Ms. Woolsey. Anyone else like to—I am sorry—

Mr. ROHRABACHER. Argument—

Chairman GORDON. Mr. Rohrabacher—

Mr. ROHRABACHER. Argument number three, Mr. Chairman.

Chairman GORDON. Without—

Mr. ROHRABACHER. All right. That is all right. Mr. Chairman, let me just note that I remember the hearings that we had here in which investigated whether or not Mr. Hanson from NASA, who is the guru of global warming for NASA, had been censored, or in some way restricted in an objectionable way when the last administration required that he put at the bottom of his papers that had not been approved by other—by NASA as a whole that this was his opinion. And that was it, saying—just requiring a—that type of dis-

claimer, that the—all of NASA did not endorse his findings. We had a hearing to determine whether that was an act of censorship, or if that was an act that undermined the honesty of scientific research.

And, you know, okay, we heard that. We heard the hearing and heard what the charges were. That charge was nothing as compared to what we have seen from—about this whole crisis on information from East Anglia and the American researches that have been tied in to global warming, and the indication that—through these intercepted e-mails that there has been dramatic fraud that has taken place. There has been this suppression of information by these very same people, and we have not had one hearing on that that I remember. Has the Science Committee had a hearing on this? We didn't have a hearing on whether or not there should be a loan guarantee that we are now relying upon, and now we are not—we didn't have a hearing on this as well.

Mr. Chairman, these are very significant issues, and to the degree that we paid any attention to Mr. Hanson's complaint that he was required to have a disclaimer at the bottom of his documents, as compared to the information that we have now about the wholesale doctoring of information by global warming researches, people who were operating with government funds, this is a disgrace. We are not doing our job here if we haven't had a hearing on this, and we haven't. And that is why I think Mr. Sensenbrenner needs to have this passed, in order to emphasize that this is a major issue that should not just be—shrug our shoulders and say, well, we are going to move on now, even though there hasn't been any real investigation of the issue. So I would support this amendment.

Chairman GORDON. Thank you, Mr. Rohrabacher. I will recognize myself. Mr. Hall has volunteered to give you a hearing next year, if that—all things work out. Let me—just for the record, let me say this. NASA already makes all of its data and modeling available to the public. Anyone can go look at it via the Internet. NASA scientists already have a 37 page article that goes into careful detail about how they model climate data and discusses differences with the CRU. That article is in a draft form, and out for peer review, but it is available to anyone to read on the NASA website.

Now, with that said, we have over 30 amendments today that deal with the core of NASA. We could talk a great deal about climate change. I think this is important, but a little off message here. And I think that Mr.—Dr. Baird has made a worthwhile suggestion to Mr. Sensenbrenner, who, in his normal jovial way, accepted, and so I think that we should take this rare moment and celebrate it and support the modified Sensenbrenner amendment. Is there further discussion? Mr. Miller?

Mr. MILLER. Mr. Chairman, I did recognize that you invited me not to speak. The Oversight Subcommittee would gladly have held a hearing had any of us been within the United States. This is in East Anglia, which is beyond the subpoena power of subcommittee. We cannot require witnesses to be produced from East Anglia. We cannot require witnesses to attend hearings and give testimony from East Anglia.

But we have all seen in the last few days just what selective editing can do to the truth, how badly it could mangle it. If there had not been a complete videotape of Shirley Sherrod's complete speech to the National Association for the Advancement of Colored People (NAACP) in Georgia, she would have been forever tarred, her character forever—her reputation forever ruined as a racist when, in fact, she was telling a story of racial reconciliation that I can tell you, as a Southerner, has happened on both sides, by whites and by African-Americans over the last generation or two.

What happened with respect to the e-mails in East Anglia is that a group of e-mails that were intended to be private, that were unguarded, were stolen and selectively edited, and we have no idea what the total picture looked like, and it is beyond our subpoena power to find out, but there have been three inquiries in the United Kingdom, which is not exactly a developing—a Third World country. Our sister committee, the equivalent committee of this one, the Science and Technology Committee of the House of Commons, did a full investigation and concluded that all of the findings of the CRU are credible, that there was no subversion of the peer review process, and that there was no reason to doubt any of the findings of the CRU with respect to climate change. There was a second panel by the Royal Society, which is the equivalent of our National Academy of Sciences, chaired by Lord Oxburgh, which reached the same conclusion, there was no evidence of any deliberate scientific malpractice or misrepresentation, that the findings of the CRU with respect to climate change were credible. And University of East Anglia itself conducted a review of all of the information, all of the e-mails, all of what was done by that unit, by that research unit, and concluded that the CRU had not, in fact, blocked access to any raw data or tampered with it in any way. They had not manipulated data to achieve a certain outcome. There was no reason to think that the work of the CRU could not be relied upon, was unreliable, that it was—that it couldn't be trusted, and that any uncertainties with respect to the CRU's work were probably applicable to any scientist doing any kind of research anywhere.

So it does help this amendment substantially that it takes out a finding that—for which there is no evidence, no credible evidence. I still think that—I understand that the Committee will support this amendment, but it is redundant. It is better that it is just redundant rather than factually incorrect and redundant, but it is still redundant because NASA is already doing this, and doing it in a very public way, and NASA's—and believe me, I am very critical of NASA. I am completely willing to be critical of NASA, as everyone on this committee knows. But with respect to their climate data, it has been open, it has been transparent. It is on the Internet. You can see it. You can subject it—it is subject to peer review. I yield back.

Chairman GORDON. Thank you, Mr. Miller, for that clarification.

Mr. BARTLETT. Mr. Chairman—

Chairman GORDON. If there is no further discussion—

Mr. BARTLETT. Mr. Chairman—

Ms. WOOLSEY. Oh, Mr. Chairman—

Chairman GORDON. We go to—Dr. Bartlett.

Mr. BARTLETT. I would just like to note that Mr. Miller may indeed be right, but still there is a—there are a very large number of people out there who have some concerns about the credibility of these data. This amendment certainly does no harm. All we are doing is asking NASA to make sure of the validity of this data. I can't see any downside to voting this—approving this amendment. I see a large upside in that it will confirm to those who believe that the data is not adulterated that it, in fact, is not adulterated. How can there be a downside to this? I yield back.

Chairman GORDON. If there are no further questions, or—

Ms. WOOLSEY. Mr. Chairman—

Chairman GORDON. Let us see, I believe Mrs. Woolsey—

Ms. WOOLSEY. —yield to me.

Chairman GORDON. —had spoken earlier, but I think probably Ms. Johnson would like to yield to you.

Ms. JOHNSON. Yes, I will yield.

Ms. WOOLSEY. Okay. Thank you. I would just—thank you very much. Some of us would like to consider a vote on this, so could we have a vote? Could—roll the vote?

Chairman GORDON. You want a roll call vote?

Ms. WOOLSEY. Yes.

Chairman GORDON. Could we have a show of hands vote, since there is a lot of folks that would have to come in for that?

Ms. WOOLSEY. Oh, we are not going to have any roll call votes on anything?

Chairman GORDON. We may. I mean, if—

Ms. WOOLSEY. Later. I mean—

Chairman GORDON. We will have a roll call vote—

Ms. WOOLSEY. —and—

Chairman GORDON. —anytime anybody wants to—

Ms. WOOLSEY. Oh, I am not calling for it now. I am calling for it when you—I am suggesting we are rolling the votes. I—

Chairman GORDON. No, we are going to take the amendments as we—

Ms. WOOLSEY. Oh, then I will—no, thank you.

Chairman GORDON. We could have a—we—

Ms. WOOLSEY. I will lose on that one, so no. I—no use throwing myself on the—my sword on that one. Thank you. Thank you, Mr. Chairman.

Chairman GORDON. If there is no further discussion on the amendment, then the vote occurs on the amendment. All in favor say aye. No's no. And no's noted, but the ayes have it, and the amendment is not agreed to—agreed to, excuse me. Agreed to. All right. The third of 30 something amendments is—on the roster is offered by the gentleman from California, Mr. Rohrabacher. Are you ready to proceed?

Mr. ROHRABACHER. Considering that I—considering the vote that—prior to this vote, I will withdraw my amendment.

Chairman GORDON. Thank you, Mr. Rohrabacher. The next amendment on the roster is also an amendment by Mr. Rohrabacher from California. Are you ready to proceed with your amendment?

Mr. ROHRABACHER. Yes. This is a bit different because it—I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 046, amendment to H.R. 5781, offered by Mr. Rohrabacher of California.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentleman for five minutes to explain his amendment.

Mr. ROHRABACHER. Thank you, Mr. Chairman, and there is a difference between what NASA proposed and what the bill before us proposes, in terms of spending for the development of commercial cargo. And, again, I know that this may scientifically prove that there are snowballs in Hell, but I am supporting the administration's request, and a champion of President Obama's policy on development of commercial cargo alternatives. And I think that what we—again, what we have done in our efforts is an alternative to what NASA is officially requesting, and if we have, you know, if we are going to this loan guarantee program, which is—might be something I might support in—after we know more about it, I think that we should not go in that direction until at least we have had hearings on that and determined the efficacy of that approach.

So what I am suggesting, then, is that we go with what the—what NASA and the President has recommended, which will ensure that, at least in the commercial cargo part of our space program, if we are not going to have a robust human space transportation system—using the system for the private sector, at least we could have the private sector system that is robust in terms of providing cargo transportation.

Let me note that this proposal is not really something that we are destroying. The—we are just moving around some money here. The effort for Constellation and what your budget has—what we are voting on today will not give us full funding anyway for what we need in—to accomplish the goal that has been stated here of having a government run system. Well, at least if we do this we—this will provide the funds that are necessary to have a private sector alternative to that. And we have seen investment, and a great deal of success, in Falcon 9, and we also have the Delta system and the Atlas system available to us, and with some modifications, which this would help out, they could actually do more than cargo. They could actually start heading even in the direction of human transportation.

But this amendment is focused on the commercial end. We should have—if we can't have a robust human space flight endeavor for the private sector, and let the private sector do that, at least we could make sure the private sector could take care of some of the commercial cargo needs for our space program, and that is what my amendment would do. Thank you.

Chairman GORDON. Thank you, Comrade Rohrabacher, and I have been informed that President Obama thanks you. Ms. Edwards is recognized.

Ms. EDWARDS. Thank you, Mr. Chairman. I plan to oppose the gentleman's amendment. Under the Commercial Orbital Transportation Services Demonstration project, NASA is helping industry develop and demonstrate cargo space transportation capabilities. \$500 million was allocated to the multi-year COTS Demonstration program, and of that amount \$14 million was to be provided in fis-

cal year 2011. However, the fiscal year 2011 budget request instead includes \$312 million for commercial cargo development efforts. That amount represents an increase in the COTS program of over 62 percent relative to the original COTS funding commitment, which is extraordinary in this time.

During the Committee's review of NASA's budget request, Committee staff asked the reason for the \$312 million increase. Here is what NASA said. \$288 million would be an augmentation to the current COTS agreements for additional milestones that NASA would like to add to the program to provide additional capabilities or tests. \$14 million would be for currently negotiated milestones expected to be completed in fiscal year 2011, part of the original 500 million COTS funding commitment. \$10 million would be for program operations for the commercial crew and cargo office at Johnson Space Center in fiscal year 2011. NASA also confirmed that neither Space-X nor Orbital, the two COTS program participants, requested the additional funding of \$288 million, and both they and NASA say that the increased funding is not required to meet planned demonstration flight milestones.

The \$14 million for currently negotiated milestones is expected to be completed in fiscal year 2011 and authorized in this bill for fiscal year 2011. We include funding for the commercial office as JSC as part of the \$50 million for the commercial activities in the bill. With this environment of tight budgets, where we have to make tough choices, the bill chooses not to add significant additional funding to a program that has been progressing satisfactorily since 2006, and doesn't need it to meet its milestones.

As I know, and Mr. Rohrabacher understands, we can't do it all, and when budgets are tight, some of the nice-to-haves and—need to be deferred in order to use scarce resources for other programs in greater need of resources. I urge colleagues to oppose the amendment, and I would say to Mr. Rohrabacher, you know, if I had had my way, we would have probably had zero in this program, and so—and the administration came out in one direction. We have struck what I think is an appropriate balance in—

Mr. ROHRABACHER. Would the gentlelady—

Ms. EDWARDS. And with that, I yield.

Mr. ROHRABACHER. —question? Would the gentlelady yield for a question?

Ms. EDWARDS. Yes.

Mr. ROHRABACHER. The money that we are talking about, this \$312 million, if it is not spent for the development of commercial—on a commercial alternative and providing that incentive, where do you think the money will be spent? And if the money is spent where it will go, will that provide us anything that will work? I am suggesting that the money being spent here will end up providing us with a commercial capability, but the money—if the \$312 million isn't spent here, will it not just go into a program that, even by the current plan, will not come to fruition and not provide us any added capability?

Ms. EDWARDS. Well, if I could reclaim my time, we have a really balanced program and a balanced budget. I mean, the fact is that even the commercial enterprises that are identified here didn't ask for the money. And so it seems to me, as we are trying to figure

out ways in which we can create balance throughout the agency and the authorization and, you know, support this sort of emerging development of a commercial space flight cargo capacity, that this budget and the authorization herein I think really reflects that, and at the same time enables NASA to move forward in a way that is responsible. So with that, Mr. Chairman, I yield.

Chairman GORDON. Thank you, Ms. Edwards. I think you made a good point, that if we took a vote with all or none, we would have a very—there are strong feelings both ways, and this was an attempt to try to make that balance. If there is no further discussion, then the vote occurs on the amendment. All in favor, say aye. Those opposed, no. The no's have it. The amendment is not agreed to. The next amendment on the roster is the amendment offered by the gentleman from Florida. Mr. Grayson, are you ready to proceed with your amendment?

Mr. GRAYSON. Yes. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 081, amendment to H.R. 5781 offered by Mr. Grayson of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentleman for five minutes to explain his amendment.

Mr. GRAYSON. Mr. Chairman, this bill provides for \$500 million in government support to companies with no revenue, no profit, virtually no capital, no customers and no product. This is the epitome of socialism and corporate welfare. I—this amendment has one purpose and one purpose only, to strike the \$500 million that we are seeking to give to people who haven't even asked for it so that they can supposedly develop a capability that the government already has. Specifically, this is an amendment that eliminates the subsidy in this bill that provides for these commercial entities to get \$500 million.

It raises the question of why we are trying in the first place to turn over an existing functioning—well functioning program that uses government entities and government resources to put men in space, and we are trying to turn that over to commercial entities for what? So that we can hand them \$500 million? Almost every large NASA contract is a cost reimbursement contract. Presumably, if one of these entities ever does develop the ability to put men in space, NASA will give them a cost reimbursement contract. A cost reimbursement contract pays the contractor a fee, and then invites the contractor to submit invoices for its expenses. It is basically a huge expense account.

So any one of these companies that actually does get to the point where they can put men in space will, in all likelihood, get a cost reimbursement contract from NASA. And then on top of that we are supposed to be giving them under this bill \$500 million in loans. For what? Why are we doing this? I think that this is a terrible waste. I think that it—if anybody here is serious at all about the idea that we should be cutting the deficit, this is a good place to start. Why hand \$500 million of Federal resources to companies that don't need it, haven't asked for it, don't want it, and will provide, in all likelihood, nothing for it. That is why I propose this amendment. I yield back.

Chairman GORDON. Would anyone else like to be heard on the amendment? Mr. Rohrabacher is recognized.

Mr. ROHRABACHER. Well, again, we are at a real crossroads here, and let me just note I think America is a better country because we have United Airlines and American Airlines and private companies that actually provide transportation through the air, although 100 years ago it seemed like that would be a totally impossible dream. We are on the, you know, we are basically—we reached a threshold now technologically where we can have commercial space endeavors. But all along, as we know, in the development of private industries and taking technologies and taking it in the private sector, and—there has never been a—you might say a pristine free enterprise approach, and there has been some government involvement, and the degree is whether or not some of us believe in some government involvement versus some people don't believe there should be any private sector involvement at all.

And I respect the notion that the government should run everything. I respect the notion that the businesses that are now run in the private sector that people should be out there—should be government employees. If people actually believe that that is the best approach to running enterprises, and they are—that is great. I don't agree with that. I don't think the American people agree with that as well. I think the American people are very supportive of efforts to try to get private individuals and entrepreneurs and commercial enterprise involved in what has basically been a government run operation, in terms of space transportation. And this—what this bill does is—and, again, I would agree with the gentleman on one thing. We haven't had the hearings necessary to talk about the efficacy of the loan program.

But that doesn't mean that we are just basically now going to take the steps of—that would just totally undermine all of the different approaches to commercial space, because that is what we are hearing today. We are hearing today that it is not good just to have the grant—a grant program. It is not good to have—and so—and now it is not good to have a loan guarantee program. And what we are really saying here is—what we are really hearing here is that there—government should run all of the space business in the future. That we are—that is what, you know, we are making that determination. I would suggest that, by taking this money and providing it at least for loan guarantees, I would have had it even more direct than that, that it is a wise use of our money, and apparently NASA and the administration agreed with that, as compared by putting the same amount of money, this \$312 million, into the exploration program, that we are going to be building a government system that the money that is being provided won't even guarantee that we have that system, because—so we are taking it from a loan guarantee program for commercial enterprise and giving it to part of our budget that will produce probably nothing, no capabilities, because we are—it is underfunded to the point that we know we are not going to be able to accomplish our mission with it.

So I would suggest that the gentleman's amendment—I certainly appreciate people with different philosophical approaches to what government should do and what it shouldn't do, but this will be the

coffin—the nail in the coffin for commercial space if we continue down the path that we seem to be going today. Thank you very much, Mr. Chairman.

Chairman GORDON. Ms. Giffords is recognized.

Ms. GIFFORDS. Thank you, Mr. Chairman. I also respectfully—respectfully oppose the gentleman's amendment. And again, you know, we have been talking a lot about the balance in this bill, and really trying to ensure that we have a national human space flight program that is NASA led, and that we are also trying to augment and promote the future of commercial space. And the way that this provision is written, the administrator is not going to provide loans or any loan guarantees to any companies unless a whole series of conditions are met. And they include the administrator determining that there is a reasonable prospect of repayment of the principle and interest by the borrower, and also that the amount of the obligation, when combined with the amount available to the borrower from other sources is actually sufficient to carry out the total development cost, and finally that the administrator shall charge fees sufficient to cover the cost—administering the program.

In contrast to the direct funding that the administration takes in their tack, this bill exposes the taxpayer, I believe, to minimum cost and minimum risk, but allows the amount of Federal funding allocated for the loan guarantees—potentially leverage a significantly greater amount of money. How much more will be set by OMB, who will have the chance to assess the risk involved with the loan guarantee programs. And since OMB is providing such large amounts to commercial providers in the President's request, I have to assume that they consider the risk to be low, so they should be willing to provide a rate that allows a large amount of leverage from the available funding. But, of course, that is for OMB to determine, not for us.

I also would just like to note that the gentleman's amendment actually cuts into NASA's budget, and I don't think that is the intent of the Committee. In fact, you know, if I had been the President, I would have doubled NASA's budget, frankly. I mean, we don't have that many resources. I want to make sure that we keep all the dollars on the table that we do—that we have. So, thank you, Mr. Chairman.

Chairman GORDON. Is there further discussion on the amendment? Not to my right. To my left, Mr. Garamendi.

Mr. GARAMENDI. Thank you, Mr. Chairman. I will be very brief with this. I support the amendment as proposed. I also note that the guarantee as written here would require that the private entrepreneur come up with 25 percent of the money, and 75 percent would be the Federal loan guarantee. I just think that we do have a program. I agree with all that Mr. Grayson said about duplication. We are talking about companies that have really no track record at all receiving up to half a billion dollars of Federal loan guarantee. Perhaps they can pay it back, but we are looking at 75 percent of the money being the government's share here, and I think we would just be better off saying no and moving on.

Chairman GORDON. Is there further discussion on this issue? I am sure there will be further discussion as we go through—down

the—amendments, but in terms of this amendment? If no, then a vote occurs on the amendment. All in favor say aye. Those opposed say no. The no's have it.

Mr. GRAYSON. Mr. Chairman, I ask for a recorded vote.

Chairman GORDON. A recorded vote has been asked. The clerk will record the vote—poll the vote.

The CLERK. Chairman Gordon?

Chairman GORDON. No.

The CLERK. Chairman Gordon votes no.

Mr. Costello?

[No response.]

The CLERK. Ms. Johnson?

Ms. JOHNSON. Aye.

The CLERK. Ms. Johnson votes aye.

Ms. Woolsey?

Ms. WOOLSEY. No.

The CLERK. Ms. Woolsey votes no.

Mr. Wu?

[No response.]

The CLERK. Mr. Baird?

Mr. BAIRD. No.

The CLERK. Mr. Baird votes no.

Mr. Miller?

[No response.]

The CLERK. Mr. Lipinski?

[No response.]

The CLERK. Ms. Giffords?

Ms. GIFFORDS. No.

The CLERK. Ms. Giffords votes no.

Ms. Edwards?

[No response.]

The CLERK. Ms. Fudge?

Ms. FUDGE. No.

The CLERK. Ms. Fudge votes no.

Mr. Luján?

Mr. LUJÁN. No.

The CLERK. Mr. Luján votes no.

Mr. Tonko?

Mr. TONKO. No.

The CLERK. Mr. Tonko votes no.

Mr. Rothman?

[No response.]

The CLERK. Mr. Matheson?

Mr. MATHESON. No.

The CLERK. Mr. Matheson votes no.

Mr. Davis?

[No response.]

The CLERK. Mr. Chandler?

Mr. CHANDLER. No.

The CLERK. Mr. Chandler votes no.

Mr. Carnahan?

Mr. CARNAHAN. No.

The CLERK. Mr. Carnahan votes no.

Mr. Hill?

[No response.]
The CLERK. Mr. Mitchell?
[No response.]
The CLERK. Mr. Wilson?
[No response.]
The CLERK. Ms. Dahlkemper?
Ms. DAHLKEMPER. Yes.
The CLERK. Ms. Dahlkemper votes aye.
Mr. Grayson?
Mr. GRAYSON. Aye.
The CLERK. Mr. Grayson votes aye.
Ms. Kosmas?
Ms. KOSMAS. No.
The CLERK. Ms. Kosmas votes no.
Mr. Peters?
[No response.]
The CLERK. Mr. Garamendi?
Mr. GARAMENDI. Aye.
The CLERK. Mr. Garamendi votes aye.
Mr. Hall?
Mr. HALL. No.
The CLERK. Mr. Hall votes no.
Mr. Sensenbrenner?
Mr. SENSENBRENNER. No.
The CLERK. Mr. Sensenbrenner votes no.
Mr. Lamar Smith?
[No response.]
The CLERK. Mr. Rohrabacher?
Mr. ROHRABACHER. No.
The CLERK. Mr. Rohrabacher votes no.
Mr. Bartlett?
Mr. BARTLETT. No.
The CLERK. Mr. Bartlett votes no.
Mr. Ehlers?
Mr. EHLERS. No.
The CLERK. Mr. Ehlers votes no.
Mr. Lucas?
Mr. LUCAS. No.
The CLERK. Mr. Lucas votes no.
Mrs. Biggert?
[No response.]
The CLERK. Mr. Akin?
[No response.]
The CLERK. Mr. Neugebauer?
[No response.]
The CLERK. Mr. Inglis?
Mr. INGLIS. No.
The CLERK. Mr. Inglis votes no.
Mr. McCaul?
Mr. MCCAUL. No.
The CLERK. Mr. McCaul votes no.
Mr. Diaz-Balart?
[No response.]
The CLERK. Mr. Bilbray?

[No response.]

The CLERK. Mr. Adrian Smith?

Mr. SMITH OF NEBRASKA. No.

The CLERK. Mr. Adrian Smith votes no.

Mr. Broun?

Dr. BROUN. Aye.

The CLERK. Mr. Broun votes aye.

Mr. Olson?

Mr. OLSON. No.

The CLERK. Mr. Olson votes no.

Mr. ROTHMAN. Mr. Chairman——

Chairman GORDON. Mr. Rothman.

Mr. ROTHMAN. Mr. Chairman, I would like to be recorded as a no.

The CLERK. Mr. Rothman votes no.

Mr. Wu?

Mr. WU. No.

The CLERK. Mr. Wu votes no.

Chairman GORDON. Ms. Edwards?

Ms. EDWARDS. No.

The CLERK. Ms. Edwards votes no.

Chairman GORDON. Is there anyone else that has not voted? Is there anyone who would like to change their vote? Ms. Woolsey is recognized.

Ms. WOOLSEY. Mr. Chairman, I would like to move from a no to a yes.

Chairman GORDON. Is there anyone else who has not—already voted aye—the clerk will—the vote.

The CLERK. Mr. Chairman, 6 members vote aye and 23 members vote no.

COMMITTEE ON SCIENCE AND TECHNOLOGY - 111th

DATE: July 22, 2010 AMENDMENT NO. 5 ROLL CALL NO. ___

Bill: H. R. 5781

SPONSOR of AMEND - Grayson-081

PASSED VOICE VOTE
 DEFEATED ✓ WITHDRAWN

Quorum - 15 to vote - 22 to report

| | MEMBER | AYE | NO | PRESENT | NOT VOTING |
|----|------------------------|-----|----|---------|------------|
| 1 | Mr. GORDON, Chair | | ✓ | | |
| 2 | Mr. COSTELLO - IL | | | | |
| 3 | Ms. JOHNSON - TX | ✓ | | | |
| 4 | Ms. WOOLSEY - CA | ✓ | | | |
| 5 | Mr. WU - OR | | ✓ | | |
| 6 | Mr. BAIRD - WA | | ✓ | | |
| 7 | Mr. MILLER - NC | | | | |
| 8 | Mr. LIPINSKI - IL | | | | |
| 9 | Ms. GIFFORDS - AZ | | ✓ | | |
| 10 | Ms. EDWARDS - MD | | ✓ | | |
| 11 | Ms. FUDGE - OH | | ✓ | | |
| 12 | Mr. LUJAN - NM | | ✓ | | |
| 13 | Mr. TONKO - NY | | ✓ | | |
| 14 | Mr. ROTHMAN - NJ | | ✓ | | |
| 15 | Mr. MATHESON - UT | | ✓ | | |
| 16 | Mr. DAVIS - TN | | | | |
| 17 | Mr. CHANDLER - KY | | ✓ | | |
| 18 | Mr. CARNAHAN - MO | | ✓ | | |
| 19 | Mr. HILL - IN | | | | |
| 20 | Mr. MITCHELL - AZ | | | | |
| 21 | Mr. WILSON - OH | | | | |
| 22 | Mrs. DAHLKEMPER - PA | ✓ | | | |
| 23 | Mr. GRAYSON - FL | ✓ | | | |
| 24 | Ms. KOSMAS - FL | | ✓ | | |
| 25 | Mr. PETERS - MI | | | | |
| 26 | Mr. GARAMENDI, CA | ✓ | | | |
| 27 | Vacancy | | | | |
| 1 | Mr. HALL - TX | | ✓ | | |
| 2 | Mr. SENSENBRENNER - WI | | ✓ | | |
| 3 | Mr. LAMAR SMITH - TX | | | | |
| 4 | Mr. ROHRBACHER - CA | | ✓ | | |
| 5 | Mr. BARTLETT - MD | | ✓ | | |
| 6 | Mr. EHLERS - MI | | ✓ | | |
| 7 | Mr. LUCAS - OK | | ✓ | | |
| 8 | Mrs. BIGGERT - IL | | | | |
| 9 | Mr. AKIN - MO | | | | |
| 10 | Mr. NEUGEBAUER - TX | | | | |
| 11 | Mr. INGLIS - SC | | ✓ | | |
| 12 | Mr. McCAUL - TX | | ✓ | | |
| 13 | Mr. DIAZ-BALART - FL | | | | |
| 14 | Mr. BILBRAY - CA | | | | |
| 15 | Mr. ADRIAN SMITH - NE | | ✓ | | |
| 16 | Mr. BROUN - GA | ✓ | | | |
| 17 | Mr. OLSON - TX | | ✓ | | |
| | TOTALS | 6 | 23 | | |

Chairman GORDON. The ayes have it. The amendment is not—I mean the no's have it, the amendment is not agreed to. And the next amendment on the roster is the amendment offered by the gentlelady from Florida, Ms. Kosmas. Are you ready to proceed with your amendment?

Ms. KOSMAS. Mr. Chairman, thank you. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 040, amendment to H.R. 5781 offered by Ms. Kosmas of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentlelady for five minutes to explain her amendment.

Ms. KOSMAS. Thank you, Mr. Chairman. I think it is fair to say that all the discussion around amendments for today's bill focus on our attempts to find a balance in what we are proposing to do. That is to say we want to ensure that we maintain America's leadership with a NASA led vehicle, but we are looking for opportunities to increase the use of innovation and entrepreneurship. And this amendment proposes to do just that by suggesting we authorize and fund from within the exploration budget a flagship technology demonstration program. This would be based at the Johnson Space Center and at the Kennedy Space Center. Demonstration missions would be launched from Kennedy Space Center and utilize the expertise and the work force there, which has been my number one priority in the 19 months that I have been serving here.

The Augustine Commission, as well as many previous commissions and studies, have identified the need to develop these technologies, such as an on orbit refueling, in site resource utilization, life support systems, and new propulsion methods in order to enable human space flight below low Earth orbit—beyond low Earth orbit, excuse me, beyond low-Earth orbit. Technologies such as on orbit fueling has the potential to significantly improve the performance of heavy lift vehicles while achieving appreciably lower total life cycle costs. The ability to utilize the resources at the destinations we intend to visit is also essential to conducting successful long duration exploration missions.

The need to develop and prove these types of technologies is fundamental to the successful execution of an exploration program. My amendment proposes to fund this program at the same levels already approved by the Senate authorizers and appropriators in order to spur the development of these critical technologies. I urge you to support my amendment, and I yield back.

Chairman GORDON. Thank you, Ms. Kosmas, and Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, I oppose this amendment. We have worked very hard to ensure that there is a follow-up program to the space shuttle that would assure the U.S. has a vibrant space exploration program. Gentlelady's amendment will likely take money away from the task of developing the next generation of launch vehicles so we can reduce the gap as soon as possible. I think some of her proposed technology demonstrations would be useful, but I don't believe most of us are willing to take money

from the development of exploration vehicles to do that at this time. We do oppose the amendment.

Chairman GORDON. Is there further discussion?

Mr. ROHRABACHER. Mr. Chairman?

Chairman GORDON. Mr. Rohrabacher is recognized.

Mr. ROHRABACHER. While I am glad to see that there are some people here who are looking to build the future, rather than trying to just get by with today's capabilities, and what the lady from Florida is suggesting as a priority for this budget is, again, very future oriented, and—as compared to simply spending money on a system that will not—well, let us put it this way, it is based on old concepts. She is taking money from part of the budget based on old concepts and taking—and trying to put the—put that money into developing new technologies in new ways to approach space exploration and space transportation. And it is—I happen to believe—anyway, we have had to talk about commercial. Now I happen to believe commercial is the way to go, but certainly we should be talking about new technologies is the way to go.

And one of the big problems with the Constellation program and the Aries system, and spending money simply in that program, was that it was not developing new technology. And the lady is—and the money that is being funded in this bill will not even lead to the completion of that program. So at least what the lady is proposing is that we take money that is being spent in a way that will not lead to the completion of any project, and at least let us start developing these new technologies that will give us new capabilities for better approaches to space transportation.

And I would not be supporting it if it just added more money, but I believe this is—now we are actually shifting money away from something that is less creative and will give less benefit in the end to America than developing these new concepts of space transportation, like refueling, which I believe, and I agree with the lady, would—will open up a whole new world, or a whole new universe, of exploration for humankind, if we perfect that approach, rather than just relying on the old approach, which is just building bigger rockets, bigger behemoths to launch into the air. Well, this will give us perhaps the same capability as building some big Constellation rocket by putting money into developing a system of refueling and other type of technologies that will expand our capabilities in a new way, rather than relying on the old ways of approaching space transportation. So I would ask my colleagues to join me in supporting this amendment.

Chairman GORDON. Thank you, Mr. Rohrabacher. Let me point out that this bill does provide \$5 billion over the next five years for new technologies, because we, you know, and I certainly agree with you that we want to look at—for those new technologies. But I can't agree that this does not add additional expense. It actually adds \$2 billion to the program, or it will pretty much gut much of the exploration program, as Mr. Hall has pointed out. And so for that, even though I am sympathetic to it in, you know, in a world with additional resources, I am afraid that we can't afford it now. Is there further discussion? If no further discussion, then the vote occurs on the amendment. All in favor say aye. Opposed, no. The no's have it. The amendment is not agreed to.

The next amendment on the roster is an amendment offered by the gentleman from New Mexico, Mr. Luján. Are you ready to proceed with your amendment?

Mr. LUJÁN. Thank you, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 065, amendment to H.R. 5781 offered by Mr. Luján of New Mexico.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentleman for five minutes to explain his amendment.

Mr. LUJÁN. Again, thank you very much, Mr. Chairman. The Commercial Reusable Sub-Orbital Research program at NASA, known as CRuSR, is designed to allow students, businesses and researchers to fly experiments on board commercial sub-orbital space vehicles. The goal of the program is to facilitate access to near space by NASA sponsored researchers, engineers, technologists and educators. These flights provide researchers access to microgravity environments, which is far less costly than sending experiments into the International Space Station. The President's budget request for NASA includes \$15 million a year for the CRuSR program for 2011 through 2015, however, the original text of this of this bill only authorizes \$1 million a year for CRuSR from the space technology authorization for 2011 and 2012. My amendment would strike the \$1 million annual authorization for the CRuSR program from 2011 to 2012, removing the one million limit and leaving allocation of funding for CRuSR to the direction of the NASA administrator. This is not a new authorization, nor does it take away funding from any other authorizations in the bill. My amendment also clarifies management and other requirements of the program which are consistent with critical sub-orbital science missions.

My home state of New Mexico is currently reaping the economic benefits of commercial sub-orbital space flight through our Spaceport America facility near Las Cruces. About 500 New Mexicans are now on the job, creating the first commercial spaceport in the world. Another 300 new jobs are expected this year. New Mexico's spaceport is inspiring students to study math and science and pursue careers in STEM fields which will develop our future economy. Investments in programs like CRuSR and in public/private partnerships within NASA to support and develop a sub-orbital space flight will ensure that America continues to be a global leader in the space technology for the 21st century.

With that, Mr. Chairman, I urge my colleagues to support this amendment. Thank you for your consideration. I yield back my time.

Chairman GORDON. Thank you, Mr. Luján, for another good amendment. Does Mr. Hall wish to be recognized?

Mr. HALL. I do. I would like to be.

Chairman GORDON. Mr. Hall—

Mr. HALL. I don't have to be.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. I was going to whisper to you that I support his amendment. I do plan to support the gentleman's amendment. I have some talented young guys in my hometown of Rockwall,

Texas. It is the smallest county in Texas out of 254 counties. I hate to admit that anything is small, but right there in that small county, operate out of a little place called Caddo Mills Airport [ph], they have a company called Armadillo Aerospace, and I attended a celebration for them and recognition for them here. Didn't know where I was going, didn't know what I was going to say when I got there, but NASA had a prize program, and they had won a part of the prize program, and received a half a million dollars. And I have seen a video of some of their work. I hope to get out there and see them in person one of these days. They are going some very interesting things, and have some good ideas for commercial and reusable sub-orbital flight vehicles.

I have had some concerns with aspects of the program, but I think Mr. Luján's amendment has improved the program, and it is likely to get help—likely to help some of these bright young people make good contributions to scientific research. I make no recommendations for my colleagues. They can vote the way they see fit, they are going to anyway, but for me, I am going to support Mr. Luján's amendment.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

I plan to support the gentleman's amendment.

I have some talented young guys in my hometown of Rockwall that operate out of the Caddo Mills Airport. They have a company called Armadillo Aerospace, and I have seen video of some of their work. I hope to get out there and see them in person one of these days. But they are doing some very interesting things and have some good ideas for commercial reusable sub-orbital flight vehicles. I have had some concerns with aspects of this program, but I think Mr. Luján's amendment has improved the program, and it is likely to help some of these bright young guys make good contributions to scientific research. I make no recommendation for my colleagues, they can vote the way they see fit, but as for me I will support Mr. Luján's amendment.

Chairman GORDON. Thank you, Mr. Hall, and I think Mr. Luján probably thanks you. If there is no further discussion on the amendment—oh, Ms. Kosmas is recognized.

Ms. KOSMAS. Thank you, Mr. Chairman. Just very quickly, I want to speak in support of this amendment. The suborbital CRuSR program obviously provides many opportunities for NASA, university or private researchers, tourists and other Federal agencies. The thing that I have identified as my number one priority almost might be affected here, as these opportunities can use the shuttle landing strip and other facilities at Kennedy Space Center, and therefore my work force and the expertise that they have may be put to good use through the support of this program. Thank you.

Chairman GORDON. Thank you, Ms. Kosmas. Does anyone else wish to be heard? If not, then the vote occurs on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to. The next amendment on the roster is an amendment offered by the gentleman from Georgia, Dr. Broun. Are you ready to proceed with your amendment?

Dr. BROUN. Yes, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 001, amendment to H.R. 5781 offered by Mr. Broun of Georgia.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentleman for five minutes to explain the amendment.

Dr. BROUN. Thank you, Mr. Chairman. I was excited to hear you, as you made your opening remarks, about being fiscally responsible. And I want to thank you, Ranking Member Hall, Chairman—Chairwoman Giffords, and Congressman Olson, along with the staff for all of you all's hard work in producing this bipartisan bill that will allow NASA to refocus its core mission in a fiscally responsible way.

I know this has not been an easy task, and many difficult decisions had to be made. While I believe this bill is a good faith effort towards a balanced approach and addresses the right priorities, I am still concerned with the heavy burden of debt and the huge deficits looming before us. Therefore, I offer my amendment today that would authorize these programs for three years instead of five years, as the current language does.

Again, I appreciate the strong bipartisan effort in developing this bill, and I urge my colleagues to support my amendment. Mr. Chairman, I yield back.

[The prepared statement of Mr. Broun follows:]

PREPARED STATEMENT OF REPRESENTATIVE PAUL C. BROUN

Mr. Chairman, I have an amendment at the desk.

Mr. Chairman, let me first thank you, Ranking Member Hall, Chairwoman Gifford and Congressman Olson, along with staff, for all of your hard work in producing a bipartisan bill that will allow NASA to refocus on its core mission in a fiscally responsible manner. I know this has not been an easy task and many difficult decisions had to be made.

While I believe this bill is a good faith effort towards a balanced approach and addresses the right priorities, I am still concerned with the heavy burden of debt and huge deficits looming before us. Therefore, I offer my amendment today, which would authorize these programs for three years, instead five years, as the current language does.

Again, I appreciate strong bipartisan effort in developing this bill and urge my colleagues to support my amendment.

Chairman GORDON. Thank you, Dr. Broun. I want to excite you some more in that I support your amendment. But I also hope—and part of that is because I hope in three years that there will be more money available, that we will have a better economy, and that we will be able to carry out things that Ms. Kosmas, Mr. Rohrabacher, and other good amendments that have been before us.

Dr. BROUN. Mr. Chairman, would you yield?

Chairman GORDON. Certainly, Dr. Broun.

Dr. BROUN. I am excited that you accept my amendment. I have been trying to be very quiet over here, let Mr. Rohrabacher do—talk, but thank you, and I agree with you, and I associate myself with your last remarks about—

Chairman GORDON. You are always—

Dr. BROUN. —thank you so much, sir.

Chairman GORDON. Is there further discussion on the amendment? If—the vote occurs on the amendment. All in favor say aye. Opposed, no. The ayes have it. The amendment is agreed to. The next amendment on the roster is an amendment offered by the gentleman from Wisconsin, Mr. Sensenbrenner. Are you ready to proceed with your amendment?

Mr. SENSENBRENNER. I am, Mr. Chairman, I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 003, amendment to H.R. 5781 offered by Mr. Sensenbrenner of Wisconsin.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentleman for five minute to explain his amendment.

Mr. SENSENBRENNER. Mr. Chairman, conspicuously absent from this legislation is any mention of the Constellation program. While that might suit the prerogative of the administration, it is not consistent with the intent of this Congress or this Committee. Congress has repeatedly affirmed its support for the Constellation program through the previous authorization bills and by the sentiments expressed by members on both sides of the aisle.

I am not here to defend NASA's mismanagement of its resources. Without question, budgetary constraints force us to re-evaluate how each program has been managed, but the wholesale elimination of Constellation will have detrimental effects on our struggling economy, set back our space program several years, and result in significant termination costs, while surrendering the progress that has been made in recent years. This amendment makes it clear that this Committee and this Congress continue to support the Constellation program.

Now, what I am here to say is that I am afraid that the omission of the word Constellation in the text of this bill will be interpreted by the administration as saying that we are going back on what we have previously stated in statements and in authorization legislation that has been previously passed. And all this amendment does is to insert the words "Constellation program" and "after support for". So this makes it clear that this is not a 180 by the Committee, it is not a 180 by the Congress, and what we should be doing here, if we need to redirect and reprogram money, is to do it in the context of legislation that has been around for more than 20—or 48 hours and open for amendment for only 24 hours.

This is a big program. We spent \$10 billion on it, and we do need to spend a little bit more time before either withdrawing support for Constellation or allowing the administration to say, well, since Congress didn't mention Constellation, as they have in the past, I guess they have drawn back on it. There is no fiscal effect on this. This basically transfers the burden to NASA to come up here and to be a little bit more detailed on why they are doing this. Given the previous support and previous comments by members of this Committee, I would strongly urge members to adopt this amendment, yield back the balance of my time.

[The prepared statement of Mr. Sensenbrenner follows:]

PREPARED STATEMENT OF REPRESENTATIVE F. JAMES SENSENBRENNER JR.

Conspicuously absent from this legislation is any mention of the Constellation Program. While that may suit the prerogative of the Obama Administration, it is not consistent with the intent of this Congress or this committee.

Congress has repeatedly affirmed its support for the Constellation program through the previous authorization bill and by the sentiments expressed by Members on both sides of the aisle.

I am not here to defend NASA's mismanagement of its resources. Without question, budgetary constraints force us to reevaluate how each program has been man-

aged, but wholesale elimination of Constellation will have detrimental effects on our struggling economy, set back our space program several years, and result in significant termination costs while surrendering the progress that has been made in recent years.

My amendment makes clear that this committee and this Congress continue to support the Constellation program.

Chairman GORDON. Thank you, Mr. Sensenbrenner. Let me point out that there have been numerous hearings, I think 19 hearings, on this program. This is not the Constellation program that was envisioned some time back. Simply because we simply do not have the money, and as Dr. Broun has pointed out, we are trying to live within our budget, this is a new program. And let me also point out, to the best of my knowledge, this Committee has never named a program. That is up to NASA. And so I would say that we should continue with that, and it is up to NASA to name—I am more interested in the content. This is a content that has provided good—a good balance, and I would suggest that we continue and reject the gentleman's amendment. Is there further discussion? If not—

Mr. HALL. Yes, I—

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. I would like to yield to Mr. Sensenbrenner, if he wants to say a word.

Mr. SENSENBRENNER. I thank the gentleman for yielding. We are not naming this program. We are using the program that NASA named. I fully agree that NASA has the prerogative to name programs. You know, we shouldn't be saying that this is the Jim Sensenbrenner program or the Bart Gordon program and making monuments to ourselves. I am just referring to NASA's own terminology in this amendment. This is very clear. You know, are we going to go back on the support for this program, or are we not? And all this does is insert NASA's name in the list of things that we support. I thank the gentleman for yielding and yield back.

Mr. HALL. Mr. Chairman, let me take up my time, if I might? We do name things after people and after programs. There is a certain Chairman of Science Committee that—I am going to name the Bart Gordon ARPA-E Foundation, if I live, and if I am here next year. And I don't think it hurts to address or tip our hat to the word Constellation because that has been the battle cry of all us, that—keep Constellation and build on it, change whatever changes we had to make on it, but make it a NASA program, rather than loaning some bunch of people some money, not knowing if they are going to pay it back, and then they are going to charge the heck out of us for flying in one of the seats, not ever knowing that we will ever get our money back. We could call it Constellation Light or anything else, but I support the gentleman's amendment. It is a simple amendment that reaffirms Congress's support for the Constellation program.

Constellation program has been a rallying cry for thousands of aerospace workers and former astronauts. Former astronauts came here, used the word Constellation time and again, and—Cernan and Armstrong, Stafford. And it means a lot to those old heroes of the past who came here before this Committee to take on the striking of a line through the word Constellation, that brought us here, that spawned this hearing. While this bill makes some important updates to the original Constellation program, it retains the key

elements and focus of that vision. And that is what it is, it is a vision. I think it is important that we recognize, as a Congress, the legacy of this program. I think that the gentleman's amendment does precisely that. I urge the passage of it, and I think you are going to hear from a lot of the old astronauts if we don't put Constellation back, at least, into this program somewhere. Yield back.
[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

I support the gentleman's amendment. It is a simple amendment that reaffirms Congress' support for the Constellation program. The Constellation program has been a rallying cry for thousands of aerospace workers and former astronauts.

While this bill makes some important updates to the original Constellation program, it retains the key elements and focus of that vision. I think that it is important that we recognize as a Congress the legacy of this program. I think that the gentleman's amendment does precisely that, and I urge its passage.

Chairman GORDON. Thank you, Mr. Hall. Let me just sort of conclude. We have got votes going on. I would support Constellation, but if we are going to call it Constellation, we need to fund it like Constellation. This program is not being funded like Constellation. This is—when you read the bill, this clearly is a hybrid with a lot of the Constellation investments that have been made, but it is something different. Once again, I think this Committee has never named a program. It is up to NASA. I think that Mr. Hall has a good idea of changing that precedent next year, and I would welcome him to do that in the context of what he was talking about.

But we are here today, and so if there is no further discussion, then those in favor of the motion, say aye. Opposed, no. I think the—well, we are—I want to do the right thing here. Let us see. Let us have a show of hands. Let us just . . .

Mr. HALL. Sounded like the ayes had it.

Chairman GORDON. Well, that is what—let us have a show of hands. If—those that are in favor, say aye. Opposed, raise your hand. The no's have it.

Mr. SENSENBRENNER. Mr. Chairman, I demand a recorded vote.

Chairman GORDON. You can get it. You are bringing them back. The clerk will record the vote.

The CLERK. Chairman Gordon?

Chairman GORDON. No.

The CLERK. Chairman Gordon votes no.

Mr. Costello?

[No response.]

The CLERK. Ms. Johnson?

[No response.]

The CLERK. Ms. Woolsey?

Ms. WOOLSEY. No.

The CLERK. Ms. Woolsey votes no.

Mr. Wu?

Mr. WU. No.

The CLERK. Mr. Wu votes no.

Mr. Baird?

Mr. BAIRD. No.

The CLERK. Mr. Baird votes no.

Mr. Miller?

[No response.]

The CLERK. Mr. Lipinski?
[No response.]
The CLERK. Ms. Giffords?
Ms. GIFFORDS. No.
The CLERK. Ms. Giffords votes no.
Ms. Edwards?
Ms. EDWARDS. No.
The CLERK. Ms. Edwards votes no.
Ms. Fudge?
Ms. FUDGE. No.
The CLERK. Ms. Fudge votes no.
Mr. Luján?
Mr. LUJÁN. No.
The CLERK. Mr. Luján votes no.
Mr. Tonko?
Mr. TONKO. No.
The CLERK. Mr. Tonko votes no.
Mr. Rothman?
Mr. ROTHMAN. No.
The CLERK. Mr. Rothman votes no.
Mr. Matheson?
Mr. MATHESON. No.
The CLERK. Mr. Matheson votes no.
Mr. Davis?
[No response.]
The CLERK. Mr. Chandler?
Mr. CHANDLER. No.
The CLERK. Mr. Chandler votes no.
Mr. Carnahan?
Mr. CARNAHAN. No.
The CLERK. Mr. Carnahan votes no.
Mr. Hill?
[No response.]
The CLERK. Mr. Mitchell?
[No response.]
The CLERK. Mr. Wilson?
[No response.]
The CLERK. Mrs. Dahlkemper?
Ms. DAHLKEMPER. No.
The CLERK. Mrs. Dahlkemper votes no.
Mr. Grayson?
Mr. GRAYSON. No.
The CLERK. Mr. Grayson votes no.
Mrs. Kosmas?
Ms. KOSMAS. No.
The CLERK. Ms. Kosmas votes no.
Mr. Peters?
[No response.]
The CLERK. Mr. Garamendi?
[No response.]
The CLERK. Mr. Hall?
Mr. HALL. Yes.
The CLERK. Mr. Hall votes aye.
Mr. Sensenbrenner?

Mr. SENSENBRENNER. Aye.
The CLERK. Mr. Sensenbrenner votes aye.
Mr. Lamar Smith?
[No response.]
The CLERK. Mr. Rohrabacher?
Mr. ROHRABACHER. No.
The CLERK. Mr. Rohrabacher votes no.
Mr. Bartlett?
Mr. BARTLETT. Aye.
The CLERK. Mr. Bartlett votes aye.
Mr. Ehlers?
Mr. EHLERS. Aye.
The CLERK. Mr. Ehlers votes aye.
Mr. Lucas?
Mr. LUCAS. Aye.
The CLERK. Mr. Lucas votes aye.
Mrs. Biggert?
[No response.]
The CLERK. Mr. Akin?
[No response.]
The CLERK. Mr. Neugebauer?
[No response.]
The CLERK. Mr. Inglis?
Mr. INGLIS. Aye.
The CLERK. Mr. Inglis votes aye.
Mr. McCaul?
Mr. MCCAUL. Aye.
The CLERK. Mr. McCaul votes aye.
Mr. Diaz-Balart?
[No response.]
The CLERK. Mr. Bilbray?
[No response.]
The CLERK. Mr. Adrian Smith?
Mr. SMITH OF NEBRASKA. Aye.
The CLERK. Mr. Adrian Smith votes aye.
Mr. Broun?
Dr. BROUN. Aye.
The CLERK. Mr. Broun votes aye.
Mr. Olson?
Mr. OLSON. Aye.
The CLERK. Mr. Olson votes aye.
Chairman GORDON. Is there anyone who has not been recorded?
Mr. Miller? Votes no.
The CLERK. Mr. Miller votes no.
Chairman GORDON. Mr. Lipinski?
The CLERK. Mr. Lipinski votes no.
Chairman GORDON. Is there anyone else—clerk—record the vote.
As she is adding it up—
The CLERK. Mr. Chairman, 10 members vote aye and 19 members vote no.

COMMITTEE ON SCIENCE AND TECHNOLOGY - 111th

DATE: July 22, 2010 AMENDMENT NO. 9 ROLL CALL NO. ___

Bill: H. R. 5781

SPONSOR OF AMEND -Sensenbrenner-003

PASSED VOICE VOTE
DEFEATED ✓ WITHDRAWN

Quorum – 15 to vote – 22 to report

| | MEMBER | AYE | NO | PRESENT | NOT VOTING |
|----|----------------------|-----|----|---------|------------|
| 1 | Mr. GORDON, Chair | | ✓ | | |
| 2 | Mr. COSTELLO - IL | | | | |
| 3 | Ms. JOHNSON - TX | | | | |
| 4 | Ms. WOOLSEY - CA | | ✓ | | |
| 5 | Mr. WU - OR | | ✓ | | |
| 6 | Mr. BAIRD - WA | | ✓ | | |
| 7 | Mr. MILLER - NC | | ✓ | | |
| 8 | Mr. LIPINSKI - IL | | ✓ | | |
| 9 | Ms. GIFFORDS - AZ | | ✓ | | |
| 10 | Ms. EDWARDS - MD | | ✓ | | |
| 11 | Ms. FUDGE - OH | | ✓ | | |
| 12 | Mr. LUJAN - NM | | ✓ | | |
| 13 | Mr. TONKO - NY | | ✓ | | |
| 14 | Mr. ROTHMAN - NJ | | ✓ | | |
| 15 | Mr. MATHESON - UT | | ✓ | | |
| 16 | Mr. DAVIS - TN | | | | |
| 17 | Mr. CHANDLER - KY | | ✓ | | |
| 18 | Mr. CARNAHAN - MO | | ✓ | | |
| 19 | Mr. HILL - IN | | | | |
| 20 | Mr. MITCHELL - AZ | | | | |
| 21 | Mr. WILSON - OH | | | | |
| 22 | Mrs. DAHLKEMPER- PA | | ✓ | | |
| 23 | Mr. GRAYSON - FL | | ✓ | | |
| 24 | Ms. KOSMAS - FL | | ✓ | | |
| 25 | Mr. PETERS- MI | | | | |
| 26 | Mr. GARAMENDI, CA | | | | |
| 27 | Vacancy | | | | |
| 1 | Mr. HALL- TX | ✓ | | | |
| 2 | Mr. SENSENBRENNER-WI | ✓ | | | |
| 3 | Mr. LAMAR SMITH- TX | | | | |
| 4 | Mr. ROHRABACHER- CA | | ✓ | | |
| 5 | Mr. BARTLETT- MD | ✓ | | | |
| 6 | Mr. EHLERS- MI | ✓ | | | |
| 7 | Mr. LUCAS- OK | ✓ | | | |
| 8 | Mrs. BIGGERT- IL | | | | |
| 9 | Mr. AKIN- MO | | | | |
| 10 | Mr. NEUGEBAUER- TX | | | | |
| 11 | Mr. INGLIS- SC | ✓ | | | |
| 12 | Mr. McCAUL- TX | ✓ | | | |
| 13 | Mr. DIAZ-BALART- FL | | | | |
| 14 | Mr. BILBRAY- CA | | | | |
| 15 | Mr. ADRIAN SMITH- NE | ✓ | | | |
| 16 | Mr. BROUN - GA | ✓ | | | |
| 17 | Mr. OLSON- TX | ✓ | | | |
| | TOTALS | 10 | 19 | | |

Chairman GORDON. No's have it, the amendment is not agreed to, and when we come back we will proceed to—as—when we come back we will proceed with Mr. Olson's amendment.

Ms. EDWARDS. Mr. Chairman?

Chairman GORDON. Yes, Mr.—

Ms. EDWARDS. Do you have a—

Chairman GORDON. —Ms. Edwards?

Ms. EDWARDS. Do you have a time that we are—we will come back? Do you have a specific time?

Chairman GORDON. We—okay. Let us do—no. I mean, I am sure people would like to go to their offices, but I would like to get started 10 minutes after the last vote.

Ms. EDWARDS. Okay. Thank you, Mr. Chairman.

[Recess.]

Chairman GORDON. The Committee will come back to order. The next amendment on the roster is an amendment offered by the gentleman from Texas, Pete Olson.

Mr. OLSON. Mr. Chairman, I have an amendment at the desk and ask for its immediate consideration.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 034, amendment to H.R. 5781 offered by Mr. Olson of Texas.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. OLSON. Mr. Chairman, one of the strengths of our bill is that it seeks to maximize development of current investments and technology, including the Orion crew capsule and the Ares I launch vehicle. Unrecognized in our bill is the great progress being made in the spacesuit technology as well. The process of producing a new spacesuit in accordance with strict NASA oversight for safety and compatibility is well under way.

My amendment would recognize those efforts in spacesuit development and life support technology by including them in the restructured exploration program. I ask my colleagues to support the amendment, and I yield back the balance of my time.

[The prepared statement of Mr. Olson follows:]

PREPARED STATEMENT OF REPRESENTATIVE PETE OLSON

Mr. Chairman, I have an amendment at the desk and ask for its immediate consideration. This bill seeks to maximize development of current investments and technology, including the Orion crew capsule and Ares 1 crew launch vehicle, among other things, but great progress is being made in spacesuit technology as well.

The process of producing a spacesuit in accordance with strict NASA oversight for safety and compatibility is well underway. This amendment would recognize those efforts in spacesuit development and life support technology.

Thank you and I yield back the balance of my time.

Chairman GORDON. Thank you, Mr. Olson, for a good amendment. Is there any further discussion?

Mr. HALL. Mr. Chairman?

Chairman GORDON. Yes, sir.

Mr. HALL. I support his amendment with some minor clarification to Section 202, the restructured exploration program, and simply directs NASA to include spacesuit development and related life

support technology among the systems that should attempt to bring forward to the new restructured exploration program. Section 202 calls out Ares I and the Orion crew vehicle. This amendment simply adds another of the Constellation-related technologies to be applied to the new crew transportation system at no additional cost. There is no cost associated with this amendment. It is a good provision. I urge all members to support it.

Chairman GORDON. If there is no further discussion, the vote is on the amendment. All in favor say aye, opposed, no. The ayes have it. The amendment is agreed to.

The next amendment on the roster is an amendment offered by the gentlelady from Florida, Ms. Kosmas. Are you ready to proceed with your amendment?

Ms. KOSMAS. Thank you, Mr. Chairman, I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 041, amendment to H.R. 5781 offered by Ms. Kosmas of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

The gentlelady is recognized for five minutes.

Ms. KOSMAS. Thank you, Mr. Chairman. The continued and expedited development of NASA led heavy lift vehicle is critical to us for maintaining America's international leadership in space exploration, and I think it is safe to say in the opinion of the members of this Committee, it is also integral to this particular piece of legislation.

What my amendment does is to support and hasten that development by utilizing the investments we have already made by both the Air Force and other government entities as well as by increasing the competition to ensure that the use of NASA funding is as efficient and effective as possible.

As currently written, the bill before us blocks out the use of many technologies in which the Federal Government has already invested. This amendment would allow NASA to consider the joint use of propulsion systems across civil, military and commercial vehicles which would enable efficiencies in production and in cost.

I urge my colleagues to support the amendment in order to ensure robust competition that will maximize Federal investments in the development of a heavy lift vehicle. And I yield back my time.

Chairman GORDON. Is there further discussion? Let me just point out that we share the same objective of getting to heavy lift as soon as possible. But once again, we want to do it within the resources of NASA. My concern is that providing this joint effort of civil, national security, commercial has never been done, at least in this area, and think it could slow us down. Where we have seen it being done is in the National Polar-orbiting Operational Environmental Satellite System (NPOESS) program that wound up being an enormous waste of money and I am afraid demonstrated that sometimes the one-size-fits-all approach does not work.

Is there further discussion?

Mr. HALL. Mr. Chairman—

Chairman GORDON. Mr. Hall.

Mr. HALL. —since you mentioned that, let me—I am sure the gentlelady has the best intentions with this amendment, but I am not sure I understand what she is trying to do. We want NASA to move forward with their design and development work. I guess I would have to ask the gentlelady to explain what she is trying to either promote or restrict and would she expect NASA to delay its design and development work until NASA completes a study on the joint use of propulsion systems with the Air Force, commercial cargo carriers and others before they could proceed with vehicle design? NASA studied exploration architecture for years. I just worry that this amendment could be an unnecessary step. Would you care to comment, Ms. Kosmas?

Ms. KOSMAS. Thank you, Mr. Hall. To the contrary, what this is intended to do is take advantage of the kinds of innovation that have already been developed and are being used by both the Air Force and other government entities and to ensure that there is a robust competition in order to support and hasten and expedite the development by using those technologies that have already been developed and are being developed for other Federal agencies.

Mr. HALL. I haven't seen the amendment. I should have looked at it before asking any questions, but do you have the word shall in there?

Ms. KOSMAS. Yes. I am sorry, yes, it does. It says the administrator shall take appropriate actions to ensure the long-term affordability and sustainability of the heavy lift launch vehicle, including consideration of joint use of propulsion systems across civil, national security and commercial vehicles.

Mr. HALL. And would you expect NASA to delay its design and development work until NASA completes a study on the use of propulsion systems the Air Force or cargo carriers have—

Ms. KOSMAS. That certainly wasn't my intention. My intention was for them to assess what is already being done out there and to ensure that there is competition in the procurement process that takes advantage of those things that are being developed or have already been developed by other Federal agencies.

Mr. HALL. I thank you. I withdraw my problems with it.

Chairman GORDON. Is there further discussion on the amendment? If no, the vote occurs on the amendment. All in favor say aye. Opposed, no. I guess we need a show of hands. All those in favor of the amendment raise your hand. Those opposed raise your hand. The no's have it. The amendment is not agreed to.

First let me say this. I notice that Ms. Jackson Lee has been in our audience for much of the day. She is a former member of this Committee, a valuable member of this Committee, and a member of the Aviation and Space Subcommittee, and she is not able to directly participate because of the rules of the House that she is no longer on our Committee but has been a great resource as we put the bill together. And we thank you, Ms. Jackson Lee, and hope to have your continued advice.

The next amendment on the roster is an amendment offered by the gentleman from Florida, Mr. Grayson. He is not here now. He just came to tell me that he is in his other committee at a point where he is asking questions. Mr. Hall and I talked earlier about not wanting to encourage people to have to wait until the end, but

we all know we serve on more than one committee. And so if we come to a point where somebody's amendment is appropriate but they are not here, then with joint agreement with Mr. Hall and I, they will be able to bring that amendment forward at the end of the proceedings. So we will pass on Mr. Grayson at this time and, I should say, unless someone wants to introduce it for him.

If not, then the next amendment on the roster is an amendment offered by the gentleman from Ohio, Mr. Wilson. Are you ready to proceed with your amendment?

Mr. WILSON. Yes. Thank you, Mr. Chairman.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 034, amendment to H.R. 5781 offered by Mr. Wilson of Ohio and Ms. Fudge of Ohio.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. WILSON. Thank you, Mr. Chairman. The authorization legislation before the Committee today seeks to reaffirm our commitment to NASA as well as ensure that America remains the world's leader in space and aeronautics.

As a proud Blue Dog Member of Congress, it is a priority of mine to ensure that NASA makes full use of its vast existing resources, and the path forward outlined in this mark restructures our exploration program in a fiscally responsible manner.

Many NASA facilities have recently been updated to reflect the testing demands of the missions outlined within this markup. Furthermore, this markup includes substantial funding to renovate existing facilities. It is the intent of my amendment to ensure that NASA utilize existing resources either in their current or renovated form and ensure that duplicative testing facilities are not built.

I yield back the balance of my time, Mr. Chairman.

Chairman GORDON. Ms. Fudge, would you like to—is there any further discussion? Mr. Wilson is recognized again.

Mr. WILSON. Yes, Mr. Chairman. I would like to withdraw my motion.

Chairman GORDON. Thank you, Mr. Wilson, and thank you for bringing that information to our attention.

The next amendment on the roster is an amendment offered by the gentlelady from Florida, Ms. Kosmas. Are you ready to proceed with your amendment?

Ms. KOSMAS. Thank you, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 043, amendment to H.R. 5781 offered by Ms. Kosmas of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. KOSMAS. Thank you, Mr. Chairman. This amendment seeks to provide guidance and authority for the use of funds as proposed by the President to upgrade the Kennedy Space Center [KSC] to create a 21st century launch complex capable of more efficient and

more versatile operations for NASA, commercial and military users. Many of the facilities and technologies at KSC and Cape Canaveral Air Force Station are literally vintage. For instance, while we all have GPS on our Blackberries, the Eastern Range still operates using radar. There are many long-overdue upgrades that are necessary to support NASA's next vehicle and to enable multiple users such as the military, suborbital vehicles and commercial launches.

Expanding the capabilities on the space coast will leverage existing infrastructure and expertise and will allow for more effective and flexible operations. The modernization and utilization of KSC's workforce, facilities and infrastructure by other users could lessen the negative impacts of the gap between the end of the shuttle program and the initiation of exploration activities.

Additionally, the success of commercial space and eventual NASA vehicle will help to ensure that the maintenance of our unique workforce continues. As you know, it is one of my highest priorities. But to enable this, we must bring KSC into the 21st century. Therefore, I urge my colleagues to support the amendment, and I yield back my time.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, I support the gentlelady's amendment. It just directs NASA administrator to carry out a program preparing the infrastructure at the Kennedy Space Center needed to support the exploration program authorized by this very bill. It also requires the administrator to provide a report to Congress within 180 days with an implementation plan, and the amendment also directs NASA to do a study on an implementation plan to make goals established under the 21st century space launch complex initiative. No direction is given to implement the plan. Rather, it calls for a report described in the initiative needed to meet the goals, a description of joint initiative with the U.S. Air Force and a timetable.

I think this amendment is very worthwhile and urge members to support it.

Chairman GORDON. Thank you, Mr. Hall. I certainly agree. This is an excellent amendment. There is a unique workforce in that area. They are under a lot of stress now. I think this is an excellent amendment to help really maintain that workforce for NASA and our country.

Is there further discussion? If there is no further discussion on the amendment, all in favor say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The next amendment on the roster is an amendment offered by the gentleman from Michigan, Mr. Peters. Are you ready to proceed with your amendment? Well, Mr. Peters was here. So we will treat Mr. Peters as we mentioned earlier and move now to the next amendment on the roster, an amendment offered by the gentlelady from Florida, Ms. Kosmas. Are you ready to proceed?

Ms. KOSMAS. Thank you, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 038, amendment to H.R. 5781 offered by Ms. Kosmas of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. KOSMAS. Thank you, Mr. Chairman. I think we all agree that the extension of the life of the International Space Station through 2020 is a very important initiative and it serves to maximize the \$100 billion investment already made in the International Space Station.

However, it is extremely important that we determine what parts and what components we might need to deliver to the International Space Station, especially in the case of large, heavy replacement systems and structures. This is to ensure that the promise to extend the International Space Station to 2020 is not just an empty gesture.

It is important to remember that to this point, decisions about which instruments and equipment were delivered to the ISS were based on the assumption of the need to support the space station only through 2015, not through 2020.

Right now we have no answers as to how we will get the equipment necessary to extend the life of the International Space Station without the shuttle. This amendment would direct the administrator to review and report to Congress on the components needed to fully service and support the extension of the space station. Right now 10 shuttle flights worth of flight-ready payloads averaging between 40,000 and 50,000 pounds per flight are sitting in storage warehouses ready to fly and ready to use, over 1,400 parts and pieces of equipment. We don't know how many or which of those grounded payload items might actually be needed in order to ensure the station can be supported and maintained until 2020. Not only that, we do not know which or how many of these items are simply too large or too heavy to be carried to orbit by any existing vehicle other than the space shuttle.

And finally, we do not know what additional items might need to be ordered, manufactured and delivered in the future or what launch vehicle capacity will be needed to deliver them to the station.

I urge my colleagues to support my amendment and require NASA to quickly report back on what additional resources and equipment are needed to fully utilize the International Space Station through 2020, on how to deliver this equipment to the space station. I urge your support, and I yield back my time.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, I originally opposed this amendment because it contained an unfunded provision to keep shuttle contracts open for the entire fiscal year 2011, but since the gentlelady has removed that provision, I think it would be helpful for NASA to thoroughly review the needs of the space station and report back to us. I support the amendment.

Chairman GORDON. Thank you, Mr. Hall. I agree, this is a common sense, constructive amendment that will help make NASA more efficient, and I agree.

Is there further discussion? If there is no further discussion, the vote occurs on the amendment. All in favor say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The next amendment on the roster, number 17, is offered by the gentlelady from Maryland, Ms. Edwards. Are you ready to proceed with your amendment?

Ms. EDWARDS. Mr. Chairman, I am withdrawing that amendment.

Chairman GORDON. Thank you, Ms. Edwards, and thank you for the input and the information.

The next amendment is number 18. It is offered by the gentleman from Wisconsin, Mr. Sensenbrenner. Are you ready to proceed with your amendment?

Mr. SENSENBRENNER. I am, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 039, amendment to H.R. 5781 offered by Mr. Sensenbrenner of Wisconsin.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. SENSENBRENNER. Mr. Chairman, I hope the members on both sides of the aisle listen to this argument very carefully.

The adoption of this amendment is essential if this bill is to work because if we do not give a preference to either U.S. Government-funded or U.S. private-sector funded launch capability, the agreements that NASA may have in mind with the Russians will simply allow the Russians to underbid our private sector launch capability, and we will probably end up outsourcing more of our launch capability to the Russians. They don't have to establish a market price for their launch capability, and we will continue going down a road that was started over 15 years ago during the reign of Administrator Dan Golden where much of our aerospace capabilities ended up not being funded because we had to fund the Russians to keep the International Space Station going.

Now, I believe that we need a public and private partnership, and during my chairmanship of the Committee, former Congressman and Chairman Bob Walker's commercial space bill was passed and signed into law by President Clinton.

We need to avoid duplication of costs, but we also have to recognize that the 800-pound gorilla out there that does not have to charge for their services and a market-based price is Russia. And as a result, without this amendment giving preference to launch capability made in the USA, either by the government or by American-based private sector companies, we simply will not be able to compete.

And all this amendment does is it says that if there is a capability on the part of American public sector or private contractors, they shall be given preference. And this is the only way that the loan guarantees that are contained in this bill will end up working. It is the only way that we will be able to develop a viable and healthy private launch capability not using government funds but using the inventiveness of the private sector. I think you could call

this amendment the prevention of outsourcing launch capability to Russia and perhaps in the future to China, and I would strongly urge its adoption. Yield back the balance of my time.

[The prepared statement of Mr. Sensenbrenner follows:]

PREPARED STATEMENT OF REPRESENTATIVE F. JAMES SENSENBRENNER JR.

A \$100 billion authorization may be commonplace for this Congress, but it still bothers me to be asked to vote on a triple-digit billion dollar budget that I received barely more than 48 hours ago.

The Majority, following the President's lead, is boldly going where our space program has never gone before and they're doing it by giving many if not most Members of the Committee little over 24 hours to read the bill and draft amendments.

Among the bill's most blatant inefficiencies is that it places the primary responsibility for Space travel in the private sector, but mandates that the government maintain a separate but equally capable capacity for space travel. Further, it places reliance on Russia to handle space transport of U.S. personnel and cargo.

Future space travel will require a public and private partnership as well as cooperation with international partners, but surely there is a way to share responsibilities rather than duplicate costs. I'm, disappointed that Members did not have more time with this legislative language to help strike a more appropriate and cost effective balance.

My current amendment addresses only a small part of this problem by ensuring that U.S. public and commercial ventures take priority over international partners when transporting cargo to space.

Chairman GORDON. Thank you, Mr. Sensenbrenner, for that constructive amendment. Is there further discussion?

Mr. HALL. Mr. Chairman?

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. This is almost a buy America deal. I support the gentleman's amendment. It is sensible that we first promote and encourage our own United States companies, very capable companies and capabilities before relying on foreign partners. I urge its passage.

Chairman GORDON. I agree. It is a sensible Sensenbrenner amendment.

If there is no further discussion, all in favor of the amendment say aye. Opposed, no. The ayes have it. The amendment is passed.

The next amendment on the roster is an amendment offered by the gentlelady from Florida, Ms. Kosmas. Are you ready to proceed with your amendment?

Ms. KOSMAS. Thank you, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 042, amendment to H.R. 5781 offered by Ms. Kosmas of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. KOSMAS. Thank you, Mr. Chairman. I think you and the other Committee members are aware of the fact that I have worked very hard and I have articulated many times today that we are seeking solutions that minimize the human spaceflight gap. This is important not only to our workforce but to maintaining American's leadership in human space exploration. And as I often say, maintaining that ability to inspire the next generation to engage in science, technology, engineering and mathematics, and that inspi-

ration has served us well for the last 50 years and I think will continue to do so.

Last year I succeeded in eliminating the hard deadline for the shuttle retirement in order to ensure that all scheduled missions were flown. I have also been pushing to officially manifest what is currently designated STS-135, the Launch On Need mission. Providing for the launch of this mission, which will have already been processed and ready to go in support of STS-134, will have several benefits which I believe are essential and a worthwhile investment.

As I have said, this mission will help to minimize the spaceflight gap by stretching out the human spaceflight capabilities into mid-2011. This will ease the transition for the unique and highly skilled professional workforce, not just at the Kennedy Space Center in Florida but across the country. Many have expressed concerns about the difficult time we would have in reestablishing this valuable and critical workforce should it be disbanded. Maintaining a large portion of the workforce and the infrastructure into 2011 will provide a better transition and will allow us to be preparing the follow-on program which NASA will be working to define during this period.

This Launch On Need flight will also help to ensure that the International Space Station is both serviced and utilized to its best potential. The extended life of the International Space Station enables us to fulfill our need to explore by serving as a test bed for exploration technology development, and it will help us to address the needs here on earth through physical and life sciences research. But we can only ensure its viability for a longer lifetime by using the shuttle, our only domestic capability to deliver large spare parts and replacement hardware that were cut from the manifest when the decision was made to arbitrarily cancel the shuttle program in 2010.

A list of the hardware which is fully built and stored at Kennedy Space Center is not attached but here in my hands for your consideration. This additional launch provides the most risk-free logistical support in the next year. We should take this critical step to maximize the \$100 billion investment given the recent decision to extend the life of the International Space Station to 2020.

I urge you to support my amendment and to authorize this critical shuttle mission in order to preserve our workforce and maximize the investments we have made in the International Space Station, and I yield back.

[The prepared statement of Ms. Kosmas follows:]

PREPARED STATEMENT OF REPRESENTATIVE SUZANNE M. KOSMAS

STS 135 Proposed Payloads for Summer 2011
High Priority

| | |
|--|-----|
| (A) CHeCS-CMS - T2 Subject Load System (SLS) (HTV2?) | 210 |
| (PM) ECLSS-GFE - Ammonia Respirator Kits (7) | 70 |
| (CM) ECLSS - Water Separator (ULF5/6) | 26 |
| (CM) ECLSS - Water Separator (R&R) | 26 |
| (CM) C&DH - EPIC CCA Front Panel (Rpr 6/11) | 4 |
| (CM) C&DH - iPEHG (Modification) | 11 |
| (PP) C&T - TDRSS Transponder (RPR/ULF 5/6) | 44 |
| (PP) R-ECLSS - Fluid Control Pump Assy (from ULF5/6) (1st Spare) | 100 |
| (PP) TCS - Fluid Control and Pump ORU (1/19/11) (1st Spare) | 130 |
| (A) ARFTA (2) | 200 |
| (PP) R-ECLSS - Hydrogen Dome (1st Spare) | 275 |
| (PP) TCS - Loop Crossover Assembly (1st Spare) | 43 |
| (PP) R-ECLSS - OGA Pump (1st Spare) | 23 |

STS 135
Medium Priority

| Hardware | Weight (lbs) |
|---|--------------|
| (R) ECLSS-WHC - ACY | ~200 |
| (PP) C&DH - iAPS (2nd Spare) | 80 |
| (PP) GFE-ECLSS - Internal Sampling Adapter (1st Spare) | 7 |
| (PP) GN&C - RGEA (1st Spare) | 54 |
| (PP) ECLSS - Pressure Control Panel (1st Spare) | 50 |
| (PP) ECLSS - CCAA Heat Exchanger (1st Spare) (needs repair) | 234 |
| (PP) ECLSS - Blower Assembly | 13 |
| (PP) ITCS - Manual Flow Control Valve | 2 |
| (PP) ITCS - Pump Bypass Valve | 2 |
| (PP) R-ECLSS - WPA Process Controller | 82 |
| (PP) CHeCS-CMS - VIS Assembly Left/Right (1st Spare) | 262 |
| (PP) CHeCS-CMS - T2 Display (# Spare) | 9 |

| | |
|--|-----|
| (PP) ECLSS - Motor Controller (7/19/10) | 5 |
| (PP) ECLSS - Particulate Filter (2) (7/30/10, 9/30/10) | 118 |
| (PP) ECLSS - Motor Controller (7/19/10) | 5 |
| (PP) ECLSS - Charcoal Bed Assembly (10/28/10) | 85 |
| (PP) R-ECLSS - OGA Hydrogen Sensor (6/30/10) | 10 |
| (PP) R-ECLSS - OGA Hydrogen Sensor (8/30/10) | 10 |
| (PP) R-ECLSS - OGA Hydrogen Sensor (10/29/10) | 10 |
| (PP) ECLSS - Charcoal Bed Assembly (3/1/11) | 85 |
| (PP) R-ECLSS - Catalytic Oxidizer Assembly (3/7/11) | 28 |
| (PP) ITCS - 3-Way Mix Valve (4/29/11) | 11 |
| (PP) R-ECLSS - OGA Process Controller (2/28/11) | 82 |
| (PP) R-ECLSS - Hydrogen Sensor (2/28/11, 4/29/11) | 20 |
| (PP) R-ECLSS - WPA Process Controller (11/30/10) (2 nd Spare) | 82 |

STS 135
Lower Priority

| <u>Hardware</u> | <u>Weight (lbs)</u> |
|--|---------------------|
| (PP) ITCS - Pump Package Assy (3rd Spare) | 189 |
| (PP) EPS - BBA (many) | (ea) 5 |
| (PP) EPS - LHA (many) | (ea) 3 |
| (PP) ECLSS - HEPA Filters (many) | (ea) 5 |
| (PP) EPS - CETA Luminaire (2 nd Spare) | 24 |
| (PP) C&T - VTR | 20 |
| (PP) CHeCS-CMS - CEVIS Control Panel | 5 |
| (PP) ETCS - FLRC | 17 |
| (PP) ECLSS - Avionics Air Assembly (-7 config) (1 st Spare) | 27 |
| (PP) S&M - TDLA | 226 |
| (PP) ECLSS - MCA ORU 5 | 7 |
| (PP) ECLSS - Heater Controller | 6 |
| (PP) R-ECLSS - Oxygen Filter ORU | 3 |
| (PP) R-ECLSS - UPA PCPA (STaR) | 99 |
| (PP) C&T - ABC | 10 |
| (PP) ECLSS - Inlet ORU (1 st Spare) | 56 |

STS 135
Lower Priority

| Hardware | Weight (lbs) |
|---|--------------|
| (PP) ECLSS - Pressure Transducer, Absolute (1 st Spare) | 1 |
| (PP) ECLSS - Filter Element (1 st Spare) | ?? |
| (PP) ECLSS - Sample Distribution Assembly (2 nd Spare) | 5 |
| (PP) ECLSS - CDRA Immersion Temp Sensor (1 st Spare) | 1 |
| (PP) ECLSS - Catalytic Oxidizer (1/6/11) (2 nd Spare) | 28 |
| (PP) ECLSS - Sorbent Bed (5/10/11) (2 nd Spare) | 11 |
| (PP) ECLSS - CDRA Two-Stage Pump (6/21/10) (2 nd Spare) | 24 |
| (PP) R-ECLSS - WPA Pump Separator (6/30/11) (2 nd Spare) | 61 |
| (PP) R-ECLSS - Ion Exchange Bed (2 nd Spare) | 27 |
| (PP) ECLSS - Flow Meter Assembly (1 st Spare) | 3 |
| (PP) ECLSS - Delta Pressure Sensor (1 st Spare) | 1 |
| (PP) ECLSS - Electrical Interface Assembly (1 st Spare) | 8 |

In Work

5

STS 135

Hardware that could be returned by Shuttle for repair and reflight

| Priority 6 Hardware | Weight (lbs) |
|---|--------------|
| (PP) R-ECLSS - Hydrogen Dome (S/N 1) | 275 |
| (PP) ECLSS - MCA #2 Mass Spectrometer | 31 |
| (PP) ECLSS - MCA #1 Data and Control Assembly | 18 |
| (PP) ECLSS - MCA #5 Series Sample Pump | 7 |
| (PP) ECLSS - Water Separator (S/N 01) | 26 |
| (PP) C&T - IAC | 23 |
| (PP) C&T - AUAI | 15 |
| (PP) ECLSS - Water Separator (returning on ULF5) | 26 |
| (PP) ECLSS - MCA #5 Series Sample Pump | 7 |
| (XX) S&M - Zero-G Racks | 20 |
| (PP) EPS - RPCM Type V Internal | 9 |
| (PP) EPS - RPCM Type V Internal (Alenia residual) | 9 |
| (PP) EPS - RPCM Type V Internal (returning on ULF4) | 9 |
| (PP) ECLSS - Three-Way Valve | 3 |
| (PP) C&T - ATU (3) | 48 |

In Work - needs modification 6

STS 135

Hardware that could be returned by Shuttle for repair and reflight

| Priority 6 Hardware | Weight (lbs) |
|---|--------------|
| (PP) ECLSS - Area Smoke Detector (12 ground spares) | 4 |
| (PP) ECLSS - MCA ORU#2 | 31 |
| (PP) C&T - Sync & Control Unit | 34 |
| (PP) ECLSS - VGA Pressure Regulator | 20 |
| (PP) ECLSS - IMV Valve Assembly | 11 |
| (PP) S&M - BMRMM | 268 |
| (PP) S&M - LTU | 92 |

In Work -- needs updates

7

Chairman GORDON. Ms. Kosmas, thank you very much. You have stated very well the need for this Launch On Need shuttle mission. It provides us a great deal of extra flexibility and again helps to maintain the good workforce that is in your area.

Is there further discussion on this? If not, all in favor say aye. Opposed, no. The ayes have it. The amendment is agreed to.

Mr. Peters, as mentioned earlier, if someone is not there when their amendment comes that we will take in consideration that we all have a variety of different committees to attend. Yours was just a couple before, and so we want to move back to your amendment, if there is no objection. What amendment is that? Mr. Peters, are you prepared to proceed?

Mr. PETERS. I am, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 050, amendment to H.R. 5781 offered by Mr. Peters of Michigan.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. PETERS. Thank you, Mr. Chairman. As we pursue human spaceflight beyond low earth orbit, the safety and well-being of our astronauts is of course paramount to all of us.

However, I also remain concerned about the research recently proposed by NASA that seeks to determine the effects of deep space radiation in humans using a research method that has not been employed in decades, radiation testing on non-human primates. NASA already possesses the results of 40 years of radiation experiments performed on non-human primates by NASA, the Air Force

and other military agencies, and I have concerns that additional Federal funding of this research is duplicative, inhumane and will not yield significantly new results to advance the safety of our astronauts.

Primates and specifically the squirrel monkeys proposed for this research differ significantly from humans in psychological and genetic traits, and the proposed studies on monkeys employ single doses of heavy ionizing radiation which may not effectively replicate the multiple doses and mix of radiation exposures that humans will encounter when they are in deep space.

Certainly one of the best parts of NASA's space exploration program is the way it has driven our technology forward, bringing us great innovations like microprocessors, Velcro and microwaves. We should also strive for equal technological advances in accompanying research programs instead of using technologies and methodologies that are over 40 years old.

Historical and ongoing studies included those funded by NASA and the Department of Energy already use validated, non-animal methods to determine the effects of radiation on human tissues. These include vitro studies, computational science, space radiation modeling, exposure data and decades of follow-up on space programs.

The European Space Agency has already rejected the use of primates in research experiments, and NASA aerospace engineer April Evans resigned her position on the International Space Station program in protest of this testing, calling it a step backwards for NASA's animal testing record.

We have an amendment before you. I have had some discussions, Mr. Chairman, with some other members of the Committee that had some concerns, and I do have a modification. Is it appropriate to talk about the modification at this time?

Chairman GORDON. Well, Mr. Peters, since we have that modification and everyone hasn't had a chance to see it, that needs to be copied, distributed to everyone and so with unanimous consent, I will ask you to temporarily withdraw your amendment until it can be shown to everyone, and then we will bring you back up at a later date.

Mr. PETERS. That is fine. Thank you.

Chairman GORDON. With no objection, so ordered. And now we will move onto the next amendment on the roster which is the gentleman from Texas, Mr. Olson. Are you ready to proceed with your amendment?

Mr. OLSON. I am, Mr. Chairman. I have an amendment at the desk and ask for its immediate consideration.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 031, amendment to H.R. 5781 offered by Mr. Olson of Texas.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. OLSON. Mr. Chairman, thank you very much. This amendment has already been discussed during the previous amendment of my colleague from Florida, and so I will be very brief.

I strongly support the exploration space operations budget and as such wanted to offer alternative methods of paying for the Launch On Need flight. I support the Launch On Need flight if it is necessary, safe and paid for.

For example, I am frustrated that funds continue to be budgeted for post-shuttle workforce transition from within NASA's own budget, the workforce transition funds and other departments, the Department of Commerce, for example, in unspent stimulus funds that should be made available to assist the workforce. Forcing NASA to use their scarce financial resources this way seems counterintuitive to me. But I will withdraw my amendment, realizing that this issue has already been voted on. I just wanted to offer an alternative path to ensure we have a viable, fiscal responsible plan to execute a Launch On Need flight if necessary.

I withdraw my amendment and yield back my time.

[The prepared statement of Mr. Olson follows:]

PREPARED STATEMENT OF REPRESENTATIVE PETE OLSON

Mr. Chairman, I have an amendment at the desk and ask for its immediate consideration. There are two flights left of the space shuttle. When that last shuttle, STS-134, launches from the Kennedy Space Center, there will be another shuttle stack ready for launch in case a rescue is needed. This amendment would authorize the flight of that final shuttle stack, upon the completion of STS-134.

The first part of my amendment deals with the need for such a flight. It would authorize the NASA Administrator to determine if this flight is necessary and if it is safe. Although I have been informed that both are true, those are not the purview of Congress to decide. Paying for this flight, however, is.

And in that regard I had a very difficult time determining how we can free up the resources. The exercise of scouring this budget for funds was a stark reminder of the extremely limited budgetary flexibility this agency has and it frankly saddens me that this agency that has achieved so much has such limited means to achieve its mission.

My amendment would use funds from Earth Science. This bill calls for an increase above the President's request of \$500M. The agency's earth science budget is already robust, and growing. Funds would also come from the 21st Century Launch Complex, an area that I feel can be absorbed in the increased Exploration budget, and defers the Loan Guarantee program for Commercial Crew of \$100M for one year.

One of the smaller pay-fors in this amendment to me is one of the most egregious. We have \$40 million for post-shuttle workforce transition. Now make no mistake, I do not disparage these efforts, but I frankly feel it is offensive that this money is coming from the Agency's budget. There are funds at the Department of Commerce, for example, and unspent stimulus funds at that, that should be made available to assist the workforce. Forcing the agency to use scarce resources this way is fiscally irresponsible.

Make no mistake, I considered using funds from Exploration and Space Operations, but the Exploration funds are there to provide the follow on generation of vehicles for this workforce. And to take money from Space Operations to pay for this flight seemed counterintuitive when their budget is as tight as is.

Mr. Chairman, I'm not trying to fall into the "take from science to pay for human space flight" conundrum. I'm asking that we recognize across the agency that authorizing this flight has benefits worthy of our consideration. I'm asking you to support this flight with the understanding that although it's the last flight, it won't be the final contribution to the International Space Station.

Chairman GORDON. Thank you, Mr. Olson, and thank you for your continued constructive role you are playing in this important bill.

The next amendment on the roster is an amendment offered by the gentleman from Oregon, Mr. Wu. Are you ready to proceed with your amendment?

Mr. WU. I am, Mr. Chairman.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 051, amendment to H.R. 5781 offered by Mr. Wu of Oregon.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. WU. Thank you, Mr. Chairman. My amendment makes a very simple but very important improvement to the bill, and it directs NASA to take into account geographic diversity when competing out where to locate retired space shuttles.

The space program is a truly national treasure that belongs to each and every American. I believe that the process for selecting locations for the retired shuttle fleet should reflect this national interest in space and in our space shuttle. The shuttle has played a central role in our Nation's aerospace history, and I know that there are deserving institutions across the country that have expressed strong interest in having one of these unique vehicles.

I think that it is very, very important that NASA's selection process be an even playing field for all institutions hoping to host a retired shuttle. My amendment is aimed at bringing the underlying bill closer to achieving that ideal.

Mr. Chairman, I want to stress that although some parts of the country do not have a substantial direct space connection and do not have personnel there or facilities there, that the support for our space program comes from the taxpayers of this country across the country, regardless of whether these facilities exist and that a fair competition for these vehicles, even without winning the award, but just a fair competition maintains that interest, maintains that support for American human spaceflight. And I think that that is absolutely crucial in this day and age of constrained resources.

And I yield back the balance of my time.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. I support the gentleman's amendment. It directs NASA to consider "geographic diversity" among other considerations as it seeks to find permanent homes from the retired orbiter fleet. This is a subject that is really discussed a lot. It has been within this Committee and on the streets. I agree with his premise that the orbiters needed to be located among different regions of the country. It would give our citizens some ease of access to visit these very marvelous machines. East Texas, West Texas, Northeast Texas, even the 4th District of Texas, even the panhandle would make excellent homes for the orbiter fleet.

I believe his amendment makes good sense, and I urge members to support it.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

I support the gentleman's amendment.

It directs NASA to consider 'geographic diversity' among other considerations as it seeks to find permanent homes for the retired Orbiter fleet. I agree with his premise that the Orbiters need to be located among different regions of the country to give our citizens some ease of access to visit these marvelous machines. East Texas, West Texas, even the Panhandle, would make excellent homes for the Orbiter fleet. I believe his amendment makes good sense, and I urge Members to support it.

Chairman GORDON. Thank you, Mr. Hall.

Is there further discussion on the amendment? If no, all in favor say aye. Oh, excuse me, Ms. Kosmas is recognized.

Ms. KOSMAS. Thank you, Mr. Chairman. I want to speak only on behalf of the workforce in the Kennedy Space Center who have processed and launched every shuttle launch that has taken place, and I would like to say that they have the shuttle system in their DNA as they have been doing it for literally generations, and I think it is most appropriate that one of the orbiters stay in Central Florida. You can call it Central Florida, North Central Florida, West Central Florida, Kennedy Space Center, whatever suits Mr. Hall is fine by me.

Chairman GORDON. Thank you, Ms. Kosmas. As I understand it, this amendment would not rule out that likelihood.

Is there further discussion? If no, all in favor of the amendment say aye. Opposed, no. The ayes have it. The amendment is agreed to.

Now we have here the 22nd amendment, the next amendment on the roster, is offered by the gentleman from Ohio, Mr. Wilson. Are you ready to proceed with your amendment?

Mr. WILSON. Yes, thank you, Mr. Chairman. My amendment is at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 033, amendment to H.R. 5781 offered by Mr. Wilson of Ohio, Ms. Fudge of Ohio and Mr. Wu of Oregon.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. WILSON. Thank you, Mr. Chairman. Dayton in my home State of Ohio is known as the birthplace of aviation. I am very proud of the contributions that some of our state heroes have made to flight, including Wilbur and Orville Wright, John Glenn, Neil Armstrong. Given NASA Glenn's significant contributions to space flight as well as the contributions of numerous Ohio companies, I think that Ohio strongly deserves consideration as the permanent location for one of the space shuttles once they are permanently retired.

However, I am concerned that language contained in this mark would effectively eliminate any chance Ohio has of competing for one of the space shuttles. The language included at the end of Section 223 appears to give preference to locations with an historical relationship in either the launch, flight operations or processing of the space shuttle orbiters.

I believe that the inclusion of some of this language would negatively impact states such as Ohio, California, Washington, Illinois, Oregon and New York, and the supposedly competitive process to obtain a space shuttle. Either this is a competitive procedure as said in line 17 and 18 of this mark or it is not. And I believe that inclusion of this language would unjustly penalize Ohio and many other states in efforts to bring a retired shuttle orbiter to their state.

Therefore, my amendment would remove the priority consideration language for organizations with a launch flight operations or processing role and once again level the playing field for this competition. I thank the Chair and yield back the remainder of my time, Mr. Chairman.

Chairman GORDON. Is there further discussion on the amendment?

Mr. OLSON. Mr. Chairman?

Chairman GORDON. Mr. Olson is recognized.

Mr. OLSON. I speak in opposition to the amendment. I admire and respect my colleague's position, Congresswoman Fudge and Congressman Wilson, but I believe that striking this language is unnecessary.

I don't feel that it is unreasonable to consider the efforts of over 30 years of launching, processing and managing the shuttle program to determine the final location of an orbiter once the flights are complete. It should come as no surprise to anyone that I believe that people of Houston in particular have earned the right to house one of these orbiters, and every member of the Texas congressional delegation agrees with me. And so do the students of the Clear Creek Independent School District, the school district that serves the Johnson Space Center. Every student from Kindergarten to 12th grade was invited to draw a picture or write a letter to Administrator Bolden extolling the virtues of Houston as the home for an orbiter.

Chairman GORDON. Would the gentleman yield for just a moment?

Mr. OLSON. Yes, sir.

Chairman GORDON. I see that I have a bill across the hall. I am going to have to leave. Let me just say that reluctantly I have to oppose this amendment. I think it undermines a good balance that we have had in this bill, and the current language is not mandatory to go anyplace. But I think it is a good balance, and I yield back.

Mr. OLSON. Thank you, Mr. Chairman. I respectfully disagree with him, and even though I grew up nearby, again I was struck how exploration is a part of their everyday lives. These people interact with their neighbors every day, and because they are their neighbors, they are coaches. And for many, they are moms and dads. They grew up with the program that began before each one of them were born, and I am not going to go on further because I know we can go down the line and every member can talk about the merits of an entity or school or museum in their district. I ask my colleagues to remember what the first word that has been said on every significant space mission we have had, Houston.

And so with great respect for my colleagues from Ohio, I oppose this amendment. The original language does not restrict, it rewards.

Ms. GIFFORDS. [Presiding] Thank you, Mr. Olson.

Mr. OLSON. I yield back.

Ms. GIFFORDS. The Chair recognizes Ms. Fudge.

Mr. WILSON. I would just like to respond to the statement of the first word said, and you are right, it was Houston. But the guy who said it is from Ohio.

Ms. GIFFORDS. Thank you, Mr. Wilson. Ms. Fudge, please.

Ms. FUDGE. Thank you, Madam Chair. I, too, would support this amendment because it does strike certain language in the competitive considerations for the disposition of the decommissioned orbiter vehicles. It amends the priority consideration given to locations with a historical relationship with the launch, with flight operations or processing of the orbiters to allow for priority consideration for all locations with a historical relationship with the orbiters.

And with all due respect to my friends from Florida and Texas, I think the rest of us would like a fair opportunity to compete. Thank you, Madam Chair.

Ms. GIFFORDS. Thank you, Ms. Fudge. The Chair will recognize Ranking Member Hall.

Mr. HALL. I thank you, and I am willing for you to compete. I think under the language that is in the bill you certainly would get to compete, and you quote Wilbur and Orville. I knew both of them, and I really believe they want it in East Texas.

But to help this Committee and to help us all stay together and to help us try to keep down so much talk on each of these amendments and so much red tape. I would report to you that Wilbur and Orville's first contract with the government was one page handwritten, the tilt rotor, the tilt wing, that you don't fly straight up and out. Just the paperwork alone weighs 22,000 pounds on that. So maybe we are letting it get away from us. Whether it is in East Texas, North Texas or wherever it is, I think we have a good program for it. This amendment strikes key language in the bill that is intended to give priority consideration for the disposition of the shuttle to eligible applicants who can demonstrate a historical relationship with either the launch, flight operations or processing of the orbiters. It only makes sense that in deciding the fate of the orbiters, the NASA administrator should give special consideration to those eligible communities whose livelihood has depended on the program for decades. While the shuttles are a national treasure, they hold special value for the people who built, operated and launched them into space. These are the men and women who work day and night to ensure that our astronauts were able to safely travel in space and assemble the incredible International Space Station.

We honor them, their families and their efforts through this provision that is on the books. I join the Chairman and urge the members to vote no on this amendment.

Ms. GIFFORDS. Thank you, Mr. Hall. The Chair recognizes Mr. Wu.

Mr. WU. Thank you very much, Madam Chair. I want to express how strongly I feel about this amendment. I have been a strong proponent of American human spaceflight, and that is with no connection for the constituents that I serve, other than the vision of Americans going into space. It is important to our Nation as a whole, and the dream that it breathes in every child in America and for a lot of adults also. Those regions that have current facilities, that have a lot of employment, that have workers who have served America well, they have been well-rewarded for those efforts. Taxpayers across this entire country have paid for these ef-

forts. The economic benefits have been concentrated in a few places. Surely the opponents of this amendment would not begrudge the rest of America some participation in the dream, and that is what it is about.

A lot of development occurred in Huntington Beach, California. But are you going to deny Southern California a fair shot at having an orbiter? I don't know how much taxes New York pays, but I suspect that it is substantial. But I think that denying folks in New York an opportunity to have an orbiter is unconscionable. And I admit that the chances of having an orbiter in Portland or Seattle or in Oregon are maybe a little bit slight, but I think my constituents would like to believe that they have a fair shot at this because they were denied an opportunity to work on the shuttle in the first place. This is a travesty. This is an absolute travesty.

I yield back the balance of my time.

Ms. GIFFORDS. Thank you, Mr. Wu.

Mr. HALL. Was he for it or against it?

Ms. GIFFORDS. The Chair will recognize Mr. Rohrabacher.

Mr. ROHRABACHER. Well, let me identify myself with that last outburst.

Mr. WU. If the gentleman would yield?

Mr. ROHRABACHER. I certainly will.

Mr. WU. I have learned from the best.

Mr. ROHRABACHER. All right. Let me just note that California did play a major role in the development of the orbiter and the space shuttle. I remember when I was a young reporter, one of the first stories I covered was going to Downy where they had the very first mock-up of the shuttle, and there it was, right there, in the heart of Southern California. I walked into this big facility, and there it was. And Senator John Tunney was having a press conference to announce his support of the shuttle program. And as my colleague noted, many of the components not only were from Southern California but to my hometown as well, Huntington Beach, very much involved with developing the technologies in parts of the shuttle. And for us to be, say, fenced off from having this honor of hosting what was left of this program, I mean, it is unconscionable. And I think that all states should have a say, and as my colleague stated, all the taxpayers participating in financing this. And I know that the people in California, a lot of people in California have played a role in actually building it and developing the technology. So I would be very much in favor of this amendment because I think it is fair to everybody and certainly it is unseemly to have certain states say no, we are going to have the leverage on saying who gets some of the credit or who gets to show their children the shuttle now that the program is over.

Thank you very much.

Ms. GIFFORDS. Thank you, Mr. Rohrabacher. The Chair will recognize Ms. Johnson.

Ms. JOHNSON. Thank you very much. I do not agree with the outburst. I recognize the sincere emotion, but I want to say that the space exploration has been some of the most important and productive research for this Nation. Every single living human being has gained from it. People move from all over the country in various

places where all of this work was going on. All of it didn't go on in the same place.

So I don't know why we are doing all this talking about where these unused pieces of metal will be. We all can read. We all know that we all had a hand in the development, and I think it is an unnecessary waste of time to be fussing over this. Thank you.

Ms. GIFFORDS. Thank you, Ms. Johnson. Is there any further discussion?

Mr. SMITH OF TEXAS. Madam Chairwoman, one final comment please.

Ms. GIFFORDS. Yes.

Mr. OLSON. Thank you, Madam Chairwoman. I just want to—

Ms. GIFFORDS. Actually, Mr. Smith, would you consider yielding to Mr. Olson? Mr. Neugebauer?

Mr. NEUGEBAUER. Thank you, Madam Chair. I will yield the balance of my time to the gentleman from Texas, Mr. Olson.

Ms. GIFFORDS. Thank you.

Mr. OLSON. Thank you to my colleagues from Texas, Madam Chairwoman. I just want to point out, again, I really appreciate my colleagues' comments in opposition to it, and I don't want to be something where we are not being fair to other states, and I don't think that is the case with the language that launch flight, operations and processing should be considered.

I also ask you to consider the value of the shuttle being at a place like we have at Space Center Houston because you can see the entire history of human spaceflight right there. I mean you can take children, your grandchildren to the facility. You can see the Mercury Redstone. You can see the Gemini rocket. You can see a Saturn V in a hanger, an unbelievable sight. And to have a space shuttle there complementing that, it gives the American public just a complete appreciation for how far we have come in human spaceflight. You see that little, tiny Mercury rocket and realize that we actually flew our first astronauts in space on that thing and what we have evolved to with the shuttle, again, you can't underestimate that. There is going to be a competition. We are just asking for consideration for the Johnson Center, the Kennedy Center, the Marshall Center, all the centers, California as well, what they have done. But I think it is important if you look at it in the big context. It really is something that matters to the American people. We can give to our youth a real understanding of how far we have come, and they can feel the pride we felt on July 20, 1969, when the man who testified here a couple of months ago, Neil Armstrong, put that foot on the moon and said, "One small step for man, one giant leap for mankind," and I know where he was from. Thank you.

Ms. GIFFORDS. Thank you, Mr. Olson.

Mr. SMITH OF TEXAS. Madam Chair, I yield back.

Ms. GIFFORDS. Thank you, Mr. Smith. Thank you, Mr. Olson. This Chair recognizes Mr. Baird.

Mr. BAIRD. I want to associate myself with remarks of Mr. Wu. You know, there has been a lot of talk in this institution about the need to do away with earmarks, the idea being that earmarks somehow prejudice spending in one direction or another and unduly restrict competition in favor of powerful individuals, be they

in the House or Senate. This language as currently exists that would be corrected by the gentleman from Oregon's amendment, the underlying language sounds sure an awful lot like an earmark to me. And I just would question how those who are opposed to earmarks can in good conscience support this. You know, there is a little place called Boeing up north that had a fair bit to do with the history of aviation. They have got a magnificent air and space museum. It is proximal to a whole lot of Americans, and there is a long history of flight there as well.

And in contrast to the underlying language, the language Mr. Wu is offering is not an earmark. It is calling for fair competition. He is just saying we ought to have a real fair competition, not some very cleverly drafted language. He, Mr. Wu, to his credit, does not offer language saying it shall go to a particular aviation museum located in a Pacific Northwest state. He hasn't done that. He has just said, let us have a fair and objective competition, and I think that is right and there are hosts of areas in this country. And I agree with geographical diversity. I want my kids to be able to go home somewhere and see a space shuttle nearby, and if the underlying language passes instead of this amendment, I think that is going to be improbable. And I respect the long and proud tradition of all my colleagues who represents districts where these were constructed, but I will tell you, with respect to the gentlelady from Texas, I don't consider the space shuttle a hunk of metal. When I go to the Smithsonian Institution down the street here and I can look at the Mercury capsule and the Gemini capsule, it blows me away. It literally takes my breath away to think a human being got in that and went into space.

I was just there two weeks ago with my family who flew out for the 4th of July celebration, and I took all my nephews and nieces and we walked there and we looked at that, and I told them the story. And I want to be able to do that at least somewhat more proximal.

With that, I commend the gentleman from Oregon and urge the passage of his amendment.

Ms. GIFFORDS. Thank you, Mr. Baird. Is there any further discussion on the amendment? No further discussion? The vote will occur on the amendment. All those in favor say aye. Those opposed say no. The no's appear to have it.

Mr. WU. I ask for a recorded vote.

Ms. GIFFORDS. Okay. The Clerk will call a roll call vote.

The CLERK. Chairman Gordon?

Chairman GORDON. No.

The CLERK. Chairman Gordon votes no.

Mr. Costello?

Mr. COSTELLO. Aye.

The CLERK. Mr. Costello votes aye.

Ms. Johnson?

Ms. JOHNSON. Yes.

The CLERK. Ms. Johnson votes aye.

Ms. Woolsey?

The CLERK. I just want to be clear. Ms. Johnson?

Ms. JOHNSON. No.

The CLERK. No? Okay.

Ms. Woolsey?
[No response.]
The CLERK. Mr. Wu?
Mr. WU. Aye.
The CLERK. Mr. Wu votes aye.
Mr. Baird?
Mr. BAIRD. Aye.
The CLERK. Mr. Baird votes aye.
Mr. Miller?
Mr. MILLER. Aye.
The CLERK. Mr. Miller votes aye.
Mr. Lipinski?
Mr. LIPINSKI. Aye.
The CLERK. Mr. Lipinski votes aye.
Ms. Giffords?
Ms. GIFFORDS. No.
The CLERK. Ms. Giffords votes no.
Ms. Edwards?
Ms. EDWARDS. Aye.
The CLERK. Ms. Edwards votes aye.
Ms. Fudge?
Ms. FUDGE. Aye.
The CLERK. Ms. Fudge votes aye.
Mr. Luján?
Mr. LUJÁN. No.
The CLERK. Mr. Luján votes no.
Mr. Tonko?
[No response.]
The CLERK. Mr. Rothman?
[No response.]
The CLERK. Mr. Matheson?
Mr. MATHESON. Aye.
The CLERK. Mr. Matheson votes aye.
Mr. Davis?
Mr. DAVIS. No.
The CLERK. Mr. Davis votes no.
Mr. Chandler?
Mr. CHANDLER. No.
The CLERK. Mr. Chandler votes no.
Mr. Carnahan?
Mr. CARNAHAN. Yes.
The CLERK. Mr. Carnahan votes aye.
Mr. Hill?
Mr. HILL. Yes.
The CLERK. Mr. Hill votes aye.
Mr. Mitchell?
Mr. MITCHELL. Aye.
The CLERK. Mr. Mitchell votes aye.
Mr. Wilson?
Mr. WILSON. Aye.
The CLERK. Mr. Wilson votes aye.
Ms. Dahlkemper?
Ms. DAHLKEMPER. Aye.
The CLERK. Ms. Dahlkemper votes aye.

Mr. Grayson?
Mr. GRAYSON. No.
The CLERK. Mr. Grayson votes no.
Ms. Kosmas?
Ms. KOSMAS. No.
The CLERK. Ms. Kosmas votes no.
Mr. Peters?
Mr. PETERS. Aye.
The CLERK. Mr. Peters votes aye.
Mr. Garamendi?
Mr. GARAMENDI. Aye.
The CLERK. Mr. Garamendi votes aye.
Mr. Hall?
Mr. HALL. No.
The CLERK. Mr. Hall votes no.
Mr. Sensenbrenner?
[No response.]
The CLERK. Mr. Lamar Smith?
Mr. SMITH OF TEXAS. No.
The CLERK. Mr. Lamar Smith votes no.
Mr. Rohrabacher?
Mr. ROHRABACHER. Yes.
The CLERK. Mr. Rohrabacher votes aye.
Mr. Bartlett?
Mr. BARTLETT. No.
The CLERK. Mr. Bartlett votes no.
Mr. Ehlers?
[No response.]
The CLERK. Mr. Lucas?
[No response.]
The CLERK. Mrs. Biggert?
Ms. BIGGERT. Aye.
The CLERK. Mrs. Biggert votes aye.
Mr. Akin?
[No response.]
The CLERK. Mr. Neugebauer?
Mr. NEUGEBAUER. No.
The CLERK. Mr. Neugebauer votes no.
Mr. Inglis?
[No response.]
The CLERK. Mr. McCaul?
[No response.]
The CLERK. Mr. Diaz-Balart?
[No response.]
The CLERK. Mr. Bilbray?
[No response.]
The CLERK. Mr. Adrian Smith?
Mr. SMITH OF NEBRASKA. No.
The CLERK. Mr. Adrian Smith votes no.
Mr. Broun?
The CLERK. [No response.]
Mr. Olson?
Mr. OLSON. No.
The CLERK. Mr. Olson votes no.

Chairman GORDON. Mr. Rothman is not recorded.

Mr. ROTHMAN. Mr. Chairman, I would like to be recorded as aye.

The CLERK. Mr. Rothman votes aye.

Chairman GORDON. Is there anyone else that would like to be recorded? If not, the Clerk will report the vote.

The CLERK. Mr. Chairman, I have 18 members voting aye and 14 members voting no.

COMMITTEE ON SCIENCE AND TECHNOLOGY - 111th

DATE: July 22, 2010 AMENDMENT NO. 21 ROLL CALL NO. ___

Bill: H. R. 5781

SPONSOR of AMEND -Wilson/Fudge/Wu-033

PASSED ✓ VOICE VOTE
 DEFEATED WITHDRAWN

Quorum – 15 to vote – 22 to report

| | MEMBER | AYE | NO | PRESENT | NOT VOTING |
|----|----------------------|-----|----|---------|------------|
| 1 | Mr. GORDON, Chair | | ✓ | | |
| 2 | Mr. COSTELLO - IL | ✓ | | | |
| 3 | Ms. JOHNSON - TX | | ✓ | | |
| 4 | Ms. WOOLSEY - CA | | | | |
| 5 | Mr. WU - OR | ✓ | | | |
| 6 | Mr. BAIRD - WA | ✓ | | | |
| 7 | Mr. MILLER - NC | ✓ | | | |
| 8 | Mr. LIPINSKI - IL | ✓ | | | |
| 9 | Ms. GIFFORDS - AZ | | ✓ | | |
| 10 | Ms. EDWARDS - MD | ✓ | | | |
| 11 | Ms. FUDGE - OH | ✓ | | | |
| 12 | Mr. LUJAN - NM | | ✓ | | |
| 13 | Mr. TONKO - NY | | | | |
| 14 | Mr. ROTHMAN - NJ | ✓ | | | |
| 15 | Mr. MATHESON - UT | ✓ | | | |
| 16 | Mr. DAVIS - TN | | ✓ | | |
| 17 | Mr. CHANDLER - KY | | ✓ | | |
| 18 | Mr. CARNAHAN - MO | ✓ | | | |
| 19 | Mr. HILL - IN | ✓ | | | |
| 20 | Mr. MITCHELL - AZ | ✓ | | | |
| 21 | Mr. WILSON - OH | ✓ | | | |
| 22 | Mrs. DAHLKEMPER- PA | ✓ | | | |
| 23 | Mr. GRAYSON - FL | | ✓ | | |
| 24 | Ms. KOSMAS - FL | | ✓ | | |
| 25 | Mr. PETERS- MI | ✓ | | | |
| 26 | Mr. GARAMENDI, CA | ✓ | | | |
| 27 | Vacancy | | | | |
| 1 | Mr. HALL- TX | | ✓ | | |
| 2 | Mr. SENSENBRENNER-WI | | | | |
| 3 | Mr. LAMAR SMITH- TX | | ✓ | | |
| 4 | Mr. ROHRABACHER- CA | ✓ | | | |
| 5 | Mr. BARTLETT- MD | | ✓ | | |
| 6 | Mr. EHLERS- MI | | | | |
| 7 | Mr. LUCAS- OK | | | | |
| 8 | Mrs. BIGGERT- IL | ✓ | | | |
| 9 | Mr. AKIN- MO | | | | |
| 10 | Mr. NEUGEBAUER- TX | | ✓ | | |
| 11 | Mr. INGLIS- SC | | | | |
| 12 | Mr. McCAUL- TX | | | | |
| 13 | Mr. DIAZ-BALART- FL | | | | |
| 14 | Mr. BILBRAY- CA | | | | |
| 15 | Mr. ADRIAN SMITH- NE | | ✓ | | |
| 16 | Mr. BROUN - GA | | | | |
| 17 | Mr. OLSON- TX | | ✓ | | |
| | TOTALS | 18 | 14 | | |

Chairman GORDON. The ayes have it, the amendment is agreed to.

The next amendment on the roster is offered by the gentleman from Florida, Mr. Grayson. Are you ready to proceed with your amendment?

Mr. GRAYSON. Yes, I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 079, amendment to H.R. 5781 offered by Mr. Grayson of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. GRAYSON. Mr. Chairman, this amendment represents a continuing effort on my part to get a simple answer to a simple question which is where are these commercial entities that seek to supplant NASA in doing launches of human beings into space, where they will begin those launches from? I asked this question of the NASA administrator a few months ago. He told me that he had been assured by every single commercial launcher that the commercial launches that they would want to do would take place from the Kennedy Space Center in Central Florida. That makes perfect sense to me. The government has invested tens of billions of dollars in development manned space programs in Central Florida. There are thousands and thousands of people who devoted their working lives to the manned space program in Central Florida. So I think that is the logical answer, but when I pressed to get specifics or even some sort of written confirmation of that, the NASA administrator left me hanging.

So this amendment is my effort to follow up on that. I see some hope, Mr. Chairman, that this may not need to come to a vote because I am still hoping that the NASA administrator will give me the specifics that I am looking for.

So I intend to take this up later on in the legislative process, but for now I withdraw this amendment.

Chairman GORDON. Thank you, Mr. Grayson, and you had given notice earlier that you had to—I think you were asking questions in your other committee. So if there is no objection, since you are here, we will go back to your earlier amendment.

Mr. GRAYSON. Mr. Chairman, would you refresh my time?

Chairman GORDON. Does the gentleman have an amendment at the desk?

Mr. GRAYSON. Yes.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 080, amendment to H.R. 5781 offered by Mr. Grayson of Florida.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. GRAYSON. Thank you, Mr. Chairman. We are now facing what has been referred to as the dual track, the two tracks, two different ways to go forward with manned spaceflight under NASA's wing. One way is to continue what we have been doing for

half-a-century which is to have government operations launch man into space. The other is to try to develop that capability through commercial entities.

I think that both are possible, both are conceivable. Only one of those is actually proven and demonstrated, but I can imagine the possibility of it happening in the future that commercial entities will one day have that capability.

What I don't understand is why we should load the dice in favor of those commercial entities. The government frequently comes across this distinction. In the Defense Department it is known as the make or buy decision. Do you make something or do you buy it? For 50 years now, we have been making manned spaceflight at NASA, and now the possibility apparently is arising that we might conceivably one day be able to buy it. That is the decision that has been made over the years in accordance with the Office of Management and Budget's Circular A-76 which basically says if it is better to make it, you make it. If it is better to buy it, you buy it. And that is the rule throughout the government, including the rule right now in NASA.

As I read this bill, this bill would change that rule. It would put a thumb on the scale in favor of commercial entities which frankly don't seem to deserve it. As I said before, they may or may not ever develop this capability. Why we should be biased in their favor is something I find hard to understand but I see in four different locations in this bill that is exactly what is happening. For instance, if you turn to page 25, you will see the language is follows. If one or more United States commercial entities are certified to provide ISS crew transportation and rescue services, the crew transportation system developed under this section shall be available as a backup ISS crew transportation rescue service as needed but shall not be utilized as the primary means of ISS crew transportation and rescue or otherwise compete with the commercial system for ISS crew transportation rescue services.

So what this means in a nutshell, Mr. Chairman, is that as soon as any commercial entity is simply certified to provide ISS crew transportation and rescue services, and the program that has stood us so well for the past half-century goes by the wayside permanently. I just don't get it. I don't understand why we would want to do that. We have all heard the phrase, if it ain't broke, don't fix it. It seems through this bill and these provisions that I have identified what we are really saying is if it ain't broke, throw it away. And it just doesn't make any sense to me. I am perfectly willing to see a level playing field, a fair competition between government program and commercial entities doing the same programming. That is fine. I don't see any harm to that. But why we would say that the minute any particular commercial entity, merely is certified in order to provide ISS crew transportation, rescue services, and that in itself means the demise of the Government program. That I don't understand at all. I have identified three other places in the bill that also tilt the playing field in favor of the commercial entities that are entirely unproven. Again, as I said earlier today, these are entities that have no sales, they have no profit, they have very little capital. They have no experience, and in fact, they have no product. They don't even have something that would launch

human beings into space at this point. And we are saying that as soon as one of them is simply made qualified, then we throw out the entire manned space program as we know it and as we have developed it from the past century. If you turn to page 47 in the bill, you will see that Congress by this bill would be affirming the policy of making use of the United States commercially provided crew transportation and crew rescue services to the maximum extent practicable, which under this bill means limiting to the maximum extent, the use of the system developed under Section 202 which in fact, a government alternative practicable to non-ISS missions, once commercial crew transportation and crew rescue services that meet safety requirements to become operational.

I want to see a fair competition. We have been led astray many, many times by government contractors who overpromise and then don't deliver. There is not a single country in this entire world with the manned space program that does this the way that this bill dictates. All I want to see is a fair, level playing field between whatever commercial alternatives develop and the program that has stood us so well for the past 50 years.

Therefore, I respectfully ask people's support for this amendment to level the playing field. Thank you.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, I oppose the gentleman's amendment. I think the existing bill itself strikes a good playing ground, strikes a very good balance between ensuring that we can meet our obligations to the Nation, encouraging commercial development of our space in a measured and rational way. If commercial crew entities can deliver on their claims and do so to NASA safety standards, there is no reason why they should not be included in NASA's mix of space transportation. This amendment takes that away. I oppose the amendment.

Chairman GORDON. Mr. Garamendi is recognized.

Mr. GARAMENDI. Thank you, Mr. Chairman. This amendment does allow for commercial human spaceflight, but what it does is to change the prioritizations. I think Mr. Grayson is absolutely right in what he is proposing. I also asked staff a while ago a definition of a commercial company. Apparently in existing law, a commercial company can in fact be a foreign-owned company, that is, one that has more than 50 percent ownership. It can also be a company that has something less than 50 percent ownership by a foreign—the language in the current bill says United States commercial company, and I am quite curious as to which definition applies and exactly what United States commercial company is. It seems to me that we may in fact be opening a door to commercial companies that are not majority owned in the United States and not controlled by United States' interests. And therefore not only is Mr. Grayson's amendment appropriate, but it may be even supercharged by a question of who controls the commercial company. And I would recommend the passage of his proposal.

Chairman GORDON. Mr. Rohrabacher is recognized.

Mr. ROHRABACHER. Well, let me just suggest that I don't agree with the fundamental logic of what Mr. Grayson, who I respect his intelligence and I respect that he has a point of view, but I don't think his argumentation actually is consistent.

The fact is, we are not loading the dice. If anything, the dice have been loaded in favor of having a government-run space transportation system. That is the way the dice have been loaded. All of the money goes through the government and through NASA and goes into this type of government approach, and that is one of the big debates around here. This is a, you know, Luke Skywalker versus Han Solo debate here, and I mean, there are two fundamentally different approaches to people in space. Do we want entrepreneurs in space? Do we want businessmen in space? Do we want government employees to be the only ones who get to go into space and have these activities? We are just laying the foundation so that the commercial sector can play a role.

We did the same thing with the railroads. And let us just note. In the beginning of our country's history, there was some people who wanted us to build all of the American ships. The ships would be built by the government, but instead, the people who founded our country had a very good understanding that no, we are going to leave this transportation across that great ocean to the private sector. We thus developed in the private sector the clipper ships which became the dominant force for commerce and the whole world, and America was playing that role and we were the ones who did this without government having to approve of everything and co-opt all of the funds that were necessary.

And when we wanted to develop a railroad, yes, the government played a role. The government provided a certain amount of wealth, meaning land, on either side of the track to promote the commercial activity. I think we would have a far different country today had we decided early on in our country's history simply to have the government running all the transportation systems, and all the people in the transportation systems working as government employees. It would be a different world, it would be a different country.

I think we are better off by the direction that we took. What is going on here is an attempt to ease us away from what had been co-opted by a total government approach to now going into a more private sector approach. And there are companies in the private sector who, I disagree with Mr. Grayson, who have great track records in building space transportation technology. Boeing and Lockheed, you look at the Delta system and the Atlas system. These are very good systems, yes, and they were done in cooperation with government. But now, let us see if we can attract by definition more money from the private sector into this whole arena of space transportation. If we do not do that, it will be the government's job and it will be only taxpayer money. And what is the problem with allowing the commercial people to come in and spend some of the money that we would otherwise be spending from the taxpayers? So I would oppose this amendment, and I would hope that we all agree that it would be a good thing to have commercial investment in space and to encourage that, and that would be a boon to the taxpayers.

Thank you very much.

Chairman GORDON. Thank you, Mr. Rohrabacher, for number three. And Ms. Giffords is recognized.

Ms. GIFFORDS. Thank you, Mr. Chairman. And I have to speak in opposition, respectfully, of the amendment. When looking at the language, the bill actually does not require that the government system be shut down if a single commercial provider is qualified for launch. Whether the provisions just allow that the commercial provider can fly U.S. astronauts to the ISS, they actually don't prohibit NASA from developing or flying its government program. And in fact, if the bill had, I wouldn't support the language myself.

What we are saying is that we don't want the government unfairly competing with the private sector once they satisfy all of NASA's requirements, and that said, as in the case with many other government make or buy decisions, the bill itself makes clear that the commercial systems can't cost more than the government provided on a dollar-per-seat basis. And of course, as Mr. Grayson knows, OMB's circular A-76 is actually not law. It is an executive branch directive.

So be that as it may, we will not be giving an unearned and undeserved preference to commercial entities as was asserted in the Dear Colleague that he circulated. They are going to have to meet all their requirements laid out in the bill before they can be considered for contracts with the Federal Government.

And again, as we have been saying, it is that balance between government, private sector and I think this strikes a fair balance.

Chairman GORDON. Thank you, Ms. Giffords.

If there is no further discussion, then all in favor say aye. Opposed, no. The no's have it. The amendment is not agreed to.

I think we have time for two more amendments, and so the next amendment on the roster is an amendment offered by the gentlelady from Ohio, Ms. Fudge. Are you ready to proceed with your amendment?

Ms. FUDGE. Yes, I have an amendment at the desk, Mr. Chairman.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment number 070, amendment to H.R. 5781 offered by Ms. Fudge of Ohio and Mr. Wilson of Ohio.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. FUDGE. Thank you, Mr. Chairman. This amendment directs the administrator to conduct a study with the National Academies on the feasibility of a commercial space market as we have yet to see a Federal study on this industry.

We need to determine the market demands for commercial human spaceflight, both home and abroad. Additionally, though, this is only a five-year authorization. It is crucial that we have the financial data to determine whether a commercial spaceflight sector can sustain itself for the long term.

Mr. Chairman, I am glad to see that you see value in conducting a study like this one described in my amendment. I look forward to working with you on the language and incorporating a commercial market study requirement before the Committee brings this bill to the Floor, and I withdraw my amendment at this time.

Chairman GORDON. Thank you, Ms. Fudge. Let me just remind members, we have one more amendment to go before we are going to go to vote, or maybe we might even have more.

If we get this bill out today, as we are going to, then there is a reasonable chance that maybe next week, if there is a lull, that we could get this on the floor, which I think would be very beneficial for us in trying then to go to conference.

So we are going to move forward, and the next amendment on the roster is an amendment offered by the gentleman from Utah, Mr. Matheson. Are you ready to proceed with your amendment?

Mr. MATHESON. Yes, sir, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Oh, the Clerk will report the amendment.

The CLERK. Amendment number 065, amendment to H.R. 5781 offered by Mr. Matheson of Utah.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. MATHESON. Thank you. I will take less than five minutes. Mr. Chairman.

This amendment clarifies NASA's obligation to the requirements that are in the bill. What my language would do is simply requires NASA to use the money that is authorized in this bill to perform work on the program spelled out in the bill.

The underlying bill requires NASA to come up with a spaceflight plan within 180 days of enactment of the law. In the meantime, there is nothing to prevent NASA from continuing to fund the programs that are authorized. My amendment requires NASA to continue to fund programs and not use that money at a later date for terminating these same programs.

Now, this is an amendment that is a result of bipartisan discussions within this Committee. I appreciate the help of both majority and minority staff to develop this amendment, and it is more a perfecting amendment than anything else in terms of the underlying bill, and I urge my colleagues on both sides to support it. And Mr. Chairman, I yield back.

Chairman GORDON. Thank you, Mr. Matheson.

Is there further discussion on this amendment? If not, the vote is on the amendment. All in favor of the amendment say aye. Opposed, no. The ayes have it. The amendment is agreed to.

Mr. Rohrabacher is up next, and since Mr. Rohrabacher is up next, we know this might take a while. So we will adjourn at this time to come back, this time five minutes after the last vote. Thank you.

[Recess.]

Chairman GORDON. The committee is called to order again, and I will put folks on notice. It seems we are going to have a vote in about an hour, and so I think we have an opportunity to complete this in an hour. It may be a contradiction of terms to say that at the same time to call on Mr. Rohrabacher, but the next amendment on the roster is an amendment offered by Mr. Rohrabacher from California. Are you ready to proceed with your amendment?

Mr. ROHRABACHER. Yes. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 045, amendment to H.R. 5781 offered by Mr. Rohrabacher of California.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain this amendment.

Mr. ROHRABACHER. This amendment requires NASA to provide reports to Congress on the current—in the current areas, that is the current laws prohibiting cooperation with the People's Republic of China. We need a report on exactly what those laws are, what the restrictions are. We need a report from NASA on the level of transparency required by a nation in order to join the ISS Coalition. We need to see that in black and white, what would be required of any nation and this, of course, is aimed at China. If they don't have a certain level of transparency, we need to know whether or not that will mean they can still become a member of the team and participate in the International Space Station.

Number three, we need a report from NASA on the military uses of the Chinese Space Program. China supposedly has a civilian space program, but like all things look very closely in China you will find so much of it tied to the People's Liberation Army, and we would like to see what military uses are being put to play by the Chinese and their space program.

And last, we need a report on the danger that is posed to the International Space Station by a mission that the Chinese flew and what they did is they launched a very—a micro satellite near the International Space Station. It was on the path of the International Space Station, and we have never had an explanation of why this little satellite was launched, and we need to get a full report on that particular incident. And so far there has been no investigation, and I think that we need explanations of what that was all about and did that and has that put the Space Station in jeopardy?

And as the Space Station goes around in its orbit, this Chinese little miniature satellite could well be a threat to the safety of the Station. We need to know whether that is the case or not, and I think it is fairly non-controversial. It is just asking for reports on those areas, Mr. Chairman.

Chairman GORDON. If the gentleman would yield, and I am not trying to be catty or anything here, you—later you have an amendment that says there can be no contact with China, so, I mean, how do we sort of, you know, how do we make those two fit together?

Mr. ROHRABACHER. You mean how we can investigate without actually having a relationship with them?

Chairman GORDON. It says you can't even talk to them.

Mr. ROHRABACHER. Well, we are basically not talking to them. We are asking them questions. If the other one is passed, by the way, if the other amendment is passed, I will gladly withdraw this amendment.

Chairman GORDON. Well, again, if the gentleman will—I will claim my own time, I think this investigation is something that would better be left to CIA or some other agency. I am not sure

that NASA has this ability, and so for that reason, and, again, and I am—maybe you can cure it later by saying you can talk to them, but this just doesn't seem to be the right business for NASA.

So is there further discussion?

If there is no further discussion—

Mr. HALL. Mr. Chairman.

Chairman GORDON. Yes. Mr. Hall is recognized.

Mr. HALL. If Rohrabacher talked to them enough, then they would have a different opinion about us over here. I support his amendment. It simply asks for a report. Why not?

Chairman GORDON. Well, why not would be because it would take resources from NASA that could be used for, you know, a number of other areas, as well as it just doesn't seem like NASA—this is like, you know, asking the National Department or the Department of Defense to look into something with, you know, hogs in Texas. I just don't think it is the right location.

Is there further discussion on this amendment?

Mr. MCCAUL. Mr. Chairman.

Chairman GORDON. Mr. McCaul is recognized.

Mr. MCCAUL. Thank you. I yield to the gentleman from California.

Mr. ROHRBACHER. Okay. Well, let me just note that there is a lot of movement going on now about furthering our cooperation with China, a lot of it, space cooperation. People are talking about bringing them into a space relationship perhaps like we are with Russia, and let me just note for everyone here there has been no reform in China as we have seen in Russia. You know, the churches are filled in Russia, there is opposition parties and newspapers. Obviously they have not reached the level that we would like, but in China they have actually retrogressed, and they are an incredibly repressive society, and I don't like to see the idea that we can just nonchalantly sort of ease into a high-tech, space-related partnership with the Chinese. And this report by NASA, who knows this, you know, the people in NASA, you know, know what issues are involved here and how they would want to cooperate.

It seems to me that that makes all the sense in the world for us to have an understanding on these particular issues about the level of transparency that we would require of the—of any member of the coalition running the International Space Station. Why is that not a report that we could expect, and what is it about the laws that are currently in place that prohibit certain cooperation with Communist China? NASA would know that, their legal counsel would know that, and what are the military uses of the Chinese Space Program? There is no reason why NASA cannot ask our Defense Department and the CIA and others to help them prepare that report.

And, of course, the danger to the Space Station by that Chinese probe, that is something that NASA would actually be the lead agency in. So I think this is an important issue because we are easing into what I consider to be a very unhealthy relationship with the world's worst human right abuser.

Chairman GORDON. Thank you, Mr. Rohrabacher and Mr. McCaul. If there is no further discussion, then all in favor of the

amendment, say aye. Opposed, no. It looks like the no's have it, and the amendment is not agreed to.

Are you ready to proceed with your amendment?

Ms. JOHNSON. Yes. Thank you.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 125, amendment to H.R. 5781 offered by Ms. Eddie Bernice Johnson of Texas.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain the amendment.

Ms. JOHNSON. Thank you, Mr. Chairman. I am sorry. I got so shook up over Mr. Wu trying to break the desk. I do have an amendment at the desk, and I want to thank you and the Ranking Member for considering it.

This amendment is pretty straightforward. This really clarifies Section 405 of the bill. We need to ensure that NASA has a clear plan in place to put NASA on the aeronautical structure, infrastructure back on track to fill the U.S. and long-term aeronautics research needs.

In order to ensure that NASA develops a plan to stabilize and reverse the deterioration of NASA's aeronautics ground test facilities, my amendment specifies that this report be completed within one year after the enactment of this Act. NASA's aeronautics test program ensures the capability, availability, and accessibility of testing facilities to meet the U.S. aeronautics needs for NASA, other government agencies, and commercial customers. These facilities provide vital testing and demonstrate new technologies, materials, structures, and flight concepts bringing understanding to the aeronautical behavior.

Mr. Chairman and Ranking Member, I appreciate your considering this amendment, and I encourage my colleagues to support it, and I yield back the balance of my time.

Chairman GORDON. Thank you, Ms. Johnson, for that excellent amendment.

Any further discussion?

If there is no further discussion, then the vote occurs on the amendment. All in favor, say aye. All in favor, no or opposed, no. The ayes have it, the amendment is agreed to. Thank you.

Let us see. I think Mrs. Fudge might be—she—okay. Well, she has been pretty attending all today, so we will see if she is going to be coming back. And Mr. Wilson.

So the next amendment on the roster is an amendment offered by the gentleman from Ohio, Mr. Wilson. Are you ready to proceed with your amendment?

Mr. WILSON. Yes. Thank you, Mr. Chairman.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 036, amendment to H.R. 5781 offered by Mr. Wilson of Ohio.

Mr. WILSON. Mr. Chairman, one of the things that I am most pleased about with this mark is the inclusion of—

Chairman GORDON. Excuse me. If the gentleman will suspend, which amendment did you—

The CLERK. 036.

Chairman GORDON. 036? Okay. Mr. Wilson's. Okay. Excuse me.

The CLERK. Are we okay?

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. WILSON. Thank you, Mr. Chairman. One of the things that I am most pleased about this mark is the inclusion of adequate funding for evidence-based programs to improve STEM education in our country. If America is to remain the world's leader in the space and aeronautics industry, we need a brilliant workforce of scientists and engineers at NASA.

I represent a rural part of Ohio. Not many people know that former astronaut and Senator John Glenn grew up in a rural part of Appalachia just west of my district in Ohio.

I know that many of my constituents have been inspired by Senator Glenn's many accomplishments, as well as while watching various NASA rocket or Shuttle launches on TV.

Sadly, too many of our rural students are struggling to receive the adequate STEM education they need to become a NASA astronaut or engineer, and too many of our teachers lack the resources needed to provide the STEM education necessary for students to look to enter NASA, the NASA workforce.

My amendment asks that NASA also consider students in rural schools as they look to increase awareness in NASA and improve STEM education at all levels of schooling. I urge my colleagues to support my amendment.

Thank you, Mr. Chairman, and I yield back the balance of my time.

Chairman GORDON. Thank you, Mr. Wilson. As the son of two farmers and someone who represents a large rural area also, I think this is an excellent amendment, and I think maybe the gentleman from the smallest county in Texas might have something to say about that also.

Mr. HALL. I agree with the Chairman. Yield back.

Chairman GORDON. All in favor of the amendment, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

If there is no objection, Ms. Fudge was the amendment before and so we will bring her up again at this time and so will report the amendment.

The CLERK. Amendment number 071, amendment to H.R. 5781 offered by Ms. Fudge of Ohio and Mr. Wilson of Ohio.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. FUDGE. Thank you, Mr. Chairman. Mr. Chairman, this amendment is very simple. It will ensure that we perform not only research and development for the technologies of the current mission but also the research, development, and demonstration of the technologies needed for future missions.

It will be quite awhile before we put a human on Mars, but if we don't start now, the technology R,D&D that will get us there, it may never happen. I yield back, Mr. Chairman.

Chairman GORDON. Thank you, Ms. Fudge.

Mr. Hall.

Mr. HALL. Mr. Chairman, I am inclined to support the gentlelady's amendment. It establishes an enabling technologies development and demonstration program under the Space Technology Program, and it is unclear to me what the program contributes to the overall Space Technology Program, but I am told it will add technologies that are needed to support the exploration program.

Will the gentlelady help me understand just a little what she expects this program will accomplish and how it helps our overall exploration effort for the record?

Ms. FUDGE. For the record, Mr. Ranking Member, it is exactly what you said.

Mr. HALL. It is what? Okay. In that case I yield back my time.

Chairman GORDON. If there is no further discussion, since Ms. Fudge has educated Mr. Hall, then we will ask for a vote. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The next amendment is offered by the gentleman from New Mexico, Mr. Luján. Are you ready to proceed with your amendment?

Mr. LUJÁN. Mr. Chairman, I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 064, amendment to H.R. 5781 offered by Mr. Luján of New Mexico.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. LUJÁN. Thank you, Mr. Chairman. Now more than ever we must invest in educating the next generation of scientists, engineers, mathematicians, and innovators. The continuing under-representation of Latinos and other minority students in mathematics, engineering, and science fields will only contribute to the shortage of professionals available to work in these important industries.

My amendment amends the STEM education and training section of the bill to ensure that participants in NASA's STEM education programs include minority and under-represented groups, including students from high-needs local school districts. We must make sure that NASA is participating in active outreach to these communities of students who for too long have suffered from a STEM achievement gap.

My amendment also allows for a special consideration to be given to minority-serving institutions when NASA is establishing or expanding degree programs in space and earth sciences, aeronautics, engineering, and other STEM disciplines.

My amendment will support the creation of leaders and innovators within our minority and under-represented communities who will be prepared to carry on NASA's mission for many years to come.

I urge my colleagues to support this amendment, and I thank you very much for your consideration.

With that, Mr. Chairman, I yield back my time.

Chairman GORDON. Any further discussion on the amendment? Governor Garamendi.

Mr. GARAMENDI. Just a quick question. The—I think the present language is both for all levels of education?

Mr. LUJÁN. Mr. Chairman, if the gentleman would yield?

Mr. GARAMENDI. Well, let me just finish my question. If that is the case, then typically minority-serving institutions are the higher level of education or the highest level. If that is a modification to only go to highest level, then I think we may not want to do that.

Mr. LUJÁN. Mr. Chairman, would the gentleman yield?

Mr. GARAMENDI. Sure. I will yield.

Mr. LUJÁN. Well, if you look, Mr. Garamendi, at page 77 of the bill, there is within the section here we are targeting minority-serving institutions for higher education, but the subsequent amendment and the language that goes on to follow is outreach to students from under-represented groups as well to make sure that we are going out, and we are recruiting over and beyond, enabling legislation around the education section is reaching out to education of all levels, and I think it was purposely written that way, taking into consideration that NASA does have programs K through 12 and post-secondary education.

And this would only emphasize that we need to make sure that, again, as we are looking at some of the programs that do exist that we are paying attention to all parts of the country. There is backgrounds coming from the National Science Board, science and engineering indicators from NSF and from others that have compiled reports showing where degree programs, STEM bachelors degrees earned by minority students is 17 percent, much lower than representation from other minorities in the country.

Mr. GARAMENDI. I am not debating that point. I just want to—thank you for yielding back. I am not debating that point. I agree entirely with it. I just want to make sure that we are not in this language inadvertently directing the money only to higher education, but apparently that is not the case. Thank you.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. I have concerns about the amendment, and my disagreement or concerns don't stem from the intent to reach out to minority students. Rather this amendment makes several wholesale revisions to statutory references contained in the bill, but my main question is when we first looked at the bill, it had a general definition of institution of higher education, and it goes one through five and that additional purposes.

That is stricken from the bill. I was just wondering why.

Mr. LUJÁN. If the gentleman would yield?

Mr. HALL. Yes, sir.

Mr. LUJÁN. Mr. Chairman, Ranking Member Hall, that was actually a recommendation from legislative counsel. That is something that could be added back. I asked that very question when we were giving the suggestion, looking at this provision, and I would be happy and I would be very supportive to ask unanimous consent that the language that was stricken which reads, "(as defined

under Section 101A of the Higher Education Act from 1965 (20 USC 1001)(A) and then closed triple time),” be added back, Mr. Chairman.

Chairman GORDON. Well, first, let me say that we have in a number of hearings during the COMPETES reauthorization it became clear that minorities, women, underserved, were our best areas to bump up in those areas, and so that is what we are attempting to do. If there is some—so I support the gentleman’s amendment. If there are some improvements that can be made between now and the Floor or in conference, then we need to continue to work on that.

So if there is no further discussion, all in favor say—

Mr. HALL. Mr. Chairman.

Chairman GORDON. Yes, sir. Mr. Hall.

Mr. HALL. I would like to make another inquiry. If he is willing to put that A through 1001 A, the general definition of institutions of higher education, back in those five definitions there would be a lot easier for us to support it. Or if he would consider that from here until the time it goes either in report language or otherwise.

Mr. LUJÁN. Mr. Chairman, I would be happy to work with the Ranking Member and yourself to make sure that we are able to get language that was suggested by legislative counsel and see what is most appropriate to get back in.

Chairman GORDON. I know there is a great deal of effort that has been put into this, and if there is more effort that needs to be put into it, then we need to do that.

If there is no further discussion, all in favor, say aye. Opposed, no. The ayes have it.

The next amendment on the roster is an amendment offered by the gentlelady from Texas. Are you ready to proceed with your amendment?

Ms. JOHNSON. Yes, Mr. Chairman.

Chairman GORDON. The clerk will report the amendment.

Ms. JOHNSON. I have an amendment at the desk.

The CLERK. Amendment number 126, amendment to H.R. 5781 offered by Ms. Eddie Bernice Johnson of Texas.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain the amendment.

Ms. JOHNSON. Thank you, Mr. Chairman and Ranking Member for considering this amendment.

As you are aware, Section 601 of this bill focuses on improving STEM education and training at NASA. This section also instructs the NASA Administrator to consult with the Secretary of Education and the Director of the National Science Foundation to improve STEM education and training.

My amendment includes the gross under-representation of minority teachers in the United States classrooms as part of its discussion. The best to improve elementary, secondary, and undergraduate and graduate level STEM education in our country is by addressing the absence of minority teachers who are well qualified.

The achievement gap for minorities is staggering, but I am convinced it can be mitigated through the interaction of minority role models and minority youth, with minority youth. If children see someone who looks like them succeeding and encouraging them to achieve, then the prospects of those children to believe in themselves and fulfill their own potential are far greater.

Put simply, believing is seeing. The best way we can strengthen our Nation's scientific enterprise is to strengthen diversity so all Americans can compete in the 21st century. According to the Secretary of Education 200,000 new teachers are hired each year nationally, and less than two percent or 4,500 are black males. This is unacceptable.

To quote Secretary Duncan, "our graduation rates have gone up dramatically, and our dropout rates have gone—have to go down," but to get there I am convinced we have to have more people of color teaching, being role models and mentors.

In my State of Texas well over half of the student population is minority, but nearly 77 percent of the Texas teaching force is non-minority. The same diversity found among students is not found among teachers. This shortage of minority teachers is a serious problem.

This is a serious problem, but my amendment to the section of this bill which tasks the NASA Administrator to consult with other agencies is a good place to start.

Mr. Chairman and Ranking Member, I appreciate your considering this amendment to ensure this discussion does not end here today, and I encourage my colleagues to support this amendment and yield back the balance of my time.

Chairman GORDON. Thank you, Ms. Johnson. Once again I think all you said was very well documented in our hearings on the *America COMPETES Act*.

Is there further discussion?

If no, all in favor of the motion, say aye. Opposed, no. The ayes have it. The motion is agreed to.

And let me see. Ms. Edwards is next, and she put us on notice earlier that she—oh, are you going to do it? Okay. She will be back. She had a press conference. She has been very attended today. So I understand that Ms. Fudge will offer that for her, so the next amendment on the roster is an amendment by the gentlelady from Maryland, who will be offered by the gentlelady from Ohio. Are you ready to proceed with your amendment?

Ms. FUDGE. Yes, Mr. Chairman. There is an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 064, amendment to H.R. 5781 offered by Ms. Edwards of Maryland.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. FUDGE. Thank you, Mr. Chairman.

Mr. Chairman, Ms. Edwards' amendment adds a new section to Title VI of the bill establishing a pilot program for hands-on space

science and engineering education and training related to aeronautics, exploration, science, space operations, and human spaceflight that serve to stimulate and engage students in science engineering and that foster skills including engineering, teamwork, project management, and problem solving.

The emphasis of the pilot program will be on technology-related education and training. The whole point of this language and this pilot program is to get our young scientists engaged and active.

The pilot program will have an emphasis on underserved and under-represented minority populations because we are losing our minority populations when it comes to math and science, and we have to aggressively make sure that we capture them and make sure they are included.

I understand that there is an issue with the appropriations language in this amendment. I am fine with changing this language to, "such sums from within the funding authorized for NASA's Education Program."

I encourage everyone to support this important amendment that will benefit our young folks by engaging them in science and technology and making our future stronger.

Mr. Chairman, I urge support and yield back.

Chairman GORDON. Thank you, Ms. Fudge. You did an excellent job as a stand-in for Ms. Edwards, and once again, this is a very good amendment as we would expect from her.

Is there further discussion?

If not, all—the vote occurs on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The next amendment on the roster is an amendment offered in person by the gentlelady from Ohio, Ms. Fudge. Are you ready to proceed with your amendment?

Ms. FUDGE. Yes, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Oh, excuse me. The clerk will report the amendment.

The CLERK. Amendment number 072, amendment to H.R. 5781 offered by Ms. Fudge of Ohio and Mr. Wilson of Ohio.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

The gentlelady has five minutes to explain her amendment.

Ms. FUDGE. Thank you very much. This amendment adds a provision to the institutional management section that will ensure that our unique and state-of-the-art facilities receive proper consideration for modifications.

In addition to maintenance repair, upgrading, and modernization, the Administrator will include an assessment of what structural modifications must be made to maximize the usage of our strongest assets and significant financial investments.

I urge passage. Thank you very much. I yield back.

Chairman GORDON. Thank you, Mrs. Fudge, for improving this bill.

Is there further discussion?

If no, the amendment occurs on the amendment. All in favor, say aye. Opposed, nay. The ayes have it. The amendment is agreed to.

The next amendment on the roster is an amendment offered by the gentleman from California, Mr. Rohrabacher. Are you ready to proceed with your amendment?

Mr. ROHRABACHER. I am. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 048, amendment to H.R. 5781 offered by Mr. Rohrabacher of California.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. ROHRABACHER. This amendment reaffirms the policy that already exists basically with respect to near-earth objects as a threat to our Nation, and yes, to all of humanity. It restates the direction that we have given the Administration to recommend a Federal agency or agencies to be responsible for designating those agencies by October 15, and those agencies that be designated with the responsibility of how to cope with a near-earth object that is—that might be observed and then would be charted and would perhaps be colliding with the earth.

And then also the Administration needs to designate what would be done and who would be responsible for the campaign and the efforts to deflect any major near-earth object that was seen and observed heading towards the earth.

This is not a—this is actually reaffirming policy that already exists, and I think that it is very responsible, and we are just asking—making sure the Administration reaffirm that October 15 deadline.

Chairman GORDON. Thank you, Mr. Rohrabacher. You have been a champion in this area.

Mr. Bartlett is recognized.

Mr. BARTLETT. There is an old adage that says, "What is everybody's business is nobody's business," and somebody has to have responsibility for this. It was a near-earth object that became a really near-earth object that spelled the end of the dinosaurs. Then you could do nothing about it. Today we might be able to do something about it.

It is very obvious with the capabilities we have today that somebody ought to be watching out there to see what is out there and to avoid a catastrophe if it is possible.

So I support the amendment. Thank you.

Chairman GORDON. Thank you, Dr. Bartlett.

If there is no further discussion on the amendment, all in favor of the amendment, say aye. Opposed, nay. The ayes have it. Thank you. The amendment is agreed to.

And the next amendment on the roster is also from the gentleman from California, Mr. Rohrabacher. Are you ready to proceed with your amendment?

Mr. ROHRABACHER. Yes, I am. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 049, amendment to H.R. 5781 offered by Mr. Rohrabacher of California.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. ROHRABACHER. Okay. This amendment, of course, is tied to the amendment that we just passed, and it reaffirms the policy in respect to the role of the Arecibo telescope and the part that it plays in the identification of threats of near-earth objects.

Let us just note that without the Arecibo telescope, we will not be able to track a distant object that is headed toward the earth and chart its course in time for us to have a response. So the Arecibo telescope is essential if we are serious about the idea that if a near-earth object is observed and we would then be able to chart its course to see if it actually was a threat.

So, again, this is reaffirming policy that exists.

Chairman GORDON. Thank you, Mr. Rohrabacher. Another good amendment.

Is there further discussion?

If not, all in favor, say aye. Opposed, nay. They ayes have it. The amendment is agreed to.

And the next amendment on the roster is offered by the gentleman from California, Mr. Rohrabacher. Are you ready to proceed with your amendment?

Mr. ROHRABACHER. Yes. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 044, amendment to H.R. 5781 offered by Mr. Rohrabacher of California.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. ROHRABACHER. Okay. This is an issue that I am very serious about, and it is one we all need to consider very seriously because it goes to the heart of the world that we are going to create in the future. I happen to believe there are major threats to our national security and to the future of the world. The one that is on us right now is radical Islam, but the other is very close by, and that is within a few years we will see the emergence of an incredibly powerful China that has had no, and I say zero political reform.

We were told over the years that if we just engage China and are more active with them in various ways economically and exchange programs and things like space programs and such that they would evolve into a more democratic country because of the contact that they had with the west.

This has been proven to be a horrendous mistake. This theory of getting close to an evil force, and that is going to make it—some of your goodness is going to rub off has not worked out. I call that the hug a Nazi, make a liberal theory, and it has not worked.

The bottom line is what we have got now is we have had these exchanges with China, and it has led to nothing but a stronger, more aggressive, more threatening, and yes, at home, more totali-

tarian government that threatens the rest of us as well as its own people.

Let us note that believers in God who are being thrown into jail today, most of them, the majority of them are in China. China is the world's worst human rights abuser, throwing Falun Gong members, people who refuse to file and to register with the government as a church under their direction are persecuted in that country still. No opposition parties, no freedom of speech, no unions, et cetera. Well, the last time we decided to cooperate with China in terms of lifting, letting them lift, for example, our satellites on Chinese rockets, there was an incredible transfer of technology that has done nothing but weaken us and strengthen this horrible dictatorship.

So this amendment prohibits any exchange or contact between NASA programs or personnel, including contractors, with the People's Republic of China or any entity that is headquartered in the People's Republic of China.

As I say, China continues to be aggressive in their stance on space issues, and they have already laid down their marker. They have, as I mentioned earlier, they launched a—some sort of a probe near the International Space Station which actually threatens the safety of that station, and we have never had any explanation of it.

Well, we shouldn't be cooperating with a country that has such belligerent, you know, and provocative actions as that, and they recently shot down another satellite, spreading debris over an already dangerous environment. One of the things I would like to see is cooperation on an international scale on debris, but are we going to let the worst offender of all become part of that partnership? I don't think so. So there are no existing treaties or trade agreements between the United States and China that would be affected by this amendment.

NASA has one agreement with the Chinese Academy of Sciences involving geo-dynamics, some sort of research that is going on there, and NASA and China have had several unofficial information exchanges, particularly on lunar data.

But I would—this amendment would basically prohibit us and prohibiting NASA from expanding a relationship with this vicious dictatorship. I think that it will do nothing but—and every time we have had this, as they say, it has resulted in a transfer of knowledge not from them to us but from us to them in a way that strengthened the government of—this is repulsive to the values that we hold dear as Americans.

So I would ask—I know this is rather controversial or whatever, but I would ask my colleagues to join me in making this declaration that we are not going to enter into a partnership with the Communist Chinese, at least until we see some reform on their end, and then we can resend this restriction on NASA.

I yield back my time.

Chairman GORDON. Thank you, Mr. Rohrabacher—

Mr. BARTLETT. Mr. Chairman.

Chairman GORDON. —for your consistency. I think the amendment goes more than says that we can enter in an agreement. It says that we can't even discuss agreements with them.

I remember—or anything else. I remember former Secretary of State Jim Baker on one occasion was asked about not having any kind of discussion with a particular country, and his response was we should not be afraid to talk with anyone. If we are concerned about their debris, we got to talk to them about, you know, about that. So I think that you have some legitimate concerns, but I am afraid that this amendment goes too far.

Is there—

Mr. BARTLETT. Mr. Chairman.

Chairman GORDON. Mr.—Dr. Bartlett.

Mr. BARTLETT. Mr. Chairman, I would like to inquire of staff, if we pass this amendment, would it trigger sequential referral to international relations?

Chairman GORDON. Counsel would answer the question, please.

The COUNSEL. I don't believe so. No.

Mr. BARTLETT. Thank you.

Chairman GORDON. So that is a definitive maybe? Okay. Or maybe not, I guess was more like it.

Is there further discussion?

Dr. Bartlett, did you have anything else you—

Mr. BARTLETT. I was just concerned that talking to other countries is really the—that whether you do or not generally resides in International Relations Committee, not in other committees, and I was just concerned that if we pass this, would it trigger a sequential referral.

Mr. ROHRABACHER. Would the gentleman yield?

Mr. BARTLETT. I would be happy to yield.

Mr. ROHRABACHER. The gentleman is making a very good point because this is only restricting NASA from talking about specific programs of cooperation. We are not talking about approaching them. The State Department has every right to approach them and talk to them as to whether or not they are willing to move forward. It just—and so if you want to open doors, that is the way to do it.

NASA's response, that is not our job to open doors like this, so we are actually just saying NASA shouldn't be leading the way to a new relationship with China if there is that type of problem with communicating. It could be done by the state department.

Chairman GORDON. Once again, as I read, it says that adds a section to the bill prohibiting NASA personnel or contractors from any exchange or contact with the People's Republic or any identity who is headquartered in the People's Republic of China.

So this is more than just entering into a contract.

Mr. ROHRABACHER. As up to the State Department.

Chairman GORDON. No, but, I mean, but your amendment goes further. It says there can't be any contact.

Mr. ROHRABACHER. That is correct.

Chairman GORDON. Okay. I just want to be sure we knew.

Mr. ROHRABACHER. I would hope that we didn't do it with Herman Goring as well, you know.

Chairman GORDON. Mr. Wu is recognized.

Mr. WU. Well, I have deeply appreciated, I do deeply appreciate the gentleman's strong, passionate, consistent commitment to human rights regardless of location, regardless of the size of the

entity that the gentleman is taking on, and I have worked with the gentleman on many of those human rights issues.

I part company with the gentleman on this particular amendment. I think that there may be some limited opportunity for bringing the Chinese into a broader family of space-faring nations, but, you know, even short of that potential future, I think that it is worth pointing out that we began our work with the Russians when they were the Soviet Union, and as I recall that process started in the early to mid '70s when the Russians and we had thousands of nuclear weapons pointed at each other, and there was very, very limited technology transfer per se, but we did as I recall have an Apollo-Soyuz docking in space, and there was some controversy about that, and you know, whether it should have been done, but it led to several decades of in my view worthwhile space cooperation and sometimes the international relationship has been testy, and the Soviet Union was not an exemplar of respect for human rights nor did we share a lot of foreign policy interests.

I want to note also that—

Mr. ROHRABACHER. Would the gentleman yield?

Mr. WU. Well, let me finish this point, which is that I was—I believe there was a foreign affairs hearing where Secretary Gates I think at that time as Defense Secretary for the Bush Administration came in and testified that he favored sharing some space activities with the Chinese, substantially to enhance our security interests because that better understanding both their intention and their capabilities was inherently in our interest and having some confidence building so that we could put pressure on them to not target satellites as most countries have done so that we don't put a bunch of particles, debris into earth orbit that, you know, that is one thing to be avoided and the confidence building and determination of capability and intent in Secretary Gates' view was well worth the risks of contact with the Chinese.

And with that I would be happy to yield to the gentleman for a moment.

Mr. ROHRABACHER. Well, for a few points let us just note this, that when we had that space cooperation with the Soviet Union, I was opposed to that then, and so—and let me just note that that did not make the world safer. That, in fact, was coincided with a massive buildup of Soviet weaponry in which they put a huge number of new missiles in Europe. And so that, while it made people feel good, it was just the opposite impact in terms of the potential that it had for peace on this planet and what eventually—

Mr. WU. Reclaiming my time. I would like to ask the gentleman—

Mr. ROHRABACHER. Yes.

Mr. WU. —if he thinks that those early efforts at space cooperation made any contribution to subsequent cooperation with respect to the International Space Station?

Mr. ROHRABACHER. In cooperation with the International Space Station, let me think about that because it is a specific question as to that end, and by the way, I have been supportive of International Space Station cooperation since the reform has taken place in what was the Soviet Union, which is now a reforming and potentially democratic Russia.

But what changed the Soviet Union, what brought down the Communist dictatorship had nothing to do with the cooperation that made people feel good at the time.

Mr. WU. As my time is expiring, let me reclaim, that I think that confidence building is very, very important, and that is certainly a worthy goal for our defense as well as for our space——

Chairman GORDON. The gentleman's time has expired. If there is no further discussion——

Mr. ROHRABACHER. Would the gentleman give me, indulge me with one more minute?

Chairman GORDON. Of course. With unanimous consent.

Mr. ROHRABACHER. Okay. About this—because this is something I have lived, and look. At the time when we were most cooperating with the Soviet Union and hoping that would have a beneficial affect, it had a negative affect, and at that very time that we were cooperating with these type of programs, they were pumping money into various countries of the world to create revolution. They were dramatically expanding their military capabilities.

That is what has happened with China as well, let me note. When we were cooperating with them in the Space Program, what has—what was the result then? No. We have given them technology now that threatens the United States. What brought down the Soviet Union and made it a more peaceful world. What brought us to the point where Ronald Reagan reached an agreement to dramatically reduce the nuclear weapons in our arsenals, and by the way, I am supportive of the current efforts to reduce our nuclear arsenals.

But what brought us to that point was when we supported those elements who were in opposition to the Soviet dictatorship, whether it was Afghanistan or Nicaragua or wherever or Poland. That is what eventually brought about a more peaceful world, not these very symbolic things, cooperation into space——

Chairman GORDON. The gentleman's time has expired.

Mr. ROHRABACHER. Thank you very much.

Chairman GORDON. Is there further discussion on the amendment?

If not, the vote occurs on the amendment. All in favor, say aye. All opposed, say no. The no's have it, the——

Mr. ROHRABACHER. I am sorry to have to call for a roll call vote.

Chairman GORDON. You want a roll call vote or show of hands? You want everybody to come back?

Mr. ROHRABACHER. I want a roll call vote.

Chairman GORDON. All right. We will have a roll call vote.

Mr. ROHRABACHER. This is going to mean a lot to the people in their districts.

Chairman GORDON. The clerk will record the vote.

The CLERK. Chairman Gordon?

Chairman GORDON. No.

The CLERK. Chairman Gordon votes no.

Mr. Costello?

[No response.]

The CLERK. Ms. Johnson?

Ms. JOHNSON. No.

The CLERK. Ms. Johnson votes no.

Ms. Woolsey?
[No response.]
The CLERK. Mr. Wu?
Mr. WU. No.
The CLERK. Mr. Wu votes no.
Mr. Baird?
[No response.]
The CLERK. Mr. Miller?
Mr. MILLER. No.
The CLERK. Mr. Miller votes no.
Mr. Lipinski?
[No response.]
The CLERK. Ms. Giffords?
Ms. GIFFORDS. No.
The CLERK. Ms. Giffords votes no.
Ms. Edwards?
The CLERK. Ms. Edwards votes no.
Ms. Fudge?
Ms. FUDGE. No.
The CLERK. Ms. Fudge votes no.
Mr. Luján?
Mr. LUJÁN. No.
The CLERK. Mr. Luján votes no.
Mr. Tonko?
Mr. TONKO. No.
The CLERK. Mr. Tonko votes no.
Mr. Rothman?
[No response.]
The CLERK. Mr. Matheson?
Mr. MATHESON. No.
The CLERK. Mr. Matheson votes no.
Mr. Davis?
[No response.]
The CLERK. Mr. Chandler?
[No response.]
The CLERK. Mr. Carnahan?
[No response.]
The CLERK. Mr. Hill?
Mr. HILL. No.
The CLERK. Mr. Hill votes no.
Mr. Mitchell?
Mr. MITCHELL. No.
The CLERK. Mr. Mitchell votes no.
Mr. Wilson?
Mr. WILSON. No.
The CLERK. Mr. Wilson votes no.
Mrs. Dahlkemper?
Ms. DAHLKEMPER. No.
The CLERK. Mrs. Dahlkemper votes no.
Mr. Grayson?
Mr. GRAYSON. No.
The CLERK. Mr. Grayson votes no.
Mrs. Kosmas?
Ms. KOSMAS. No.

The CLERK. Mrs. Kosmas votes no.
 Mr. Peters?
 Mr. PETERS. No.
 The CLERK. Mr. Peters votes no.
 Mr. Garamendi?
 [No response.]
 The CLERK. Mr. Hall?
 Mr. HALL. Aye.
 The CLERK. Mr. Hall votes aye.
 Mr. Sensenbrenner?
 [No response.]
 The CLERK. Mr. Lamar Smith?
 [No response.]
 The CLERK. Mr. Rohrabacher?
 Mr. ROHRABACHER. Aye.
 The CLERK. Mr. Rohrabacher votes aye.
 Mr. Bartlett?
 Mr. BARTLETT. Aye.
 The CLERK. Mr. Bartlett votes aye.
 Mr. Ehlers?
 [No response.]
 The CLERK. Mr. Lucas?
 [No response.]
 The CLERK. Mrs. Biggert?
 [No response.]
 The CLERK. Mr. Akin?
 [No response.]
 The CLERK. Mr. Neugebauer.
 [No response.]
 The CLERK. Mr. Inglis?
 [No response.]
 The CLERK. Mr. McCaul?
 Mr. MCCAUL. I support——
 The CLERK. Mr. McCaul votes no.
 Mr. Diaz-Balart?
 [No response.]
 The CLERK. Mr. Bilbray?
 Mr. BILBRAY. Mr. Bilbray votes aye before——
 The CLERK. Mr. Bilbray votes aye.
 Mr. Adrian Smith?
 [No response.]
 The CLERK. Mr. Broun?
 [No response.]
 The CLERK. Mr. Olson?
 Mr. OLSON. Aye.
 The CLERK. Mr. Olson votes aye.
 Mr. Rothman is not recorded.
 Mr. ROTHMAN. Mr. Chairman, I would like to be recorded as no,
 please.
 The CLERK. Mr. Rothman votes no.
 Mr. Baird is not recorded.
 Mr. BAIRD. If I knew how to say no in Chinese, that would be
 my answer.

Chairman GORDON. Is there anyone that has not had a chance to vote?

Mr. Smith.

Mr. SMITH OF NEBRASKA. Mr. Chairman, am I recorded?

Chairman GORDON. You are not recorded. Would you like to be?

Mr. SMITH OF NEBRASKA. Yes, I would like to be.

Chairman GORDON. And so would you like to tell us what that would be?

Mr. SMITH OF NEBRASKA. Aye.

The CLERK. Mr. Adrian Smith votes aye.

Chairman GORDON. Is there anyone else that has not been recorded? If not, please report the vote.

The CLERK. Mr. Chairman, I have 6 members voting aye and 20 members voting no.

Chairman GORDON. The ayes have it. The amendment—excuse me. The no's have it. Pardon me. Brainwashed by those folks. The no's have it. The amendment is not agreed to.

The next amendment on the roster is the amendment offered by the gentlelady from Maryland, Ms. Edwards. Are you ready to proceed with your amendment?

Ms. EDWARDS. Mr. Chairman, I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 063, amendment to H.R. 5781 offered by Ms. Edwards of Maryland.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. EDWARDS. Thank you, Mr. Chairman, and also thank you to Ranking Member Hall because I think sometimes we hear about how, you know, horrible it is around here and Members can't work together across the aisles, and I always think that this committee really disproves that little rumor, and I appreciate what we are trying to do here to make sure that we cover a lot of different bases and concerns with the NASA Reauthorization.

My amendment concerns retaining highly-skilled and talented NASA workers for the new NASA future. As you know, in my service on this committee I have always raised the question about what I believe is the need to retain the internal capacity at NASA so they have the ability to oversee, to manage, to direct, and influence the many talented contractors who do so much of the work for the agency, and I believe that sustaining and building upon that talented reserve should be our first priority as we move forward with this authorization because nothing in this bill can happen really without our skilled workforce.

We should recognize that the new authorization is itself a transition. It lays the groundwork for the future, and it is about the expertise and oversight that we could potentially lose, and so what my amendment does is merely extend the current moratorium against reductions in force that has received unanimous, really nearly unanimous bipartisan support since 2004.

This policy was embraced in 2005, and 2008, reauthorization acts controlled by both parties, and given the looming retirement of the Shuttle this language is particularly important for upwards of thousands of NASA employees, particularly at Johnson Space Center and at Kennedy Spaceflight Center that will be caught up in the transition over the next few years of this new reauthorization.

The language is also important for all NASA employees, however, those who are at Goddard Spaceflight Center in the county that is my home would be impacted, and I know that some have suggested that the moratorium keeps workers and jobs that shouldn't exist with a changing mission, but I think it is really to the contrary. The NASA workforce is very fluid and adaptable, and it is skilled, and in this important transition filling those functions the way that the agency needs to will help the agency transition now during this authorization period.

The key point here is that we need internal capacity for technical oversight of the agency, and I think also the psychological impact already of what we are doing in this period has been really tremendous on all of the NASA workforce. In fact, you know, pretty demoralizing sometimes from what I can hear. Everyone feels targeted.

So we need to make sure that our workers know that they are supported, that we value what they are doing, that they have something important to contribute, and continue a policy that we have had for the last several years, and obviously the amendment is endorsed by a number of the representatives of workers at all of these NASA facilities.

I encourage my colleagues to support the continued moratorium through this authorization period and to support our workforce.

And with that I would yield.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, I am reluctant to support the gentlelady's amendment. I don't like to protect only civil service employees while thousands of contractor's jobs are being eliminated, but we do need to do everything we can to ensure our talented workforce remains intact.

For that reason I support the amendment.

Chairman GORDON. Thank you, Mr. Hall. Let me, first of all, I would agree with Ms. Edwards that we have a very talented NASA workforce, and I would certainly like to see that maintained at full strength and expanded, but let us be realistic here. This is a five-year moratorium on past moratoriums.

We simply have to give the agency more flexibility than that. Clearly if there—we are looking at a change in direction in many ways for NASA. If there is someone in NASA that can do another job, it makes no sense that they are going to fire them and hire somebody else. Of course NASA's going to move all the employees that they can into these new jobs.

I just think that we need to provide more flexibility to the agency. Otherwise, we could have a workforce that then does not allow you to hire new people that have these new skills, or it just is not in my opinion on top of all the others it doesn't give adequate flexibility for NASA. So I would reluctantly have to oppose this amendment.

Is there further discussion?

If not, all in favor, say aye. Opposed, nay.

Ms. EDWARDS. Mr. Chairman.

Chairman GORDON. Could we do it by hand?

Ms. EDWARDS. I would ask for a recorded vote.

Chairman GORDON. We will do a recorded vote. The clerk will call the vote or, I mean, will call, and I hope the clerk will move along with good rhythm because we have just a few minutes.

The CLERK. Chairman Gordon?

Chairman GORDON. No.

The CLERK. Chairman Gordon votes no.

Mr. Costello?

[No response.]

The CLERK. Ms. Johnson?

[Inaudible.]

The CLERK. Ms. Woolsey?
Ms. WOOLSEY. Yes.
The CLERK. Ms. Woolsey votes aye.
Mr. Wu?
[No response.]
The CLERK. Mr. Baird?
Mr. BAIRD. No.
The CLERK. Mr. Baird votes no.
Mr. Miller?
Mr. MILLER. No.
Chairman GORDON. Mr. Miller votes no.
Mr. Lipinski?
[No response.]
The CLERK. Ms. Giffords?
Ms. GIFFORDS. No.
The CLERK. Ms. Giffords votes no.
Ms. Edwards?
Ms. EDWARDS. Aye.
The CLERK. Ms. Edwards votes aye.
Ms. Fudge?
Ms. FUDGE. Aye.
The CLERK. Ms. Fudge votes aye.
Mr. Luján?
Mr. LUJÁN. Aye.
The CLERK. Mr. Luján votes aye.
Mr. Tonko?
Mr. TONKO. Aye.
The CLERK. Mr. Tonko votes aye.
Mr. Rothman?
[No response.]
The CLERK. Mr. Matheson?
[No response.]
The CLERK. Mr. Davis?
[No response.]
The CLERK. Mr. Chandler?
[No response.]
The CLERK. Mr. Carnahan?
[No response.]
The CLERK. Mr. Hill?
Mr. HILL. No.
The CLERK. Mr. Hill votes no.
Mr. Mitchell?
Mr. MITCHELL. Yes.
The CLERK. Mr. Mitchell votes aye.
Mr. Wilson?
Mr. WILSON. Yes.
The CLERK. Mr. Wilson votes aye.
Mrs. Dahlkemper?
Ms. DAHLKEMPER. No.
The CLERK. Mrs. Dahlkemper votes no.
Mr. Grayson?
Mr. GRAYSON. Aye.
The CLERK. Mr. Grayson votes aye.
Mrs. Kosmas?

Ms. KOSMAS. Aye.
The CLERK. Mrs. Kosmas votes aye.
Mr. Peters?
Mr. PETERS. No.
The CLERK. Mr. Peters votes no.
Mr. Garamendi?
[No response.]
The CLERK. Mr. Hall?
Mr. HALL. No.
The CLERK. Mr. Hall votes no.
Mr. Sensenbrenner?
[No response.]
The CLERK. Mr. Lamar Smith?
[No response.]
The CLERK. Mr. Rohrabacher?
Mr. ROHRABACHER. No.
The CLERK. Mr. Rohrabacher votes no.
Mr. Bartlett?
Mr. BARTLETT. No.
The CLERK. Mr. Bartlett votes no.
Mr. Ehlers?
[No response.]
The CLERK. Mr. Lucas?
[No response.]
The CLERK. Mrs. Biggert?
Ms. BIGGERT. No.
The CLERK. Mrs. Biggert votes no.
Mr. Akin?
[No response.]
The CLERK. Mr. Neugebauer.
[No response.]
The CLERK. Mr. Inglis?
Mr. INGLIS. No.
The CLERK. Mr. Inglis votes no.
Mr. McCaul?
Mr. McCAUL. No.
The CLERK. Mr. McCaul votes no.
Mr. Diaz-Balart?
[No response.]
The CLERK. Mr. Bilbray?
Mr. BILBRAY. Bilbray votes no.
The CLERK. Mr. Bilbray votes no.
Mr. Adrian Smith?
Mr. SMITH OF NEBRASKA. No.
The CLERK. Mr. Adrian Smith votes no.
Mr. Broun?
[No response.]
The CLERK. Mr. Olson?
Mr. OLSON. No.
The CLERK. Mr. Olson votes no.
Chairman GORDON. How does Mr. Rothman vote?
Mr. ROTHMAN. Mr. Chairman, I would like to be recorded as an
aye, please.
Chairman GORDON. Is there—Mr. Matheson.

Mr. MATHESON. No.
Chairman GORDON. Mr. Matheson votes no.
Mr. Wu.
Mr. WU. Aye.
Chairman GORDON. Mr. Wu votes aye.
Anyone else?
The CLERK. Mr. Matheson, how are you recorded?
Mr. MATHESON. I would like to be recorded as no.
The CLERK. No.
Chairman GORDON. The clerk will report.
The CLERK. Who was after Mr. Matheson?
Chairman GORDON. Mr. Wu.
The CLERK. Mr. Wu. He votes aye?
Chairman GORDON. Did you get Ms. Johnson?
The CLERK. No.
Chairman GORDON. Ms. Johnson, how would you like to be recorded?
Ms. JOHNSON. Aye.
Chairman GORDON. Is there—oh, Mr. Lipinski.
The CLERK. Mr. Lipinski is not recorded.
Mr. LIPINSKI. No.
The CLERK. Mr. Lipinski votes no.
Chairman GORDON. We have 2 minutes and 44 seconds to the next vote, so the clerk will report the vote.
The CLERK. Mr. Chairman, I have 12 members voting aye, and 18 members voting no.

Chairman GORDON. The no's prevail. The amendment is—does not pass, and let me announce that we have two more amendments, and I would appreciate—three amendments? Oh, we have three amendments, so we will come back immediately after this vote to finish the bill. Thank you.

[Recess.]

Chairman GORDON. Back to order. Let us see. The next amendment on the roster is an amendment offered by the gentleman from Texas, Mr. McCaul, the patient gentleman from Texas, Mr. McCaul.

Mr. MCCAUL. Thank you, Mr. Chairman.

Chairman GORDON. Are you ready to proceed?

Mr. MCCAUL. I am, and I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 002, amendment to H.R. 5781 offered by Mr. McCaul.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. MCCAUL. Thank you, Mr. Chairman, and let me—I don't think this has been said enough today. Let me commend you and the Ranking Member and Ms. Giffords and Mr. Olson for a fine job in a bipartisan piece of legislation that not only reauthorizes the Human Spaceflight Program but saves, restores, and advances human spaceflight, and I want to thank you personally for that and with that my amendment basically provides for a sense of the Congress that NASA should attempt to carry out the top recommendations of the decadal survey where possible.

The decadal survey puts forth recommendations for NASA research which is developed by the top scientists in their fields, and in the past years NASA experienced dramatic funding shortfalls when the budget and appropriations did not adequately fund the agency. The NASA Administrator had the authority and exercised his authority to move large funding amounts from the science missions, including the top recommendations of the decadal survey mission areas in order to cover the budget shortfalls in other areas.

As a result this hurt the progress of emissions and put them behind schedule. At a minimum NASA should be given priority to planning, designing, funding, and executing the top recommendations from the decadal survey in each mission area.

And while the current amendment language is a sense of Congress, I would like to be able to work with the Chairman and the Ranking Member to strengthen this language as the bill moves to the Floor.

And with that I yield back.

[The prepared statement of Mr. McCaul follows:]

PREPARED STATEMENT OF REPRESENTATIVE MICHAEL T. MCCAUL

- In past years, NASA experienced dramatic funding shortfalls when the budget and appropriations did not adequately fund the agency.
- The NASA administrator had the authority, and exercised his authority, to move large funding amounts from the Science missions—including the top

recommendations of the Decadal survey mission areas—in order to cover the budget shortfalls in other areas.

- This hurt the progress of the missions and put them behind schedule.
- At a minimum, NASA should give priority to planning, designing, funding and executing the top recommendation from the Decadal survey in each mission area.

Chairman GORDON. I thank you, Mr. McCaul, and thank you for your endurance today. You have a good amendment, and I think the committee should support it.

Mr. Hall is recognized.

Mr. HALL. Commonsense amendment, and I support it.

Chairman GORDON. If there is no further discussion, the vote is on the amendment from the gentleman from Texas, Mr. McCaul. All in favor, say aye. Opposed, nay. The ayes have it. The amendment is passed.

The next amendment on the roster is an amendment by Mr. Sensenbrenner and Mr. Miller, a bipartisan amendment, and I think Mr. Miller is going to carry that.

Mr. MILLER. Thank you. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 041, amendment to H.R. 5781 offered by Mr. Sensenbrenner of Wisconsin and Mr. Miller of North Carolina.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. MILLER. Thank you, Mr. Chairman. Mr. Sensenbrenner and I disagreed about an amendment earlier today, but this amendment restores the happy harmony that usually exists between Mr. Sensenbrenner and me.

In our work on the Investigations and Oversight Subcommittee we have been, Mr. Sensenbrenner and I have been disappointed in the role of the NASA Counsel, Office of General Counsel. What I think we want a general counsel to do is advise government agencies to follow both the letter and the spirit of the law.

It appeared with respect to two instances that we know of that instead of doing that the General Counsel's Office or the General Counsel determined that what management wanted to do was something other than what the letter and spirit of the law allowed or required, and instead of telling them to do what the law required it seemed to help them think through a strategy for to do something different and get away with it.

This amendment requires ethics training for the members of the counsel's office, the licensed attorneys in that office, and it moves the position of ethics officer away from the counsel.

I yield back the balance of my time.

[The prepared statement of Mr. Sensenbrenner follows:]

PREPARED STATEMENT OF REPRESENTATIVE F. JAMES SENSENBRENNER JR.

NASA's General Counsel's Office has behaved like a defense lawyer for the mob—more intent on enabling and even covering up misconduct than on ensuring lawful actions.

NASA's general counsel publicly testified that he destroyed video records from a meeting between NASA's Administrator and the staff of NASA's Office of the Inspector General because he wanted to prevent the recordings from becoming agency records that would be subject to FOIA and Congressional requests. He was aware at the time that the recorded meeting pertained to a matter that this Committee was actively investigating. He destroyed the recordings by breaking the compact discs over his knees and discarding the pieces in the trash.

This amendment attempts to instill greater accountability in NASA's General Counsel's office by clarifying that counsel's role is to ensure that staff behaves lawfully—not to help them avoid repercussions when they break the law. urge my colleagues to support it.

Chairman GORDON. Thank you, Mr. Miller, and thank you, Mr. Sensenbrenner, for bringing this excellent amendment.

Is there further discussion?

If no, all in favor of the amendment say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The—I think the last amendment is a modified amendment offered by the gentleman from Michigan, Mr. Peters. Are you ready to proceed with your amendment?

Mr. PETERS. I am, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 050 to H.R. 5781 offered by Mr. Peters of Michigan.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. PETERS. I will be very brief because I explained it beforehand, Mr. Chairman. Basically this amendment requests that the Administrator conduct a study on the use of radiation research on non-human primates. It was mentioned in my initial comments. This is research that has been done for 40 years, and there are now other ways of conducting the same sort of radiation experiments without using non-human primates. The European Space Agency, for example, no longer uses non-human primates. The U.S. Air Force has put out a fairly detailed report as to why they have moved away from this as well.

This will also—this amendment simply asks NASA to present a report before any additional research. If they have anything that they are doing now, they can continue, but they need to provide justification and rationale for any additional research, and I would urge adoption.

Chairman GORDON. Is there further—

Mr. BARTLETT. Mr. Chairman.

Chairman GORDON. Dr. Bartlett is recognized.

Mr. BARTLETT. Thank you very much. I was part of the research team that put the first primates in space. It was more than half a century ago. I was a school physiologist at Pensacola Florida. We had an Army monkey and a Navy monkey—their monkey was a rhesus monkey, ours was a spider monkey, the ones they are anticipating using here, and it was a suborbital flight, so I am not apriorily opposed to appropriately using animals.

But I rise in strong support of this amendment. I think that the—if they did this research they are talking about, it would be

duplicative, and as a scientist I have some real concern about the validity of this kind of research.

Radiation is a stressor, but these animals are already enormously stressed. These are not the affectionate spider monkeys that the organ grinder uses, although they are the same spider monkeys. These are monkeys that have forced incarceration which they keenly resent, and they are enormously stressed. I don't know how you pretend that you are going to measure the effects of an additional stress radiation when you already have animals that are enormously stressed.

And as Mr. Peters mentioned, we now have pretty much moved beyond this. We don't need whole body exposures anymore because we know the target organs. We do a lot of tissue culture research, and so I think not only would these experiments be duplicative, they are needed because today we have moved beyond that, and we are doing tissue culture studies and so forth.

I rise in strong support of this amendment. I hope that it can be passed. I think it sends the right message. Thank you.

Chairman GORDON. Mr. Wu is recognized.

Mr. WU. I do agree that a study is in order, and I support the amendment. Mr. Garamendi, would you—I yield back the balance of my time.

Chairman GORDON. Is there further discussion on the amendment?

If not, the vote occurs on the amendment. All in favor, say—on the modified amendment. All members say aye. Vote, nay. The ayes have it. The amendment is agreed to.

Are there any other amendments?

If no, then the vote is on the bill as amended. All those in favor say aye. Opposed, no. The ayes have it. The—let me make sure that I was just saying no as an option for someone. I was not voting no. I was voting aye so there will be no misunderstanding.

I now recognize Mr. Hall for a motion.

Mr. HALL. Mr. Chairman, I move that the committee favorably report H.R. 5781 as amended to the House with the recommendation that the bill do pass. Furthermore, I move that staff be instructed to prepare the legislative report and make necessary technical and conforming changes and that the Chairman take all necessary steps to bring the bill before the House for consideration.

I yield back.

Chairman GORDON. The question is on the motion to report the bill favorably. Those in favor of the motion will signify by saying aye. Those opposed. The ayes have it. The bill is reported favorably.

Without objection the motion to reconsider is laid upon the table. Members will have two subsequent calendar days in which to submit supplemental, minority, or additional views on the measure.

Let me say to Mr. Hall, Ms. Giffords, Mr. Olson, job well done. Let me particularly say to the staff that has put so much time into this, we thank you for that. I will be the first to say this is not a perfect bill because we did not have the perfect amount of money, but we are going to move forward to a conference to the Floor, and we welcome additional improvements to the bill as we go long, and again, thank you all.

And this hearing is adjourned.
[Whereupon, at 4:16 p.m., the Committee was adjourned.]

Appendix:

H.R. 5781, SECTION-BY-SECTION ANALYSIS, AMENDMENT ROSTER

.....
(Original Signature of Member)

111TH CONGRESS
2D SESSION

H. R. 5781

To authorize the programs of the National Aeronautics and Space Administration, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

Mr. GORDON of Tennessee (for himself, Mr. HALL of Texas, Ms. GIFFORDS, and Mr. OLSON) introduced the following bill; which was referred to the Committee on _____

A BILL

To authorize the programs of the National Aeronautics and Space Administration, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

4 (a) SHORT TITLE.—This Act may be cited as the
5 “National Aeronautics and Space Administration Author-
6 ization Act of 2010”.

7 (b) TABLE OF CONTENTS.—The table of contents for
8 this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Findings.
- Sec. 3. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

- Sec. 101. Fiscal year 2011.
- Sec. 102. Fiscal year 2012.
- Sec. 103. Fiscal year 2013.
- Sec. 104. Fiscal year 2014.
- Sec. 105. Fiscal year 2015.

TITLE II—HUMAN SPACE FLIGHT

Subtitle A—Exploration

- Sec. 201. Reaffirmation of exploration policy.
- Sec. 202. Restructured Exploration program.
- Sec. 203. Space radiation.

Subtitle B—International Space Station

- Sec. 211. Extension of ISS operations.
- Sec. 212. ISS research management institution.
- Sec. 213. ISS research management plan.
- Sec. 214. Outreach plan for United States ISS research.
- Sec. 215. ISS cargo resupply requirements and contingency capacity through 2020.
- Sec. 216. Centrifuge.
- Sec. 217. Exploration technology development using the ISS.
- Sec. 218. Fundamental space life science and physical sciences and related technology research.

Subtitle C—Space Shuttle

- Sec. 221. Expanded scope of Space Shuttle Transition Liaison Office.
- Sec. 222. Post-Shuttle workforce transition initiative grant program.
- Sec. 223. Disposition of orbiter vehicles.

Subtitle D—Space and Flight Support

- Sec. 231. 21st Century Space Launch Complex Initiative.

Subtitle E—Commercial Crew Transportation

- Sec. 241. Affirmation of policy.
- Sec. 242. Commercial crew and related commercial space initiatives.
- Sec. 243. Federal assistance for the development of commercial orbital human space transportation services.

TITLE III—SCIENCE

Subtitle A—Earth Science

- Sec. 301. Earth science applications.
- Sec. 302. Essential space-based Earth science and climate measurements.
- Sec. 303. Commercial remote sensing data purchases pilot project.

Subtitle B—Space Science

- Sec. 311. Suborbital programs.
- Sec. 312. Explorer program.
- Sec. 313. Radioisotope thermoelectric generator material requirements and supply.

TITLE IV—AERONAUTICS

- Sec. 401. Environmentally friendly aircraft research and development initiative.
- Sec. 402. Research on NextGen airspace management concepts and tools.
- Sec. 403. Research on aircraft cabin air quality.
- Sec. 404. Research on on-board volcanic ash sensor systems.
- Sec. 405. Aeronautics test facilities.
- Sec. 406. Expanded research program on composite materials used in aerospace.

TITLE V—SPACE TECHNOLOGY

- Sec. 501. Space technology program.

TITLE VI—EDUCATION AND OUTREACH

- Sec. 601. STEM education and training.
- Sec. 602. Assessment of impediments to space science and engineering workforce development for minority and underrepresented groups at NASA.
- Sec. 603. Independent review of the National Space Grant College and Fellowship Program.

TITLE VII—INSTITUTIONAL CAPABILITIES REVITALIZATION

- Sec. 701. Institutional management.
- Sec. 702. James E. Webb Cooperative Education Distinguished Scholar Program.

TITLE VIII—ACQUISITION MANAGEMENT

- Sec. 801. Prohibition on expenditure of funds when 30 percent threshold is exceeded.
- Sec. 802. Project and program reserves.
- Sec. 803. Independent reviews.
- Sec. 804. Avoiding organizational conflicts of interest in major NASA acquisition programs.
- Sec. 805. Report to Congress.

TITLE IX—OTHER PROVISIONS

- Sec. 901. Cloud computing.
- Sec. 902. Review of practices to detect and prevent the use of counterfeit parts.
- Sec. 903. Preservation and management of lunar sites.
- Sec. 904. Continuity of moderate resolution land imaging remote sensing data.
- Sec. 905. Space weather.
- Sec. 906. Use of operational commercial suborbital vehicles for research, development, and education.
- Sec. 907. Study on export control matters related to United States astronaut safety and NASA mission operations.
- Sec. 908. Amendment to the National Aeronautics and Space Act of 1958.
- Sec. 909. Near-Earth objects.

1 **SEC. 2. FINDINGS.**

2 The Congress finds the following:

3 (1) NASA is and should remain a multimission
4 agency with a balanced and robust set of core mis-
5 sions in science, aeronautics, and human space flight
6 and exploration.

7 (2) NASA's programs have the potential to in-
8 spire our youth to pursue studies and careers in
9 science, technology, engineering, and mathematics,
10 and the agency should carry out its activities in a
11 manner that enhances the educational and outreach
12 potential of its programs.

13 (3) NASA should begin to reinvest in sustained
14 fashion in a long-term space technology research and
15 development activity. Such investments are an im-
16 portant catalyst for innovation, and they represent
17 the critically important "seed corn" on which
18 NASA's ability to carry out challenging and produc-
19 tive missions in the future will depend.

20 (4) The Space Shuttle workforce, both civil
21 servants and contractors, encompasses skills and ex-
22 perience that will be needed in the Nation's future
23 human space flight activities, and the transition of
24 that workforce to a challenging human space flight
25 and exploration program needs to be carried out in

1 as expeditious and nondisruptive a manner as possible.
2

3 (5) Human and robotic exploration of the solar
4 system will be a significant undertaking of humanity
5 in the 21st century and beyond, and it is in the national
6 interest that the United States should assume
7 a leadership role in a cooperative international exploration
8 initiative. Continuity of exploration goals is
9 critical if progress is to be maximized and costly inefficiencies
10 are to be minimized.

11 (6) Commercial activities have long contributed
12 to the vitality and strength of the Nation's space
13 and aeronautics programs, and the growth of a
14 healthy, self-sustaining United States commercial
15 space and aeronautics sector should continue to be
16 encouraged.

17 (7) Congress agrees with the finding of the Review
18 of United States Human Spaceflight Plans
19 Committee that: "While there are many potential
20 benefits of commercial services that transport crew
21 to low-Earth orbit, there are simply too many risks
22 at the present time not to have a viable fallback option
23 for risk mitigation."

24 (8) It is in the national interest for the United
25 States Government to develop a government system

1 to serve as an independent means—whether primary
2 or backup—of crewed access to low-Earth orbit and
3 beyond so that it is not dependent on either non-
4 United States or commercial systems for its crewed
5 access to space.

6 (9) Development of the next crewed space
7 transportation system to low-Earth orbit should be
8 guided by the Columbia Accident Investigation
9 Board’s recommendation that “the design of the sys-
10 tem should give overriding priority to crew safety,
11 rather than trade safety against other performance
12 criteria, such as low cost and reusability”.

13 (10) In an environment of constrained budgets,
14 responsible stewardship of taxpayer-provided re-
15 sources makes it imperative that NASA’s exploration
16 program be carried out in a manner that builds on
17 the investments made to date in the Orion, Ares I,
18 and heavy lift projects and other activities of the ex-
19 ploration program in existence prior to fiscal year
20 2011 rather than discarding them. A restructured
21 exploration program should pursue the incremental
22 development and demonstration of crewed and
23 heavy-lift transportation systems in a manner that
24 ensures that investments to provide assured access
25 to low-Earth orbit also directly support the expedi-

1 tious development of the heavy lift launch vehicle
2 system, minimize the looming human space flight
3 “gap”, provide a very high level of crew safety, and
4 enable challenging missions beyond low-Earth orbit
5 in a timely manner.

6 (11) NASA’s programs in astrophysics,
7 heliophysics, planetary science, and Earth science
8 and climate research have greatly increased our un-
9 derstanding of both our home planet and the rest of
10 the universe, and they have also provided numerous
11 benefits to our society.

12 (12) NASA’s aeronautics program is under-
13 taking research and development that benefits our
14 economic development and competitiveness, enhances
15 our quality of life and enables environmentally re-
16 sponsible aviation operations, and strengthens our
17 national defense.

18 (13) The ISS provides a unique research envi-
19 ronment and capabilities for basic and applied re-
20 search, as well as having the potential to serve as a
21 testbed for human space flight technologies and
22 operational concepts. It is critically important that
23 NASA make needed investments to promote produc-
24 tive ISS utilization, including a meaningful program

1 of grants in the life and physical sciences micro-
2 gravity research disciplines.

3 (14) It is in the national interest for the United
4 States to have an export control policy that protects
5 the national security while also enabling the United
6 States aerospace industry to compete effectively in
7 the global marketplace and the United States to un-
8 dertake cooperative programs in science and human
9 space flight in an effective manner.

10 (15) A strong, robust NASA program is in the
11 national interest. Ensuring that it can continue to
12 pursue cutting-edge space and aeronautical research
13 and development activities and push back the fron-
14 tier of space exploration requires a sustained and
15 adequate commitment in resources. However,
16 NASA's share of the Federal discretionary budg-
17 etary authority has declined significantly relative to
18 its post-Apollo historical average share of 2.07 per-
19 cent. It should be a national goal to restore NASA's
20 funding share to its post-Apollo historical average.

21 (16) NASA should be vigilant in taking all nec-
22 essary steps to control cost and schedule growth in
23 mission projects, including the development of an in-
24 tegrated cost containment strategy, and adopt meas-
25 ures that improve the performance and transparency

1 of its cost and acquisition management practices.
2 NASA should approach cost and schedule manage-
3 ment with the same level of innovation, rigor, and
4 technical excellence that it applies to the execution
5 of its mission projects.

6 (17) NASA has been inconsistent in its treat-
7 ment of termination liability costs for contracts
8 issued by different mission directorates and across
9 various agency programs relative to historical prac-
10 tice. This inconsistency has hampered NASA's abil-
11 ity to effectively execute its Exploration programs.

12 **SEC. 3. DEFINITIONS.**

13 In this Act:

14 (1) ADMINISTRATOR.—The term “Adminis-
15 trator” means the Administrator of NASA.

16 (2) ISS.—The term “ISS” means the Inter-
17 national Space Station.

18 (3) NASA.—The term “NASA” means the Na-
19 tional Aeronautics and Space Administration.

20 (4) NOAA.—The term “NOAA” means the Na-
21 tional Oceanic and Atmospheric Administration.

22 (5) OSTP.—The term “OSTP” means the Of-
23 fice of Science and Technology Policy.

1 **TITLE I—AUTHORIZATION OF**
2 **APPROPRIATIONS**

3 **SEC. 101. FISCAL YEAR 2011.**

4 There are authorized to be appropriated to the Ad-
5 ministrator for fiscal year 2011 \$19,000,000,000, to be
6 allocated as follows:

7 (1) For Science, \$5,015,700,000, of which—

8 (A) \$1,801,800,000 shall be for Earth
9 Science;

10 (B) \$1,485,700,000 shall be for Planetary
11 Science;

12 (C) \$1,076,300,000 shall be for Astro-
13 physics;

14 (D) \$646,900,000 shall be for
15 Heliophysics, of which \$5,000,000 shall be an
16 augmentation to the Explorers program; and

17 (E) \$5,000,000 shall be an augmentation
18 to the total amount provided under subpara-
19 graphs (C) and (D) for Astrophysics and
20 Heliophysics in order to augment the funding
21 for the Science Mission Directorate's suborbital
22 research programs, to be allocated between the
23 Astrophysics and Heliophysics suborbital pro-
24 grams at the Administrator's discretion.

25 (2) For Aeronautics, \$579,600,000.

1 (3) For Space Technology, \$572,200,000, of
2 which \$1,000,000 shall be for the Commercial Reus-
3 able Suborbital Research project for defining user
4 requirements and identifying, assessing, and charac-
5 terizing commercial reusable suborbital vehicle capa-
6 bilities and risks for use as potential research and
7 development platforms.

8 (4) For Exploration, \$4,535,300,000 of
9 which—

10 (A) \$215,000,000 shall be for Human Re-
11 search;

12 (B) \$14,000,000 shall be for the Commer-
13 cial Orbital Transportation System demonstra-
14 tion program;

15 (C) \$50,000,000 shall be for commercial
16 crew transportation-related activities;

17 (D) \$4,156,300,000 shall be for the re-
18 structured exploration program described in
19 section 202; and

20 (E) \$100,000,000 shall be for the loan and
21 loan guarantee program described in section
22 243.

23 (5) For Space Operations, \$4,594,300,000, of
24 which—

1 (A) \$989,100,000 shall be for the Space
2 Shuttle program;

3 (B) \$2,804,800,000 shall be for the ISS,
4 of which \$75,000,000 shall be for fundamental
5 space life science and physical sciences and re-
6 lated technology research using ground-based,
7 free-flyer, and ISS facilities, including ISS Na-
8 tional Laboratory research;

9 (C) \$60,000,000 shall be for the Post-
10 Shuttle Workforce Transition Initiative grant
11 program described in section 222; and

12 (D) \$740,400,000 shall be for Space and
13 Flight Support, of which \$50,000,000 shall be
14 for the 21st Century Launch Complex Initia-
15 tive.

16 (6) For Education, \$145,800,000.

17 (7) For Cross-Agency Support Programs,
18 \$3,111,400,000.

19 (8) For Construction and Environmental Com-
20 pliance and Restoration, \$407,300,000, of which
21 \$10,000,000 is an augmentation to the President's
22 requested funding level in order to support the
23 NASA laboratory revitalization initiative described in
24 section 701.

25 (9) For Inspector General, \$38,400,000.

1 **SEC. 102. FISCAL YEAR 2012.**

2 There are authorized to be appropriated to the Ad-
3 ministrator for fiscal year 2012 \$19,450,000,000, to be
4 allocated as follows:

5 (1) For Science, \$5,278,600,000 of which—

6 (A) \$1,944,500,000 shall be for Earth
7 Science;

8 (B) \$1,547,200,000 shall be for Planetary
9 Science;

10 (C) \$1,109,300,000 shall be for Astro-
11 physics;

12 (D) \$672,600,000 shall be for
13 Heliophysics, of which \$25,000,000 shall be an
14 augmentation to the Explorers program; and

15 (E) \$5,000,000 shall be an augmentation
16 to the total amount provided under subpara-
17 graphs (C) and (D) for Astrophysics and
18 Heliophysics in order to augment the funding
19 for the Science Mission Directorate's suborbital
20 research programs, to be allocated between the
21 Astrophysics and Heliophysics suborbital pro-
22 grams at the Administrator's discretion.

23 (2) For Aeronautics, \$598,700,000, of which
24 \$78,900,000 shall be for the Aviation Safety Pro-
25 gram, \$80,400,000 shall be for the Aeronautics Test
26 Program, \$83,900,000 shall be for the Airspace Sys-

1 tems Program, \$233,500,000 shall be for Funda-
2 mental Aeronautics, and \$122,000,000 shall be for
3 Integrated Systems Research.

4 (3) For Space Technology, \$1,012,200,000, of
5 which \$1,000,000 shall be for the Commercial Reus-
6 able Suborbital Research project.

7 (4) For Exploration, \$4,881,800,000 of
8 which—

9 (A) \$215,000,000 shall be for Human Re-
10 search;

11 (B) \$50,000,000 shall be for commercial
12 crew transportation-related activities;

13 (C) \$4,516,800,000 shall be for the re-
14 structured exploration program described in
15 section 202; and

16 (D) \$100,000,000 shall be for the loan and
17 loan guarantee program described in section
18 243.

19 (5) For Space Operations, \$3,930,300,000, of
20 which—

21 (A) \$86,100,000 shall be for the Space
22 Shuttle program;

23 (B) \$3,033,600,000 shall be for the ISS,
24 of which \$100,000,000 shall be for fundamental
25 space life science and physical sciences and re-

1 lated technology research using ground-based,
2 free-flyer, and ISS facilities, including ISS Na-
3 tional Laboratory research;

4 (C) \$40,000,000 shall be for the Post-
5 Shuttle Workforce Transition Initiative grant
6 program described in section 222; and

7 (D) \$770,600,000 shall be for Space and
8 Flight Support, of which \$50,000,000 shall be
9 for the 21st Century Launch Complex Initia-
10 tive.

11 (6) For Education, \$145,800,000.

12 (7) For Cross-Agency Support Programs,
13 \$3,189,600,000.

14 (8) For Construction and Environmental Com-
15 pliance and Restoration, \$373,800,000, of which
16 \$10,000,000 is an augmentation to the President's
17 requested level in order to support the NASA labora-
18 tory revitalization initiative described in section 701.

19 (9) For Inspector General, \$39,200,000.

20 **SEC. 103. FISCAL YEAR 2013.**

21 There are authorized to be appropriated to the Ad-
22 ministrators for fiscal year 2013 \$19,960,000,000, to be
23 allocated as follows:

24 (1) For Science, \$5,569,500,000, of which—

1 (A) \$2,089,500,000 shall be for Earth
2 Science;

3 (B) \$1,591,200,000 shall be for Planetary
4 Science;

5 (C) \$1,149,100,000 shall be for Astro-
6 physics;

7 (D) \$734,700,000 shall be for
8 Heliophysics, of which \$55,000,000 shall be an
9 augmentation to the Explorers program; and

10 (E) \$5,000,000 shall be an augmentation
11 to the total amount provided under subpara-
12 graphs (C) and (D) for Astrophysics and
13 Heliophysics in order to augment the funding
14 for the Science Mission Directorate's suborbital
15 research programs, to be allocated between the
16 Astrophysics and Heliophysics suborbital pro-
17 grams at the Administrator's discretion.

18 (2) For Aeronautics, \$609,400,000, of which
19 \$81,200,000 shall be for the Aviation Safety Pro-
20 gram, \$79,600,000 shall be for the Aeronautics Test
21 Program, \$87,300,000 shall be for the Airspace Sys-
22 tems Program, \$239,000,000 shall be for Funda-
23 mental Aeronautics, and \$122,300,000 shall be for
24 Integrated Systems Research.

25 (3) For Space Technology, \$1,059,700,000.

1 (4) For Exploration, \$4,888,500,000 of
2 which—

3 (A) \$215,000,000 shall be for Human Re-
4 search;

5 (B) \$5,000,000, shall be for the Explo-
6 ration Technology and Demonstration program;

7 (C) \$5,000,000 shall be for the Explo-
8 ration Precursor Robotic Missions program;

9 (D) \$50,000,000 shall be for commercial
10 crew transportation-related activities;

11 (E) \$4,513,500,000 shall be for the re-
12 structured exploration program described in
13 section 202; and

14 (F) \$100,000,000 shall be for the loan and
15 loan guarantee program described in section
16 243.

17 (5) For Space Operations, \$3,993,300,000, of
18 which—

19 (A) \$3,179,400,000 shall be for the ISS,
20 of which \$100,000,000 shall be for fundamental
21 space life science and physical sciences and re-
22 lated technology research using ground-based,
23 free-flyer, and ISS facilities, including ISS Na-
24 tional Laboratory research;

1 (B) \$40,000,000 shall be for the Post-
2 Shuttle Workforce Transition Initiative grant
3 program described in section 222; and

4 (C) \$773,900,000 shall be for Space and
5 Flight Support, of which \$50,000,000 shall be
6 for the 21st Century Launch Complex Initia-
7 tive.

8 (6) For Education, \$145,800,000.

9 (7) For Cross-Agency Support Programs,
10 \$3,276,800,000.

11 (8) For Construction and Environmental Com-
12 pliance and Restoration, \$376,900,000, of which
13 \$10,000,000 is an augmentation to the President's
14 requested funding level in order to support the
15 NASA laboratory revitalization initiative described in
16 section 701.

17 (9) For Inspector General, \$40,100,000.

18 **SEC. 104. FISCAL YEAR 2014.**

19 There are authorized to be appropriated to the Ad-
20 ministrator for fiscal year 2014 \$20,600,000,000, to be
21 allocated as follows:

22 (1) For Science, \$5,794,800,000, of which—

23 (A) \$2,216,600,000 shall be for Earth
24 Science;

1 (B) \$1,635,100,000 shall be for Planetary
2 Science;

3 (C) \$1,158,700,000 shall be for Astro-
4 physics;

5 (D) \$779,400,000 shall be for
6 Heliophysics, of which \$75,000,000 shall be an
7 augmentation to the Explorers program; and

8 (E) \$5,000,000 shall be an augmentation
9 to the total amount provided under subpara-
10 graphs (C) and (D) for Astrophysics and
11 Heliophysics in order to augment the funding
12 for the Science Mission Directorate's suborbital
13 research programs, to be allocated between the
14 Astrophysics and Heliophysics suborbital pro-
15 grams at the Administrator's discretion.

16 (2) For Aeronautics, \$615,100,000, of which
17 \$81,900,000 shall be for the Aviation Safety Pro-
18 gram, \$81,400,000 shall be for the Aeronautics Test
19 Program, \$88,300,000 shall be for the Airspace Sys-
20 tems Program, \$246,000,000 shall be for Funda-
21 mental Aeronautics, and \$117,500,000 shall be for
22 Integrated Systems Research.

23 (3) For Space Technology, \$1,063,900,000.

24 (4) For Exploration, \$5,106,800,000 of
25 which—

1 (A) \$215,000,000 shall be for Human Re-
2 search;

3 (B) \$10,000,000 shall be for the Explo-
4 ration Technology and Demonstration program;

5 (C) \$10,000,000 shall be for the Explo-
6 ration Precursor Robotic Missions program;

7 (D) \$50,000,000 shall be for commercial
8 crew transportation-related activities;

9 (E) \$4,721,800,000 shall be for the re-
10 structured exploration program described in
11 section 202; and

12 (F) \$100,000,000 shall be for the loan and
13 loan guarantee program described in section
14 243.

15 (5) For Space Operations, \$4,062,600,000, of
16 which—

17 (A) \$3,271,900,000 shall be for the ISS,
18 of which \$125,000,000 shall be for fundamental
19 space life science and physical sciences and re-
20 lated technology research using ground-based,
21 free-flyer, and ISS facilities, including ISS Na-
22 tional Laboratory research; and

23 (B) \$790,700,000 shall be for Space and
24 Flight Support, of which \$50,000,000 shall be

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1 for the 21st Century Launch Complex Initia-
2 tive.

3 (6) For Education, \$145,800,000.

4 (7) For Cross-Agency Support Programs,
5 \$3,366,500,000.

6 (8) For Construction and Environmental Com-
7 pliance and Restoration, \$403,500,000, of which
8 \$10,000,000 is an augmentation to the President's
9 requested funding level in order to support the
10 NASA laboratory revitalization initiative described in
11 section 701.

12 (9) For Inspector General, \$41,000,000.

13 **SEC. 105. FISCAL YEAR 2015.**

14 There are authorized to be appropriated to the Ad-
15 ministrator for fiscal year 2015 \$20,990,000,000, to be
16 allocated as follows:

17 (1) For Science, \$5,899,000,000 of which—

18 (A) \$2,282,200,000 shall be for Earth
19 Science;

20 (B) \$1,654,400,000 shall be for Planetary
21 Science;

22 (C) \$1,131,600,000 shall be for Astro-
23 physics;

1 (D) \$825,800,000 shall be for
2 Heliophysics, of which \$75,000,000 shall be an
3 augmentation to the Explorers program; and

4 (E) \$5,000,000 shall be an augmentation
5 to the total amount provided under subpara-
6 graphs (C) and (D) for Astrophysics and
7 Heliophysics in order to augment the funding
8 for the Science Mission Directorate's suborbital
9 research programs, to be allocated between the
10 Astrophysics and Heliophysics suborbital pro-
11 grams at the Administrator's discretion.

12 (2) For Aeronautics, \$625,300,000, of which
13 \$82,700,000 shall be for the Aviation Safety Pro-
14 gram, \$82,200,000 shall be for the Aeronautics Test
15 Program, \$91,400,000 shall be for the Airspace Sys-
16 tems Program, \$250,000,000 shall be for Funda-
17 mental Aeronautics, and \$119,000,000 shall be for
18 Integrated Systems Research.

19 (3) For Space Technology, \$1,217,900,000.

20 (4) For Exploration, \$5,157,900,000 of
21 which—

22 (A) \$215,000,000 shall be for Human Re-
23 search;

24 (B) \$30,000,000 shall be for the Explo-
25 ration Technology and Demonstration program;

1 (C) \$30,000,000 shall be for the Explo-
2 ration Precursor Robotic Missions program;

3 (D) \$50,000,000 shall be for commercial
4 crew transportation-related activities;

5 (E) \$4,732,900,000 shall be for the re-
6 structured exploration program described in
7 section 202; and

8 (F) \$100,000,000 shall be for the loan and
9 loan guarantee program described in section
10 243.

11 (5) For Space Operations, \$4,030,500,000, of
12 which—

13 (A) \$3,232,800,000 shall be for the ISS,
14 of which \$125,000,000 shall be for fundamental
15 space life science and physical sciences and re-
16 lated technology research using ground-based,
17 free-flyer, and ISS facilities, including ISS Na-
18 tional Laboratory research; and

19 (B) \$797,700,000 shall be for Space and
20 Flight Support, of which \$50,000,000 shall be
21 for the 21st Century Launch Complex Initia-
22 tive.

23 (6) For Education, \$146,800,000.

24 (7) For Cross-Agency Support Programs,
25 \$3,462,200,000.

1 (8) For Construction and Environmental Com-
2 pliance and Restoration, \$408,500,000, of which
3 \$10,000,000 is an augmentation to the President's
4 requested funding level in order to support the
5 NASA laboratory revitalization initiative described in
6 section 701.

7 (9) For Inspector General, \$41,900,000.

8 **TITLE II—HUMAN SPACE FLIGHT**

9 **Subtitle A—Exploration**

10 **SEC. 201. REAFFIRMATION OF EXPLORATION POLICY.**

11 Congress reaffirms its support for the exploration
12 policy set forth in sections 401 and 402 of the National
13 Aeronautics and Space Administration Authorization Act
14 of 2008 (Public Law 110–422; 122 Stat. 4788-4789).

15 **SEC. 202. RESTRUCTURED EXPLORATION PROGRAM.**

16 (a) REQUIREMENTS.—Not later than 180 days after
17 the date of enactment of this Act, the Administrator shall
18 develop a plan to restructure the exploration program in
19 existence prior to fiscal year 2011 in order to develop and
20 demonstrate in an integrated manner and as expeditiously
21 and efficiently as practicable a governmentally owned crew
22 transportation system and heavy lift transportation sys-
23 tem that satisfies the following requirements:

24 (1) The plan shall make maximum practicable
25 use of the design, development, and test work com-

1 pleted to date on the Orion crew exploration vehicle,
2 Ares I crew launch vehicle, heavy lift launch vehicle
3 system, and associated ground support and explo-
4 ration enabling systems and take best advantage of
5 investments and contracts implemented to date.

6 (2) The performance capabilities of the crew
7 transportation system shall be phased in a manner
8 that is consistent with available and anticipated re-
9 sources, with the initial operational goal of having
10 the crew transportation system developed under this
11 section available to assure crewed access to low-
12 Earth orbit and the ISS no later than December 31,
13 2015, in order to minimize the duration of the
14 United States human space flight gap following the
15 retirement of the Space Shuttle fleet. If one or more
16 United States commercial entities are certified to
17 provide ISS crew transportation and rescue services,
18 the crew transportation system developed under this
19 section shall be available as a backup ISS crew
20 transportation and rescue service as needed but shall
21 not be utilized as the primary means of ISS crew
22 transportation and rescue or otherwise compete with
23 the commercial system for ISS crew transportation
24 and rescue services.

1 (3) The crewed spacecraft element of the crew
2 transportation system shall be evolvable on a contin-
3 uous development path to support—

4 (A) ISS crew transportation and rescue ca-
5 pability;

6 (B) non-ISS missions to, from, and in low-
7 Earth orbit; and

8 (C) human missions beyond low-Earth
9 orbit.

10 (4) The crew transportation system shall be
11 able to serve as a testbed for demonstrating oper-
12 ations concepts for exploration missions beyond low-
13 Earth orbit, as well as for demonstrating tech-
14 nologies and carrying out risk reduction for the
15 heavy lift launch vehicle development program.

16 (5) The crew transportation system shall have
17 predicted levels of safety during ascent to low-Earth
18 orbit, transit, and descent from low-Earth orbit that
19 are not less than those required of the Ares I/Orion
20 configuration that has completed program prelimi-
21 nary design review.

22 (6) In order to make the most cost-effective use
23 of the funds available for the restructured explo-
24 ration program, the Administrator shall pursue the
25 expeditious and cost-efficient development of a heavy

1 lift launch system that utilizes the systems and
2 flight and ground test activities of the crew trans-
3 portation system developed under this section to the
4 maximum extent practicable. In developing the heavy
5 lift launch vehicle—

6 (A) the heavy lift launch vehicle shall be
7 sized to enable challenging missions beyond low-
8 Earth orbit and evolvable on a continuous de-
9 velopment path to enable the efficient and cost-
10 effective conduct of crewed missions to the full
11 range of destinations envisioned in the National
12 Aeronautics and Space Administration Author-
13 ization Act of 2008, namely Lagrangian points,
14 the Moon, near-Earth objects, and Mars and its
15 moons;

16 (B) not later than 180 days after the date
17 of enactment of this Act, the Administrator
18 shall carry out a review of the heavy lift launch
19 vehicle requirements needed to support crewed
20 missions to the full range of destinations envi-
21 sioned in the National Aeronautics and Space
22 Administration Authorization Act of 2008, and
23 shall select an exploration launch vehicle archi-
24 tecture to meet those requirements;

1 (C) the development of the heavy lift
2 launch vehicle authorized in this paragraph
3 shall be completed as expeditiously as possible
4 within available resources and shall take max-
5 imum benefit from the prior investments made
6 in the Orion, Ares I, and heavy lift projects and
7 from investments made in the restructured pro-
8 gram on the development, demonstration, and
9 test of the crew transportation system; and

10 (D) the Administrator shall strive to meet
11 the goal of having the heavy lift launch vehicle
12 authorized in this paragraph available for oper-
13 ational missions by the end of the current dec-
14 ade.

15 (b) IMPLEMENTATION OF RESTRUCTURED PRO-
16 GRAM.—The restructured exploration program shall be
17 implemented in a manner that—

18 (1) facilitates the planned transition of Space
19 Shuttle program personnel to the restructured explo-
20 ration program upon the retirement of the Space
21 Shuttle fleet, while providing for cost effective man-
22 agement and vehicle development;

23 (2) provides for a robust flight and ground test
24 and demonstration program;

1 (3) streamlines program management processes
2 to the maximum extent practicable while ensuring
3 that the Government's ability to meet its responsibil-
4 ities for cost discipline, safety, and mission assur-
5 ance is maintained;

6 (4) working with industry, eliminates unneces-
7 sary NASA and industry institutional infrastructure,
8 other fixed costs, processes, and oversight, reducing
9 exploration program fixed costs to the extent prac-
10 ticable and maximizing the program's affordability;

11 (5) incentivizes, through innovative manage-
12 ment practices, NASA program and project man-
13 agers and industry counterparts to establish and
14 maintain realistic cost and schedule estimates, and
15 take necessary steps to avoid cost and schedule
16 growth;

17 (6) seeks to minimize to the extent practicable
18 the operating costs of the crew transportation sys-
19 tem developed under the restructured exploration
20 program;

21 (7) enables the restructured exploration pro-
22 gram to undertake in an incremental fashion in-
23 creasingly challenging uncrewed and crewed dem-
24 onstration flights in and beyond low-Earth orbit;

1 (8) allows the systems developed under the re-
2 structured exploration program to serve as potential
3 testbeds for the demonstration of key enabling explo-
4 ration technologies and operational capabilities; and

5 (9) prepares for and enables human missions to
6 a variety of destinations in the inner solar system,
7 including cislunar space, the Moon, Lagrangian
8 points, near-Earth objects, and ultimately Mars and
9 its moons.

10 (c) SUPPORT SYSTEMS.—The restructured explo-
11 ration program shall continue work on ground systems
12 and other exploration-enabling technologies and capabili-
13 ties needed to support the exploration program as expedi-
14 tiously as possible within available resources.

15 (d) INTERNATIONAL COLLABORATION.—The Admin-
16 istrator shall explore potential international collaborations
17 that would enable more ambitious exploration missions in
18 a timely manner and within available resources than would
19 otherwise be possible, such as human lunar landings or
20 the incremental establishment of a lunar research outpost.

21 **SEC. 203. SPACE RADIATION.**

22 (a) STRATEGY.—The Administrator shall develop a
23 space radiation mitigation and management strategy and
24 implementation plan that includes key milestones, a time-
25 table, and estimation of budget requirements. The strat-

1 egy shall include a mechanism to coordinate NASA re-
2 search, technology, facilities, engineering, operations, and
3 other functions required to support the strategy and plan.
4 The Administrator shall transmit the strategy and plan
5 to the Congress not later than 12 months after the date
6 of enactment of this Act.

7 (b) SPACE RADIATION RESEARCH FACILITIES.—The
8 Administrator, in consultation with the heads of other ap-
9 propriate Federal agencies, shall assess the national capa-
10 bilities for carrying out critical ground-based research on
11 space radiation biology, and shall identify any issues that
12 could affect the ability to carry out that research.

13 (c) RESEARCH ON SOLAR PARTICLE EVENTS.—The
14 Administrator shall carry out research on solar particle
15 events to improve the predictions and forecasts of solar
16 particle events that could affect human missions beyond
17 low-Earth orbit.

18 **Subtitle B—International Space** 19 **Station**

20 **SEC. 211. EXTENSION OF ISS OPERATIONS.**

21 The Administrator shall, in consultation with the ISS
22 partners, take all necessary measures to support the oper-
23 ation and full utilization of the International Space Sta-
24 tion through at least the year 2020, if it can continue to
25 be operated safely over that period. The Administrator

1 shall, in consultation with the ISS partners, seek to mini-
2 mize to the extent practicable the operating costs of the
3 ISS.

4 **SEC. 212. ISS RESEARCH MANAGEMENT INSTITUTION.**

5 (a) DESIGNATION.—Pursuant to section 507 of the
6 National Aeronautics and Space Administration Author-
7 ization Act of 2005 (42 U.S.C. 16767), the Administrator
8 shall designate an independent, nonprofit United States
9 institution, based on the result of a competitive solicita-
10 tion, for the management of fundamental space life science
11 and physical sciences and related technology research to
12 be conducted on the ISS, as well as all research, including
13 United States commercial research, that is funded by non-
14 NASA United States domestic entities and carried out on
15 the ISS.

16 (b) RESPONSIBILITIES.—The research management
17 institution designated under subsection (a) shall make rec-
18 ommendations to the Administrator for—

19 (1) competitively selecting, prioritizing, and
20 overseeing United States ISS research projects
21 across all United States users, sponsors, and dis-
22 ciplines, including domestic entities other than
23 NASA, seeking to carry out research on the ISS;

24 (2) establishing a process for governance of
25 United States ISS research users;

1 (3) conducting outreach and education to en-
2 hance the utilization of the ISS; and

3 (4) providing easily accessible information on
4 the United States capabilities, research facilities,
5 and resources associated with the United States re-
6 search use of the ISS.

7 (c) DEVIATIONS.—If the Administrator takes actions
8 that deviate from the recommendations provided by the
9 research management institution under subsection (b), the
10 Administrator shall transmit to the Congress a report ex-
11 plaining the reasons for such deviation.

12 (d) OTHER GOVERNMENT CONTRACTS.—Other gov-
13 ernment agencies engaged in research and development
14 are authorized to enter into contracts with the nonprofit
15 organization designated under subsection (a) if it is deter-
16 mined by those agencies to be beneficial to meeting their
17 mission requirements for use of the ISS.

18 **SEC. 213. ISS RESEARCH MANAGEMENT PLAN.**

19 (a) IN GENERAL.—The Administrator, in coordina-
20 tion with the Associate Administrator for the Space Oper-
21 ations Mission Directorate, shall require that the institu-
22 tion designated under section 212(a) prepare for the Ad-
23 ministrator a United States ISS research management
24 plan that—

1 (1) establishes a process for selecting United
2 States ISS research;

3 (2) identifies the expertise and support avail-
4 able to researchers selected to carry out research on
5 the ISS;

6 (3) establishes a process for determining alloca-
7 tion schedules for research to be carried out on the
8 ISS;

9 (4) establishes a process for accommodating
10 logistical and transportation requirements for ISS
11 research payloads;

12 (5) prescribes flight schedules for research pay-
13 loads to the ISS (and research materials to be re-
14 turned to Earth, if necessary); and

15 (6) addresses other factors associated with the
16 selection, management, and oversight of United
17 States ISS research.

18 (b) TRANSMITTAL TO CONGRESS.—The plan shall be
19 transmitted to the Congress not later than 2 years after
20 the date of enactment of this Act.

21 **SEC. 214. OUTREACH PLAN FOR UNITED STATES ISS RE-**
22 **SEARCH.**

23 Not later than 2 years after the date of enactment
24 of this Act, the Administrator shall transmit to the Con-
25 gress a plan prepared by the institution designated under

1 section 212(a) for broadening and enhancing the outreach
2 to potential United States Government, academic, and
3 commercial users of the ISS.

4 **SEC. 215. ISS CARGO RESUPPLY REQUIREMENTS AND CON-**
5 **TINGENCY CAPACITY THROUGH 2020.**

6 (a) IN GENERAL.—The Administrator shall ensure
7 the availability of ISS cargo resupply capacity to support
8 the full and productive utilization and the extended oper-
9 ations of the ISS through the year 2020.

10 (b) ASSESSMENT.—The Administrator shall conduct
11 an assessment of the ISS cargo resupply capacity required
12 to support the enhanced research utilization and extended
13 operations of the ISS through 2020. The assessment shall
14 describe the methodology and assumptions used to define
15 the cargo requirements and provide a breakdown of the
16 cargo resupply requirements (upmass and downmass) to
17 support scientific research, other research and develop-
18 ment, operations and maintenance, crew supplies, and
19 other necessary activities. In addition, the assessment
20 shall identify the systems to be used for ISS cargo resup-
21 ply, the amount of cargo those systems will transport, and
22 the timeline for cargo resupply services to the ISS.

23 (c) ADDITIONAL RESUPPLY OPTIONS.—The Admin-
24 istrator shall explore with ISS partners options for ensur-
25 ing the provision of needed upmass to and downmass from

1 the ISS in the event that adequate commercial cargo re-
2 supply capabilities are not available during any extended
3 period after the date that the Space Shuttle is retired.

4 **SEC. 216. CENTRIFUGE.**

5 (a) ASSESSMENT.—The Administrator shall carry out
6 an assessment of innovative options for deploying a vari-
7 able-gravity centrifuge on the ISS. The assessment shall
8 identify the requirements for a variable-gravity centrifuge
9 to support fundamental and applied research on the ISS,
10 including research to help mitigate the risk of long-term
11 spaceflight beyond low-Earth orbit. The assessment shall
12 also—

13 (1) review the requirements for development,
14 launch, and operation of the facility on the ISS;

15 (2) provide an estimate of the potential cost
16 and timeline for developing and deploying the cen-
17 trifuge capabilities evaluated as part of the assess-
18 ment;

19 (3) evaluate the status of previous work on de-
20 velopment of an in-flight centrifuge for the ISS and
21 the cost and time that would be required to complete
22 the work and the launch the facility; and

23 (4) identify the potential for international col-
24 laboration and other potential partnerships or inno-
25 vative acquisition approaches that could facilitate

1 the development and deployment of a centrifuge fa-
2 cility for the ISS.

3 (b) TRANSMITTAL TO CONGRESS.—The Adminis-
4 trator shall transmit the assessment described in sub-
5 section (a) to the Congress not later than 1 year after
6 the date of enactment of this Act.

7 **SEC. 217. EXPLORATION TECHNOLOGY DEVELOPMENT**
8 **USING THE ISS.**

9 (a) PLAN.—The Administrator shall develop prior-
10 ities for technology development, testing, and demonstra-
11 tion activities that enable and support NASA's long-term
12 plans for exploration beyond low-Earth orbit and that re-
13 quire the capabilities of the ISS, and shall develop a plan,
14 including milestones, a schedule, and an estimate of re-
15 source requirements, for carrying out the prioritized ac-
16 tivities. The plan shall be developed for the period of fiscal
17 years 2011 through 2020.

18 (b) TRANSMITTAL TO CONGRESS.—The Adminis-
19 trator shall transmit the plan developed under subsection
20 (a) to the Congress not later than 270 days after the date
21 of enactment of this Act.

1 **SEC. 218. FUNDAMENTAL SPACE LIFE SCIENCE AND PHYS-**
2 **ICAL SCIENCES AND RELATED TECHNOLOGY**
3 **RESEARCH.**

4 (a) STRATEGIC PLAN FOR SCIENCE AND TECH-
5 NOLOGY RESEARCH.—

6 (1) DEVELOPMENT.—The Administrator, in
7 consultation with academia, other Federal agencies,
8 and other potential stakeholders, shall develop a
9 strategic plan for carrying out competitive, peer-re-
10 viewed fundamental space life science and physical
11 sciences and related technology research, including
12 research on phenomena such as the response of
13 fluids and materials to reduced gravity environments
14 that need to be understood in developing explo-
15 ration-related technologies and systems. The plan
16 shall—

17 (A) address the facilities and instrumenta-
18 tion that would enable and facilitate such re-
19 search;

20 (B) be consistent with the priorities and
21 recommendations established by the National
22 Academies in its decadal survey of life and
23 microgravity sciences;

24 (C) provide a research timeline and iden-
25 tify the resource requirements for its implemen-
26 tation;

1 (D) include an estimate of the number of
2 students, including undergraduate, graduate,
3 and post-doctoral students, and early-career re-
4 searchers that would be supported in carrying
5 out the plan; and

6 (E) identify—

7 (i) criteria for the proposed space re-
8 search, including—

9 (I) a justification for the research
10 to be carried out in the space micro-
11 gravity environment;

12 (II) the use of model systems;

13 (III) the testing of flight hard-
14 ware to understand and ensure its
15 functioning in the microgravity envi-
16 ronment;

17 (IV) the use of controls to help
18 distinguish among the direct and indi-
19 rect effects of microgravity, among
20 other effects of the flight or space en-
21 vironment;

22 (V) approaches for facilitating
23 data collection, analysis, and interpre-
24 tation;

- 1 (VI) procedures to ensure repeti-
2 tion of experiments as needed; and
3 (VII) support for timely presen-
4 tation of the peer-reviewed results of
5 the research;
- 6 (ii) instrumentation required to sup-
7 port the measurements and analysis of the
8 research to be carried out under the stra-
9 tegic plan, including the potential use of
10 instrumentation developed by other coun-
11 tries and the potential for a variable-grav-
12 ity centrifuge to support the research;
- 13 (iii) the capabilities needed to support
14 direct, real-time communications between
15 astronauts working on research experi-
16 ments onboard the ISS and the principal
17 investigator on the ground; and
- 18 (iv) a process for involving the exter-
19 nal user community in research planning,
20 including planning for relevant flight hard-
21 ware and instrumentation, and for utiliza-
22 tion of the ISS, free flyers, or other re-
23 search platforms.
- 24 (2) TRANSMITTAL TO CONGRESS.—Not later
25 than 1 year after the date of enactment of this Act,

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1 the Administrator shall transmit the strategic plan
2 developed under paragraph (1) to the Congress.

3 (b) INTEGRATED RESEARCH MANAGEMENT ORGANI-
4 ZATION.—

5 (1) RESPONSIBLE OFFICIAL.—

6 (A) IN GENERAL.—The Administrator
7 shall ensure that a responsible official is des-
8 ignated at NASA headquarters to lead a com-
9 petitive, integrated basic and applied research
10 program in fundamental space life science and
11 physical sciences and related technology.

12 (B) RESPONSIBILITIES.—The official des-
13 ignated under subparagraph (A) shall be re-
14 sponsible for—

15 (i) leading near-term and long-term
16 strategic planning pursuant to the research
17 plan developed under subsection (a);

18 (ii) ensuring the input of the external
19 user community in science planning proc-
20 esses;

21 (iii) ensuring the implementation of
22 an integrated, multidisciplinary and inter-
23 disciplinary, competitive research program
24 in fundamental space life and physical
25 sciences and related technology;

1 (iv) supporting the appropriate inter-
2 action of research investigators and agency
3 managers and engineers in planning, de-
4 signing, testing, and operations related to
5 such research projects;

6 (v) monitoring progress of the pro-
7 gram in achieving the objectives and mile-
8 stones identified in the strategic plan de-
9 veloped under subsection (a)(1); and

10 (vi) other functions required to sup-
11 port the research program under this sec-
12 tion.

13 (C) COORDINATION AND COMMUNICA-
14 TIONS.—The Administrator shall ensure that
15 the responsible official coordinates and commu-
16 nicates the fundamental space life science and
17 physical sciences and related technology re-
18 search activities with relevant entities within
19 NASA, with the ISS research management in-
20 stitution designated under section 212(a), and
21 with other relevant agencies and organizations.

22 (2) BUDGET REQUEST.—The Administrator
23 shall, as part of the annual NASA fiscal year budget
24 request—

1 (A) identify and include a description of
2 research being carried out pursuant to section
3 204 of the National Aeronautics and Space Ad-
4 ministration Authorization Act of 2005 (42
5 U.S.C. 16633); and

6 (B) identify the percentage of the total re-
7 search budget for ISS research that the re-
8 search described in subparagraph (A) rep-
9 resents; and

10 (C) identify the programs proposed for
11 carrying out research activities on the ISS and
12 the proposed funding to support those research
13 programs, including a breakdown for each of
14 the programs identified of the funding re-
15 quested for competitive grants.

16 **Subtitle C—Space Shuttle**

17 **SEC. 221. EXPANDED SCOPE OF SPACE SHUTTLE TRANSI-** 18 **TION LIAISON OFFICE.**

19 Section 613(b) of the National Aeronautics and
20 Space Administration Authorization Act of 2008 (42
21 U.S.C. 17761(b)) is amended—

22 (1) in paragraph (1), by striking “Space Shut-
23 tle Transition Liaison Office” and inserting “Post-
24 Shuttle Transition Liaison Office”; and

1 (2) in paragraph (3), by striking “2 years after
2 the completion of the last Space Shuttle flight” and
3 inserting “2 years after the award of the final grant
4 under section 222 of the National Aeronautics and
5 Space Administration Authorization Act of 2010”.

6 **SEC. 222. POST-SHUTTLE WORKFORCE TRANSITION INITIA-**
7 **TIVE GRANT PROGRAM.**

8 (a) ESTABLISHMENT.—

9 (1) IN GENERAL.—The Administrator, acting
10 through the Post-Shuttle Transition Liaison Office
11 established under section 613(b) of the National
12 Aeronautics and Space Administration Authorization
13 Act of 2008 (42 U.S.C. 17761(b)), as amended by
14 section 221, is authorized to make grants for the es-
15 tablishment, operation, coordination, and implemen-
16 tation of aerospace workforce and community transi-
17 tion strategies.

18 (2) TRANSFER.—The Administrator may trans-
19 fer amounts made available under this section to
20 other Federal agencies for the purpose of assisting
21 in the transition of aerospace workers and commu-
22 nities adversely affected by the termination of the
23 Space Shuttle program.

1 (b) USE OF FUNDS.—A recipient of a grant under
2 subsection (a) shall use the funds made available through
3 the grant to—

4 (1) conduct community and business outreach;

5 (2) develop and implement regional
6 revitalization and facilities reuse strategies;

7 (3) support entrepreneurship and new business
8 development initiatives; and

9 (4) support workforce retraining.

10 **SEC. 223. DISPOSITION OF ORBITER VEHICLES.**

11 (a) IN GENERAL.—Upon the termination of the
12 Space Shuttle Program, the Administrator shall decom-
13 mission any remaining Space Shuttle orbiter vehicles ac-
14 cording to established safety and historic preservation pro-
15 cedures prior to their designation as surplus government
16 property. The orbiter vehicles shall be made available and
17 located for display and maintenance through a competitive
18 procedure established pursuant to the disposition plan de-
19 veloped under section 613(a) of the National Aeronautics
20 and Space Administration Act of 2008 (42 U.S.C.
21 17761(a)), with priority consideration given to eligible ap-
22 plicants meeting all conditions of that plan which would
23 provide for the display and maintenance of orbiters at lo-
24 cations with the best potential value to the public, includ-
25 ing where the location of the orbiters can advance edu-

1 cational opportunities in science, technology, engineering,
2 and mathematics disciplines, and with an historical rela-
3 tionship with either the launch, flight operations, or proc-
4 essing of the Space Shuttle orbiters.

5 (b) SMITHSONIAN INSTITUTION ORBITER.—Notwith-
6 standing the procedures in subsection (a), the Smithso-
7 nian Institution shall be entitled to receive one of the re-
8 maining Space Shuttle orbiter vehicles. The Administrator
9 shall collaborate with the Secretary of the Smithsonian In-
10 stitution to determine which orbiter the Smithsonian Insti-
11 tution shall receive, and otherwise determine the timing
12 and procedures of transfer from NASA to the Smithsonian
13 Institution. The Smithsonian Institution, which, as of the
14 date of enactment of this Act, houses the Space Shuttle
15 Enterprise, shall determine any new location for the En-
16 terprise.

17 (c) DISPLAY AND MAINTENANCE.—The orbiter vehi-
18 cles made available under subsection (a) shall be displayed
19 and maintained through agreements and procedures es-
20 tablished pursuant to section 613(a) of the National Aero-
21 nautics and Space Administration Authorization Act of
22 2008 (42 U.S.C. 17761(a)).

1 **Subtitle D—Space and Flight**
2 **Support**

3 **SEC. 231. 21ST CENTURY SPACE LAUNCH COMPLEX INITIA-**
4 **TIVE.**

5 In carrying out the 21st Century Space Launch Com-
6 plex Initiative, the Administrator shall give priority to ac-
7 tivities in support of the program established in section
8 202.

9 **Subtitle E—Commercial Crew**
10 **Transportation**

11 **SEC. 241. AFFIRMATION OF POLICY.**

12 The Congress affirms the policy of—

13 (1) making use of United States commercially
14 provided ISS crew transportation and crew rescue
15 services to the maximum extent practicable;

16 (2) limiting, to the maximum extent practicable,
17 the use of the system developed under section 202
18 to non-ISS missions once commercial crew transpor-
19 tation and crew rescue services that meet safety re-
20 quirements become operational; and

21 (3) facilitating, to the maximum extent prac-
22 ticable, the transfer of NASA-developed technologies
23 to United States commercial orbital human space
24 transportation companies in order to help promote

1 the development of commercially provided ISS crew
2 transportation and crew rescue services.

3 **SEC. 242. COMMERCIAL CREW AND RELATED COMMERCIAL**
4 **SPACE INITIATIVES.**

5 (a) **COMMERCIAL SERVICES OPPORTUNITIES.**—
6 NASA shall seek, to the extent practicable, to make use
7 of commercially available space services, including com-
8 mercially available services to transport United States
9 Government astronauts to and from the ISS, provided
10 that—

11 (1) those commercial services have dem-
12 onstrated the capability to meet NASA-specified as-
13 cent, transit, entry, and ISS proximity operations
14 safety requirements;

15 (2) the services provider has completed, and
16 NASA has verified, crewed flight demonstrations or
17 operational flights that comply with NASA stand-
18 ards, policies, and procedures; and

19 (3) the per-seat cost to the United States is not
20 greater than the per-seat cost for the system devel-
21 oped under section 202.

22 (b) **HUMAN-RATING.**—The Administrator shall estab-
23 lish requirements, standards, and processes for the human
24 rating of space transportation systems that are equivalent
25 to NASA safety processes and procedures.

1 (e) TECHNOLOGY TRANSFER.—The Administrator
2 shall make available, on a nonexclusive basis, NASA-devel-
3 oped technologies for transfer to potential United States
4 commercial orbital human space transportation compa-
5 nies. NASA shall determine the appropriate means,
6 through cost-reimbursable arrangements or other mecha-
7 nisms, to transfer the technologies.

8 (d) TECHNICAL ASSISTANCE AND FACILITIES.—The
9 Administrator shall make available, to the extent prac-
10 ticable, NASA facilities and equipment to assist in the
11 testing and demonstration of commercial crew transpor-
12 tation systems, including those associated with NASA's
13 safety and mission assurance activities, such as NASA's
14 Independent Verification and Validation facility for soft-
15 ware verification. The Administrator shall determine the
16 appropriate means, through cost-reimbursable arrange-
17 ments, agreements entered into under section 203(c)(5)
18 of the National Aeronautics and Space Act of 1958 (42
19 U.S.C. 2473(c)(5)), or other mechanisms, to provide tech-
20 nical assistance and access to facilities to the commercial
21 space sector.

22 (e) NASA INSIGHT AND OVERSIGHT PROCESSES.—
23 Any company that seeks to provide commercial crew trans-
24 portation services under contract to NASA shall enter into
25 an arrangement with NASA that allows NASA to obtain

1 ongoing insight into the design methodologies, processes,
2 technologies, test data, and production and quality control
3 practices employed in the development of the commercial
4 crew transportation system throughout the development,
5 test, demonstration, and production phases. NASA may
6 offer early warning of conditions that could lead NASA
7 to withhold certification of the crew transportation sys-
8 tems for the flight of United States Government personnel
9 or to decline to enter into a contract for services. NASA
10 may not require the company to make changes to its de-
11 sign, technologies, or processes during the development,
12 test, demonstration, or production phases.

13 (f) CONTRACTS FOR COMMERCIALY AVAILABLE ISS
14 CREW TRANSPORTATION AND CREW RESCUE SERV-
15 ICES.—

16 (1) CERTIFICATION OF SAFETY AND RELI-
17 ABILITY.—Before entering into a contract for the
18 use of commercially available commercial crew trans-
19 portation or crew rescue services for United States
20 Government astronauts, the Administrator shall cer-
21 tify that a commercial ISS crew transportation and
22 crew rescue service provider with which a contract is
23 planned has demonstrated the safety and reliability
24 of its systems for crew transportation and crew res-
25 cue to be equivalent to NASA-promulgated safety

1 and reliability policies, procedures, and standards for
2 human spaceflight. Individual certifications made
3 under this paragraph shall be provided to the Com-
4 mittee on Science and Technology of the House of
5 Representatives and to the Committee on Commerce,
6 Science, and Transportation of the Senate.

7 (2) FLIGHT EXPERIENCE.—The Administrator
8 shall not enter into any contract or commit any
9 United States Government funds for a commercial
10 ISS crew transportation or rescue service to a serv-
11 ice provider until sufficient successful flight experi-
12 ence has been accrued by the service provider's sys-
13 tem to provide to NASA the safety-related and reli-
14 ability-related data and information needed to deter-
15 mine whether to fly its astronauts on that system.
16 The Administrator shall require an amount of dem-
17 onstrated flight experience for a commercial crew
18 transportation system that is at least as much as
19 NASA requires under Alternative 1 as delineated in
20 the NASA Policy Directive NPD 8610.7D, effective
21 January 31, 2008, for common launch vehicle con-
22 figurations before Class A (high cost and high pri-
23 ority) payloads can be flown on them.

24 (3) ADMINISTRATOR'S ACTIONS.—To facilitate
25 the ability of commercial crew transportation pro-

1 viders to comply with NASA human spaceflight safe-
2 ty and reliability requirements, the Administrator
3 shall—

4 (A) develop and communicate the human-
5 rating requirements established under sub-
6 section (b) to commercial space companies;

7 (B) establish minimum acceptable safety
8 levels;

9 (C) provide technical assistance, to the
10 maximum extent practicable, to the commercial
11 space sector in understanding and applying
12 NASA human-rating requirements, standards,
13 and processes to commercial crew transpor-
14 tation and crew rescue systems;

15 (D) establish and communicate to the com-
16 mercial sector the process NASA will apply for
17 securing ongoing NASA insight into the design
18 methodologies, processes, technologies, test
19 data, and production and quality control prac-
20 tices employed in the development of the com-
21 mercial crew transportation system throughout
22 the development, test, demonstration, and pro-
23 duction phases;

24 (E) establish and communicate to the com-
25 mercial sector NASA's process for certifying

1 that commercial human spaceflight systems (in-
2 cluding mission control, operations, ground sys-
3 tems, and other supporting infrastructure) com-
4 ply with NASA human-rating requirements and
5 standards and related NASA policies and proce-
6 dures for safety and reliability, which process
7 shall be no less stringent than the NASA poli-
8 cies and procedural requirements established
9 for launch of Class A (high cost and high pri-
10 ority) payloads; and

11 (F) ensure that the certification estab-
12 lished under subparagraph (E) includes inde-
13 pendent verification and validation of compli-
14 ance with NASA policies, procedures, and
15 standards.

16 (g) ASAP REVIEW OF NASA'S HUMAN-RATING RE-
17 QUIREMENTS, STANDARDS, AND PROCESSES.—

18 (1) IN GENERAL.—The Aerospace Safety Advi-
19 sory Panel shall conduct a review to identify issues
20 pertinent to the establishment of human-rating re-
21 quirements, standards, and processes for commercial
22 crew transportation and rescue systems that are pro-
23 posed for transport of United States astronauts.

24 (2) REPORT.—Not later than 1 year after the
25 date of enactment of this Act, the Aerospace Safety

1 and Advisory Panel shall transmit to the Congress
2 a report describing—

3 (A) the Panel's assessment of NASA's cur-
4 rently established human-rating specifications
5 and guidance;

6 (B) the Panel's view of the mandatory
7 safety requirements that must be met with re-
8 gard to human rating; and

9 (C) the steps NASA and the commercial
10 space industry need to take to ensure that com-
11 mercial crew transportation and rescue vehicles
12 have human rating requirements, standards,
13 and processes equivalent to those of NASA.

14 (h) INDEMNIFICATION AND LIABILITY.—The Admin-
15 istrator shall not proceed with a request for proposals,
16 award any contract, or commit any United States Govern-
17 ment funds for a commercial ISS crew transportation or
18 rescue service to be provided by a commercial service pro-
19 vider until all indemnification and liability issues associ-
20 ated with the use of such systems by the United States
21 Government shall have been addressed and the Adminis-
22 trator has provided to the Congress a report describing
23 the indemnification and liability provisions that are
24 planned to be included in such contracts.

1 (i) PREDICTED LEVEL OF SAFETY.—The Adminis-
2 trator shall not award any contract or commit any United
3 States Government funds for a commercial ISS crew
4 transportation system service to a service provider unless
5 that commercial crew transportation system has a pre-
6 dicted level of safety during ascent to low-Earth orbit,
7 transit, and descent from low-Earth orbit that is not less
8 than that specified for the Government system in section
9 202(a)(5).

10 **SEC. 243. FEDERAL ASSISTANCE FOR THE DEVELOPMENT**
11 **OF COMMERCIAL ORBITAL HUMAN SPACE**
12 **TRANSPORTATION SERVICES.**

13 (a) ESTABLISHMENT.—The Administrator shall es-
14 tablish a program to provide financial assistance in the
15 form of direct loans or loan guarantees to commercial enti-
16 ties for the costs of development of orbital human space
17 transportation systems.

18 (b) ELIGIBLE PROJECTS.—A loan or loan guarantee
19 may be made under such program only for a project in
20 the United States to develop commercial orbital human
21 space transportation systems that would be used to pro-
22 vide transportation services to and from low Earth orbit.

23 (c) ELIGIBLE BORROWER.—A loan or loan guarantee
24 may be made under such program only for a borrower who

1 is determined by the Administrator to be eligible under
2 the criteria established pursuant to subsection (i).

3 (d) LIMITATIONS.—No loan or guarantee shall be
4 made unless the Administrator determines that—

5 (1) there is a reasonable prospect of repayment
6 of the principal and interest on the obligation by the
7 borrower;

8 (2) the amount of the obligation (when com-
9 bined with amounts available to the borrower from
10 other sources which shall be a minimum of 25 per-
11 cent of the total expected project development cost)
12 is sufficient to carry out the total development
13 project.

14 (e) SUPERIORITY OF RIGHTS.—The rights of the Ad-
15 ministrator, with respect to any property acquired pursu-
16 ant to a loan, shall be superior to the rights of any other
17 person with respect to the property.

18 (f) TERMS AND CONDITIONS.—Notwithstanding any
19 other provision of law, a loan or loan guarantee made pur-
20 suant to this section shall—

21 (1) bear interest at an annual rate, as deter-
22 mined by the Administrator, of—

23 (A) in the case of a direct loan—

1 (i) the cost of borrowing to the De-
2 partment of the Treasury for obligations of
3 comparable maturity; or

4 (ii) 4 percent; and

5 (B) in the case of a guaranteed loan, the
6 current applicable market rate for a loan of
7 comparable maturity; and

8 (2) have a term not to exceed 30 years.

9 (g) CONSULTATION.—In establishing the terms and
10 conditions of a loan or loan guarantee under this section,
11 the Administrator shall consult with the Secretary of the
12 Treasury.

13 (h) FEES.—

14 (1) IN GENERAL.—The Administrator shall
15 charge and collect fees for loans and loan guarantees
16 in amounts the Administrator determines are suffi-
17 cient to cover applicable administrative expenses.

18 (2) AVAILABILITY.—Fees collected under this
19 subsection shall—

20 (A) be deposited by the Administrator into
21 the Treasury of the United States; and

22 (B) remain available until expended, sub-
23 ject to such other conditions as are contained in
24 annual appropriations Acts.

1 (3) LIMITATION.—In charging and collecting
2 fees under paragraph (1), the Administrator shall
3 take into consideration the amount of the obligation.

4 (i) REGULATIONS.—The Administrator shall issue
5 final regulations before making any loan or loan guarantee
6 under the program. Such regulations shall include—

7 (1) criteria that the Administrator shall use to
8 determine eligibility for loans and loan guarantees
9 under this section, including whether a borrower
10 demonstrates that a non-governmental market exists
11 for the orbital human space transportation service,
12 as evidenced by written statements of interest from
13 potential purchasers of the services;

14 (2) criteria that the Administrator shall use to
15 determine the amount of any fees charged under
16 subsection (h), including criteria related to the
17 amount of the obligation; and

18 (3) any other policies, procedures, or informa-
19 tion necessary to implement this section.

20 (j) AUDIT.—

21 (1) ANNUAL INDEPENDENT AUDITS.—The Ad-
22 ministrator shall enter into an arrangement with an
23 independent auditor for annual evaluations of the
24 program under this section.

1 (2) COMPTROLLER GENERAL REVIEW.—The
2 Comptroller General of the United States shall con-
3 duct a biennial review of the Administrator’s execu-
4 tion of the program under this section.

5 (3) REPORT.—The results of the independent
6 audit under paragraph (1) and the Comptroller Gen-
7 eral’s review under paragraph (2) shall be provided
8 directly to the Committee on Science and Tech-
9 nology of the House of Representatives and the
10 Committee on Commerce, Science, and Transpor-
11 tation of the Senate.

12 (k) REPORT TO CONGRESS.—Concurrent with the
13 submission to Congress of the President’s annual budget
14 request in each year after the date of enactment of this
15 section, the Secretary shall transmit to the Committee on
16 Science and Technology of the House of Representatives
17 and the Committee on Commerce, Science, and Transpor-
18 tation of the Senate a report containing a summary of
19 all activities carried out under this section.

20 (l) MINIMIZING RISK.—The Administrator shall pro-
21 mulgate regulations and policies to carry out this section
22 in accordance with Office of Management and Budget Cir-
23 cular No. A-129, entitled “Policies for Federal Credit Pro-
24 grams and Non-Tax Receivables”, as in effect on the date
25 of enactment of this section.

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1 (m) DEFINITIONS.—In this section:

2 (1) COST.—The term “cost” has the meaning
3 given such term under section 502 of the Federal
4 Credit Reform Act of 1990 (2 U.S.C. 661a).

5 (2) OBLIGATION.—The term “obligation”
6 means the loan issued under this section or the loan
7 or other debt obligation that is guaranteed under
8 this section.

9 (3) PROGRAM.—The term “program” means
10 the program established in subsection (a).

11 **TITLE III—SCIENCE**

12 **Subtitle A—Earth Science**

13 **SEC. 301. EARTH SCIENCE APPLICATIONS.**

14 The Administrator shall develop guidelines and proce-
15 dures for entering into arrangements with State, local, re-
16 gional, tribal, and other Federal Government agencies that
17 seek to benefit from ongoing NASA technical information,
18 capabilities, and support related to Earth science applica-
19 tions and decision support systems. The guidelines and
20 procedures shall include a definition of the partnership,
21 milestones, cost-sharing, and project-relevant criteria for
22 the project. The guidelines and procedures shall define ar-
23 rangements for reimbursement for Government services,
24 as appropriate, including the use of NASA spacecraft and
25 aircraft, sensors, equipment, facilities, and associated per-

1 sonnel for the purpose of aiding State, local, regional, trib-
2 al, and other Federal Government needs.

3 **SEC. 302. ESSENTIAL SPACE-BASED EARTH SCIENCE AND**
4 **CLIMATE MEASUREMENTS.**

5 The Administrator, in cooperation with the Adminis-
6 trator of NOAA and other relevant Federal agencies, shall
7 enter into an arrangement with the National Academies
8 for a study, to be completed, and transmitted to the Con-
9 gress not later than 18 months after the date of enactment
10 of this Act, to provide a prioritized list and definition of
11 essential Earth science and climate measurements that
12 should be collected with space-based means, and main-
13 tained and archived by the Federal Government on a con-
14 tinuous basis. The study shall also identify which measure-
15 ments could potentially be obtained through international
16 partnerships, from data purchases or other arrangements
17 with private or commercial entities, or from other relevant
18 sources.

19 **SEC. 303. COMMERCIAL REMOTE SENSING DATA PUR-**
20 **CHASES PILOT PROJECT.**

21 (a) **WORKSHOP.**—Not later than 9 months after the
22 date of enactment of this Act, the Administrator shall or-
23 ganize a workshop including relevant commercial remote
24 sensing data providers, scientists, and remote sensing data
25 users, among other relevant stakeholders, to identify the

1 essential criteria for a pilot project for purchasing com-
2 mercial remote sensing data to support research in Earth
3 science and for applied uses of the data to address State,
4 local, regional, and tribal needs. The workshop shall ad-
5 dress lessons learned and recommendations related to past
6 experience with commercial data purchases, including
7 those outlined in the National Research Council report en-
8 titled “Toward New Partnerships in Remote Sensing:
9 Government, the Private Sector, and Earth Science Re-
10 search”.

11 (b) PILOT PROJECT.—Not later than 18 months
12 after the date of enactment of this Act, after consideration
13 of the results of the workshop under subsection (a) and
14 after obtaining relevant information from potential com-
15 mercial remote sensing data providers and users of such
16 data, the Administrator shall establish a pilot project for
17 the provision, through competitive solicitations, of com-
18 mercial remote sensing data to serve research and applied
19 uses of the data to serve State, local, regional, and tribal
20 needs.

21 **Subtitle B—Space Science**

22 **SEC. 311. SUBORBITAL PROGRAMS.**

23 (a) RESPONSIBLE OFFICIAL.—

24 (1) IN GENERAL.—The Administrator shall en-
25 sure that an individual who shall report directly to

1 the Associate Administrator of the Science Mission
2 Directorate is designated to lead NASA's suborbital
3 and airborne program.

4 (2) RESPONSIBILITIES.—The designated indi-
5 vidual shall be responsible for—

6 (A) leading near-term and long-term stra-
7 tegic planning for the suborbital and airborne
8 program;

9 (B) ensuring the implementation of stra-
10 tegic and other relevant plans;

11 (C) integrating NASA's suborbital and air-
12 borne programs;

13 (D) ensuring the productivity of the sub-
14 orbital facilities and assets as necessary to
15 carry out the plans;

16 (E) coordinating NASA's suborbital activi-
17 ties with associated NASA offices and Centers,
18 universities, and other external institutions; and

19 (F) monitoring progress on meeting the
20 strategic objectives for enhanced suborbital and
21 airborne activities, NASA workforce develop-
22 ment, and integration of suborbital activities
23 within NASA's overall plans and priorities.

24 (b) STRATEGIC PLAN.—Not later than 1 year after
25 the date of enactment of this Act, the Administrator shall

1 provide to the Congress a strategic plan to support the
2 full and productive use of NASA's suborbital and airborne
3 assets as a foundation for meeting its scientific research,
4 engineering, workforce development, and education goals
5 and objectives across NASA centers and mission direc-
6 torates and in partnership with universities and other rel-
7 evant external institutions. The strategic plan shall—

8 (1) be developed in consultation with relevant
9 NASA offices and Centers and with input from uni-
10 versities, nonprofit research institutions, and private
11 industry;

12 (2) identify the needs and priorities for using
13 NASA's airborne and suborbital assets to support
14 NASA's scientific research, engineering, workforce
15 development, and educational goals;

16 (3) identify and prioritize the required infra-
17 structure investments, including maintenance, up-
18 grades, and any enhanced facility or equipment ca-
19 pabilities, that are required to carry out the needs
20 and priorities described in paragraph (2); and

21 (4) provide an estimate of the budget require-
22 ments and a schedule and timeline for implementing
23 the plan.

24 (c) TRAINING AND PROFESSIONAL DEVELOPMENT.—

25 The Administrator shall, to the extent practicable, expand

1 the opportunities within NASA's suborbital programs for
2 training science and engineering students and for pro-
3 viding professional development for early career profes-
4 sionals. Training and development activities shall be ex-
5 panded consistent with the goals and objectives of the
6 strategic plan to be developed under subsection (b).

7 **SEC. 312. EXPLORER PROGRAM.**

8 (a) REVIEW OF EXPLORER PROGRAM.—

9 (1) ESTABLISHMENT.—Not later than 120 days
10 after the date of enactment of this Act, the Adminis-
11 trator shall enter into an arrangement with the Na-
12 tional Academies to conduct a review of the Explorer
13 Program and offer any recommendations as it con-
14 siders necessary.

15 (2) SCOPE.—Such review shall address at least
16 the following:

17 (A) A review of existing or recent Explorer
18 program elements such as NASA's University
19 Class Explorer (UNEX), Small Explorer
20 (SMEX), Medium Class Explorer (MIDEX),
21 Explorers (EX), and Missions of Opportunity to
22 assess the degree of—

23 (i) innovation in instrumentation, and
24 other technology and space mission ele-
25 ments;

1 (ii) flexibility and new approaches in
2 management and collaboration;

3 (iii) project implementation within the
4 planned budget and schedule; and

5 (iv) training opportunities for space
6 scientists and engineers.

7 (B) The status, capability, and availability
8 of launch vehicles and infrastructure to support
9 the Explorer program elements.

10 (C) Projected launch capabilities and facili-
11 ties for Explorers, including private sector
12 launch capabilities.

13 (D) The frequency of Explorer missions.

14 (E) The balance of Explorer missions
15 among theme areas and between larger and
16 smaller mission sizes.

17 (F) The opportunities and challenges for
18 partner participation in Explorer missions, in-
19 cluding international and interagency collabora-
20 tions.

21 (G) The contributions of Explorers to a ro-
22 bust space science program, and the value of
23 the Explorer Program for the Nation's scientific
24 research and engineering community, including

1 its impact on training of younger researchers
2 and engineers.

3 (3) REPORT.—Not later than 16 months after
4 the date of enactment of this Act, the Administrator
5 shall transmit to the Congress the review and a plan
6 for responding to the recommendations of the re-
7 view.

8 **SEC. 313. RADIOISOTOPE THERMOELECTRIC GENERATOR**
9 **MATERIAL REQUIREMENTS AND SUPPLY.**

10 (a) ANALYSIS OF REQUIREMENTS AND RISKS.—The
11 Administrator, in consultation with other Federal agen-
12 cies, shall conduct an analysis of NASA requirements for
13 radioisotope power system material which is needed to
14 carry out planned, high priority robotic missions in the
15 solar system and other surface exploration activities be-
16 yond low-Earth orbit, as well as the risks to NASA mis-
17 sions in meeting those requirements, or any additional re-
18 quirements, due to a lack of adequate domestic production
19 of radioisotope power system material. The analysis
20 shall—

21 (1) detail NASA's current projected mission re-
22 quirements for radioisotope power system material;

23 (2) explain the assumptions used to determine
24 NASA's requirements for the material, including—

1 (A) the planned use of Advanced Stirling
2 Radioisotope Generator technology;

3 (B) the status of and timeline for com-
4 pleting development and demonstration of the
5 Advanced Stirling Radioisotope Generator tech-
6 nology, including the development of flight
7 readiness requirements; and

8 (C) the risks, implications, and contin-
9 gencies for NASA mission plans of any delays
10 or unanticipated technical challenges related to
11 the anticipated use of Advanced Stirling Radio-
12 isotope Generator technology;

13 (3) assess the risk to NASA programs of any
14 potential delays in achieving the schedule and mile-
15 stones for planned domestic production of radioiso-
16 tope power system material;

17 (4) outline a process for meeting any additional
18 NASA requirements for the material; and

19 (5) estimate the incremental costs required to
20 increase the amount of material produced each year,
21 if such an increase is needed to support additional
22 NASA requirements for the material.

23 (b) TRANSMITTAL.—Not later than 180 days after
24 the date of enactment of this Act, the Administrator, in

1 consultation with other Federal agencies, shall transmit
2 the results of the analysis to the Congress.

3 **TITLE IV—AERONAUTICS**

4 **SEC. 401. ENVIRONMENTALLY FRIENDLY AIRCRAFT RE-**
5 **SEARCH AND DEVELOPMENT INITIATIVE.**

6 Section 302 of the National Aeronautics and Space
7 Administration Authorization Act of 2008 (42 U.S.C.
8 17721) is amended—

9 (1) by striking “The Administrator” and insert-
10 ing the following:

11 “(a) IN GENERAL.—The Administrator”; and

12 (2) by adding at the end the following:

13 “(b) PLAN.—

14 “(1) IN GENERAL.—The Administrator shall
15 develop a plan and associated timetable for this ini-
16 tiative identifying key milestones, including projected
17 flight demonstrations to validate vehicle and tech-
18 nology concepts in a relevant environment.

19 “(2) SUBMISSION.—Not later than 270 days
20 after the date of enactment of the National Aero-
21 nautics and Space Administration Authorization Act
22 of 2010, the Administrator shall transmit the plan
23 to the Congress.”.

1 **SEC. 402. RESEARCH ON NEXTGEN AIRSPACE MANAGE-**
2 **MENT CONCEPTS AND TOOLS.**

3 The Administrator shall review at least annually the
4 alignment and timing of NASA's research and develop-
5 ment activities in support of the NextGen airspace man-
6 agement modernization initiative and shall make any nec-
7 essary adjustments by reprioritizing or retargeting
8 NASA's research and development activities in support of
9 the NextGen initiative.

10 **SEC. 403. RESEARCH ON AIRCRAFT CABIN AIR QUALITY.**

11 The Administrator shall initiate research on aircraft
12 cabin air quality that complements research conducted by
13 the Federal Aviation Administration and its Center of Ex-
14 cellence on Research in the Intermodal Transport Envi-
15 ronment, including research on innovative aircraft cabin
16 air quality sensors operating during ground and flight op-
17 erations and on innovative warning and mitigation tech-
18 nologies for poor air quality.

19 **SEC. 404. RESEARCH ON ON-BOARD VOLCANIC ASH SENSOR**
20 **SYSTEMS.**

21 (a) IN GENERAL.—The Administrator shall conduct
22 a study to assess the feasibility of establishing a project
23 focused on the development of a low-cost on-board volcanic
24 ash sensor system.

25 (b) SPECIFICATIONS.— The study shall consider, at
26 a minimum—

- 1 (1) NASA's unique capabilities;
- 2 (2) opportunities for collaboration, both nation-
- 3 ally and internationally; and
- 4 (3) projected resource requirements, research
- 5 milestones, and potential accomplishments.

6 **SEC. 405. AERONAUTICS TEST FACILITIES.**

7 (a) SENSE OF CONGRESS.—It is the sense of the Con-

8 gress that—

- 9 (1) NASA must reverse the deteriorating condi-
- 10 tion of its aeronautics ground test facilities and in-
- 11 frastructure, as this condition is hampering the ef-
- 12 fectiveness and efficiency of aeronautics research
- 13 performed by both NASA and industry participants
- 14 making use of NASA facilities, thus reducing the
- 15 competitiveness of the United States aviation indus-
- 16 try;
- 17 (2) NASA has a role in providing test capabili-
- 18 ties that are not economically viable as commercial
- 19 entities and thus are not available elsewhere; and
- 20 (3) to ensure continued access to reliable and
- 21 efficient national-class test capabilities by research-
- 22 ers, NASA should seek to establish strategic part-
- 23 nerships with other Federal agencies, academic insti-
- 24 tutions, and industry.

1 (b) PLAN.—The Administrator shall develop a plan
2 to stabilize and, where possible, reverse the deterioration
3 of NASA’s aeronautics ground test facilities.

4 **SEC. 406. EXPANDED RESEARCH PROGRAM ON COMPOSITE**
5 **MATERIALS USED IN AEROSPACE.**

6 The Administrator shall expand NASA’s research
7 program on composite materials used in aerospace appli-
8 cations to address—

9 (1) progressive damage analysis, aging, inspec-
10 tion techniques, and new manufacturing and repair
11 techniques; and

12 (2) ways to mitigate how the environment, op-
13 erating fluids, and mechanical loads interact with
14 composite materials over time.

15 **TITLE V—SPACE TECHNOLOGY**

16 **SEC. 501. SPACE TECHNOLOGY PROGRAM.**

17 (a) ESTABLISHMENT.—The Administrator shall es-
18 tablish a space technology program to enable research and
19 development on advanced space technologies and systems
20 that are independent of specific space mission flight
21 projects. The program shall support—

22 (1) early-stage concepts and innovation;

23 (2) development of innovative technologies in
24 areas such as in-space propulsion, power generation
25 and storage, liquid rocket propulsion, avionics, struc-

1 tures, and materials that may enable new ap-
2 proaches to human and robotic space missions; and

3 (3) flight demonstrations of technologies, in-
4 cluding those that have the potential to benefit mul-
5 tiple NASA mission directorates, other Federal Gov-
6 ernment agencies, and the commercial space indus-
7 try.

8 (b) PROCEDURE.—In establishing the space tech-
9 nology program under this section, the Administrator
10 shall—

11 (1) to the maximum extent practicable, use a
12 competitive process to select projects to be supported
13 as part of the program;

14 (2) support the development of an organization
15 to investigate innovative concepts for technological
16 approaches, systems, architectures, or mission strat-
17 egies;

18 (3) make use of small satellites and NASA sub-
19 orbital platforms, to the extent practicable, to dem-
20 onstrate space technology concepts and develop-
21 ments; and

22 (4) undertake partnerships with other Federal
23 agencies, universities, private industry, and other
24 spacefaring nations, as appropriate.

1 (c) DECADAL SURVEY.—The Administrator shall
2 enter into an arrangement with the National Academies
3 for a decadal survey study to make recommendations for
4 research and development priorities for NASA’s space
5 technology program over the next decade. Included in the
6 decadal survey shall be an identification and prioritization
7 of key technology research and development activities
8 needed to enable a robust exploration technology program,
9 from basic research and development through flight dem-
10 onstrations. The Administrator shall transmit the results
11 of the study to the Congress not later than 20 months
12 after the date of enactment of this Act.

13 **TITLE VI—EDUCATION AND**
14 **OUTREACH**

15 **SEC. 601. STEM EDUCATION AND TRAINING.**

16 (a) IN GENERAL.—In order to create the diverse,
17 skilled scientific and technical workforce essential to meet-
18 ing the challenges facing NASA and the Nation in the
19 21st century, the Administrator shall develop, conduct,
20 support, promote, and coordinate formal and informal
21 educational and training activities that leverage NASA’s
22 unique content expertise and facilities to—

23 (1) contribute to improving science, technology,
24 engineering and mathematics (STEM) education
25 and training at all levels in the United States; and

1 (2) enhance awareness and understanding of
2 STEM, including space and Earth sciences, aero-
3 nautics, and engineering.

4 (b) PROGRAMS.—

5 (1) IN GENERAL.—The Administrator shall
6 carry out evidence-based programs designed to—

7 (A) increase student interest and participa-
8 tion, including by women and underrepresented
9 minority students;

10 (B) improve public literacy and support;
11 and

12 (C) improve the teaching and learning of
13 space and Earth sciences, aeronautics, engi-
14 neering, and other STEM disciplines supported
15 by NASA.

16 (2) INCLUDED PROGRAMS.—Programs author-
17 ized under this subsection may include—

18 (A) informal educational programming de-
19 signed to excite and inspire students and the
20 general public about space and Earth science,
21 aeronautics, engineering, and other STEM dis-
22 ciplines supported by NASA while strength-
23 ening their content knowledge in these dis-
24 ciplines;

1 (B) teacher training and professional de-
2 velopment opportunities for pre-service and in-
3 service elementary and secondary school teach-
4 ers designed to increase the content knowledge
5 of teachers in space and Earth science, aero-
6 nautics, engineering, and other STEM dis-
7 ciplines supported by NASA, especially through
8 hands-on research and technology experiences;

9 (C) research opportunities for secondary
10 school students, including internships at NASA
11 and its field centers, that provide secondary
12 school students with hands-on research and
13 technology experiences as well as exposure to
14 working scientists and engineers;

15 (D) research opportunities at NASA and
16 its field centers for undergraduate and graduate
17 students pursuing degrees in space and Earth
18 sciences, aeronautics, engineering, and other
19 STEM disciplines supported by NASA;

20 (E) competitive scholarships, fellowships,
21 and traineeships for undergraduate and grad-
22 uate students in space and Earth sciences, aer-
23 onautics, engineering, and other STEM dis-
24 ciplines supported by NASA; and

1 (F) competitive grants for institutions of
2 higher education (as defined under section
3 101(a) of the Higher Education Act of 1965
4 (20 U.S.C. 1001(a))), including 2-year institu-
5 tions of higher education, to establish or expand
6 degree programs or courses in space and Earth
7 sciences, aeronautics, engineering, and other
8 STEM disciplines supported by NASA.

9 (c) ORGANIZATION OF STEM EDUCATION PRO-
10 GRAMS.—

11 (1) DIRECTOR OF STEM EDUCATION.—The Ad-
12 ministrator shall appoint or designate a Director of
13 STEM Education, who shall have the principal re-
14 sponsibility to oversee and coordinate all NASA pro-
15 grams and activities in support of STEM education
16 and training, including space and Earth sciences,
17 aeronautics, and engineering.

18 (2) QUALIFICATIONS.—The Director shall be an
19 individual who, by reason of professional background
20 and experience, is specially qualified to advise the
21 Administrator on all matters pertaining to STEM
22 education and training, including space and Earth
23 sciences, aeronautics, and engineering, at NASA.

24 (3) DUTIES.—The Director shall—

1 (A) oversee and coordinate all programs in
2 support of STEM education and training, in-
3 cluding space and Earth sciences, aeronautics,
4 and engineering;

5 (B) represent NASA as the principal inter-
6 agency liaison for all STEM education and
7 training programs, unless otherwise represented
8 by the Administrator or the Associate Adminis-
9 trator for Education;

10 (C) prepare the annual budget and advise
11 the Associate Administrator for Education and
12 the Administrator on all budgetary issues for
13 STEM education and training relative to the
14 programs of NASA;

15 (D) establish, periodically update, and
16 maintain a publicly accessible online inventory
17 of STEM education and training programs and
18 activities;

19 (E) develop, implement, and update the
20 STEM education and training strategic plan re-
21 quired under subsection (d);

22 (F) increase, to the maximum extent prac-
23 ticable, the participation and advancement of
24 women and underrepresented minorities at

1 every level of STEM education and training;
2 and

3 (G) perform such other matters relating to
4 STEM education and training as are required
5 by the Administrator or the Associate Adminis-
6 trator for Education.

7 (d) STRATEGIC PLAN.—The Director of STEM Edu-
8 cation shall develop, implement, and update once every 3
9 years a STEM education and training strategic plan for
10 NASA. The plan shall—

11 (1) identify and prioritize annual and long-term
12 STEM education and training goals and objectives
13 for NASA;

14 (2) describe the role of each NASA program or
15 activity in contributing to the goals and objectives
16 identified under paragraph (1);

17 (3) specify the metrics that will be used to as-
18 sess progress toward achieving those goals and ob-
19 jectives; and

20 (4) describe the approaches that will be taken
21 to assess the effectiveness of each STEM education
22 program and activity supported by NASA.

23 (e) OUTREACH TO STUDENTS FROM UNDERREP-
24 RESENTED GROUPS.—In carrying out a program author-
25 ized under this section, the Administrator shall give con-

1 sideration to the goal of promoting the participation of
2 individuals identified in sections 33 and 34 of the Science
3 and Engineering Equal Opportunities Act (42 U.S.C.
4 1885a; 1885b).

5 (f) CONSULTATION AND PARTNERSHIP WITH OTHER
6 AGENCIES.—In carrying out the programs and activities
7 authorized under this section, the Administrator shall—

8 (1) consult with the Secretary of Education and
9 the Director of the National Science Foundation re-
10 garding activities designed to improve elementary
11 and secondary STEM education and training; and

12 (2) consult and partner with the Director of the
13 National Science Foundation in carrying out pro-
14 grams under this section designed to build capacity
15 in STEM education and training at the under-
16 graduate and graduate level.

17 **SEC. 602. ASSESSMENT OF IMPEDIMENTS TO SPACE**
18 **SCIENCE AND ENGINEERING WORKFORCE**
19 **DEVELOPMENT FOR MINORITY AND UNDER-**
20 **REPRESENTED GROUPS AT NASA.**

21 (a) ASSESSMENT.—The Administrator shall enter
22 into an arrangement for an independent assessment of any
23 impediments to space science and engineering workforce
24 development for minority and underrepresented groups at
25 NASA, including recommendations on—

1 (1) measures to address such impediments;

2 (2) opportunities for augmenting the impact of
3 space science and engineering workforce development
4 activities and for expanding proven, effective pro-
5 grams; and

6 (3) best practices and lessons learned, as identi-
7 fied through the assessment, to help maximize the
8 effectiveness of existing and future programs to in-
9 crease the participation of minority and underrep-
10 resented groups in the space science and engineering
11 workforce at NASA.

12 (b) REPORT.—A report on the assessment carried out
13 under subsection (a) shall be transmitted to the Congress
14 not later than 15 months after the date of enactment of
15 this Act.

16 (c) IMPLEMENTATION.—To the extent practicable,
17 the Administrator shall take all necessary steps to address
18 any impediments identified in the assessment.

19 **SEC. 603. INDEPENDENT REVIEW OF THE NATIONAL SPACE**
20 **GRANT COLLEGE AND FELLOWSHIP PRO-**
21 **GRAM.**

22 (a) SENSE OF CONGRESS.—It is the sense of the Con-
23 gress that—

24 (1) the National Space Grant College and Fel-
25 lowship Program, established in title II of the Na-

1 tional Aeronautics and Space Administration Au-
2 thorization Act of 1988 (42 U.S.C. 2486 et seq.),
3 has been an important program through which the
4 Federal Government has partnered with State and
5 local governments, universities, private industry, and
6 other organizations to enhance the understanding
7 and use of space and aeronautics activities and their
8 benefits through education, the fostering of inter-
9 disciplinary and multidisciplinary space research and
10 training, and supporting Federal funding for grad-
11 uate fellowships in space-related fields; and

12 (2) enhancing the National Space Grant College
13 and Fellowship Program's effectiveness will support
14 the program's maximum contribution to NASA's
15 and the Nation's goals for science, technology, engi-
16 neering and mathematics (STEM) education and
17 training.

18 (b) REVIEW.—The Administrator shall enter into an
19 arrangement with the National Academies for a review of
20 the National Space Grant College and Fellowship Pro-
21 gram, including its structure and capabilities for sup-
22 porting STEM education and training, and recommenda-
23 tions on measures, if needed, to enhance the program's
24 effectiveness.

1 (c) TRANSMITTAL.—The Administrator shall trans-
 2 mit the results of the review to the Congress not later than
 3 18 months after the date of enactment of this Act.

4 **TITLE VII—INSTITUTIONAL**
 5 **CAPABILITIES REVITALIZATION**

6 **SEC. 701. INSTITUTIONAL MANAGEMENT.**

7 (a) MODERNIZATION OF LABORATORIES, FACILITIES,
 8 AND EQUIPMENT.—

9 (1) STRATEGY.—

10 (A) IN GENERAL.—The Administrator
 11 shall develop a strategy for the maintenance,
 12 repair, upgrading, and modernization of
 13 NASA’s laboratories, facilities, and equipment.

14 (B) CRITERIA.—The strategy shall include
 15 criteria for prioritizing deferred maintenance
 16 tasks and also for upgrading or modernizing
 17 laboratories, facilities, and equipment.

18 (2) PLAN.—The Administrator shall develop a
 19 plan for implementing the strategy in paragraph (1),
 20 including a timeline, milestones, and an estimate of
 21 resources required for carrying out the plan.

22 (3) TRANSMITTAL TO CONGRESS.—The Admin-
 23 istrator shall transmit to the Congress the strategy
 24 under paragraph (1) and the plan under paragraph

1 (2) not later than 180 days after the date of enact-
2 ment of this Act.

3 (b) ESTABLISHMENT OF CAPITAL FUND.—

4 (1) IN GENERAL.—The Administrator shall es-
5 tablish a capital fund at each of NASA's field cen-
6 ters for the modernization of facilities and labora-
7 tories.

8 (2) SOURCE OF FUNDING.— The Administrator
9 shall ensure to the maximum extent practicable that
10 all financial savings achieved by closing outdated or
11 surplus facilities at a NASA field center shall be
12 made available to that center's capital fund for the
13 purpose of modernizing the field center's facilities
14 and laboratories and for upgrading the infrastruc-
15 ture at the field center.

16 **SEC. 702. JAMES E. WEBB COOPERATIVE EDUCATION DIS-**
17 **TINGUISHED SCHOLAR PROGRAM.**

18 (a) ESTABLISHMENT.—The Administrator is author-
19 ized to establish a national cooperative education program
20 to complement existing NASA Center-administered coop-
21 erative education initiatives.

22 (b) APPLICATION PROCESS.—The Administrator
23 shall encourage and seek applications from the pool of
24 American students pursuing science, technology, engineer-

1 ing, or mathematics degrees who wish to gain working ex-
2 perience in NASA.

3 (c) SELECTION.—From the applications, the Admin-
4 istrator shall select 10 finalists annually as James E.
5 Webb Cooperative Education Distinguished Scholars.

6 (d) AWARD.—The James E. Webb Cooperative Edu-
7 cation Distinguished Scholars shall be provided with—

8 (1) learning experiences that will enhance their
9 understanding of activities conducted in the various
10 NASA Centers in furtherance of NASA’s missions
11 and priorities;

12 (2) exposure to NASA headquarters functions
13 and activities; and

14 (3) stipends for living expenses.

15 **TITLE VIII—ACQUISITION**
16 **MANAGEMENT**

17 **SEC. 801. PROHIBITION ON EXPENDITURE OF FUNDS WHEN**
18 **30 PERCENT THRESHOLD IS EXCEEDED.**

19 Section 103(e) of the National Aeronautics and Space
20 Administration Authorization of 2005 (42 U.S.C.
21 16613(e)) is amended by striking “beginning 18 months
22 after the date the Administrator transmits a report under
23 subsection (d)(1)” and inserting “beginning 18 months
24 after the Administrator makes such determination”.

1 **SEC. 802. PROJECT AND PROGRAM RESERVES.**

2 To ensure that the establishment, maintenance, and
3 allotment of project and program reserves contribute to
4 prudent management, not later than 180 days after the
5 date of enactment of this Act, the Administrator shall
6 transmit to the Congress a report describing NASA's cri-
7 teria for establishing the amount of reserves at the project
8 and program levels and how such criteria complement
9 NASA's policy of budgeting at a 70 percent confidence
10 level.

11 **SEC. 803. INDEPENDENT REVIEWS.**

12 Not later than 270 days after the date of enactment
13 of this Act, the Administrator shall transmit to the Con-
14 gress a report describing NASA's procedures for con-
15 ducting independent reviews of projects and programs at
16 lifecycle milestones and how NASA ensures the independ-
17 ence of the individuals who conduct those reviews prior
18 to their assignment.

19 **SEC. 804. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**
20 **TEREST IN MAJOR NASA ACQUISITION PRO-**
21 **GRAMS.**

22 (a) **REVISED REGULATIONS REQUIRED.**—Not later
23 than 270 days after the date of enactment of this Act,
24 the Administrator shall revise the NASA Supplement to
25 the Federal Acquisition Regulation to provide uniform
26 guidance and tighten existing requirements for preventing

1 organizational conflicts of interest by contractors in major
2 acquisition programs.

3 (b) ELEMENTS.—The revised regulations required by
4 subsection (a) shall, at a minimum—

5 (1) address organizational conflicts of interest
6 that could potentially arise as a result of—

7 (A) lead system integrator contracts on
8 major acquisition programs and contracts that
9 follow lead system integrator contracts on such
10 programs, particularly contracts for production;

11 (B) the ownership of business units per-
12 forming systems engineering and technical as-
13 sistance functions, professional services, or
14 management support services in relation to
15 major acquisition programs by contractors who
16 simultaneously own business units competing to
17 perform as either the prime contractor or the
18 supplier of a major subsystem or component for
19 such programs;

20 (C) the award of major subsystem con-
21 tracts by a prime contractor for a major acqui-
22 sition program to business units or other affili-
23 ates of the same parent corporate entity, and
24 particularly the award of subcontracts for soft-

1 ware integration or the development of a pro-
2 prietary software system architecture; or

3 (D) the performance by, or assistance of,
4 contractors in technical evaluations on major
5 acquisition programs;

6 (2) ensure that NASA receives advice, when ap-
7 propriate, on systems architecture and systems engi-
8 neering matters with respect to major acquisition
9 programs from federally funded research and devel-
10 opment centers or other sources independent of the
11 prime contractor;

12 (3) require that a contract for the performance
13 of systems engineering and technical assistance
14 functions for a major acquisition program contains
15 a provision prohibiting the contractor or any affiliate
16 of the contractor from participating as a prime con-
17 tractor or a major subcontractor in the development
18 of a system under the program; and

19 (4) establish such limited exceptions to the re-
20 quirement in paragraphs (2) and (3) as may be nec-
21 essary to ensure that NASA has continued access to
22 advice on systems architecture and systems engi-
23 neering matters from highly qualified contractors
24 with domain experience and expertise, while ensuring

1 that such advice comes from sources that are objec-
2 tive and unbiased.

3 **SEC. 805. REPORT TO CONGRESS.**

4 The Administrator shall transmit to the Congress,
5 not later than April 30 of each year, an estimate of the
6 total termination liability as of the end of the second fiscal
7 quarter for all NASA contracts with a total value in excess
8 of \$200,000,000.

9 **TITLE IX—OTHER PROVISIONS**

10 **SEC. 901. CLOUD COMPUTING.**

11 (a) DEFINITION.—As defined by the National Insti-
12 tute of Standards and Technology, for purposes of this
13 section, the term “cloud computing” means a model for
14 enabling convenient, on-demand network access to a
15 shared pool of configurable computing resources that can
16 be rapidly provisioned with minimal management effort or
17 service provider interaction.

18 (b) REPORT.—Not later than 1 year after NASA has
19 entered into a contract for its first use of a non-Federal
20 cloud computing facility, the Comptroller General shall
21 transmit to the Congress a report detailing whether sen-
22 sitive but unclassified and classified NASA information
23 was processed on that facility and if so, how NASA en-
24 sured that data access and security requirements were in

1 place to safeguard NASA's scientific and technical infor-
2 mation.

3 **SEC. 902. REVIEW OF PRACTICES TO DETECT AND PRE-**
4 **VENT THE USE OF COUNTERFEIT PARTS.**

5 Not later than 1 year after the date of enactment
6 of this Act, the Comptroller General shall transmit to the
7 Congress a review of NASA's processes and controls to
8 detect and prevent the use of counterfeit parts in NASA
9 mission projects and related assets. The review shall ex-
10 amine—

11 (1) the trends in known and identified counter-
12 feit parts in NASA's supply chain;

13 (2) NASA's processes and controls to detect
14 counterfeit parts and prevent their incorporation
15 into NASA mission projects, instruments, and other
16 mission-related assets; and

17 (3) any gaps in NASA's controls and processes
18 for detecting counterfeit part and preventing their
19 incorporation into NASA missions and related as-
20 sets.

21 **SEC. 903. PRESERVATION AND MANAGEMENT OF LUNAR**
22 **SITES.**

23 (a) INTERNATIONAL DIALOG.—The Director of
24 OSTP, in cooperation of the Administrator, other relevant
25 Federal agencies, commercial entities, and international

1 bodies, shall enter into a dialogue to identify the questions
2 and research needed to understand—

3 (1) the potential adverse impacts of various
4 uses of the Moon on scientific research activities;

5 (2) the potential adverse impacts of such uses
6 on lunar areas of historical, cultural, or scientific
7 value; and

8 (3) how to prevent or mitigate such impacts.

9 (b) GRANTS PROGRAM.—The Administrator, in co-
10 operation with other relevant Federal agencies and stake-
11 holders, shall establish a grants program to conduct re-
12 search for the purpose of identifying and characterizing
13 potential impacts related to lunar activities and describing
14 potential means for managing and mitigating the impacts.

15 (c) INTERNATIONAL FRAMEWORK.—As a result of
16 the dialog under subsection (a), the Director of OSTP
17 shall initiate an effort to establish a framework for identi-
18 fying, protecting, and preserving lunar areas determined
19 to be of significant historical, cultural, or scientific value.

20 (d) REPORT.—The Director of OSTP shall provide
21 a report on the results of the international dialog under
22 subsection (a) and the establishment of an international
23 framework under subsection (c), to be transmitted to the
24 Congress not later than 2 years after the date of enact-
25 ment of this Act.

1 **SEC. 904. CONTINUITY OF MODERATE RESOLUTION LAND**
2 **IMAGING REMOTE SENSING DATA.**

3 (a) REAFFIRMATION OF POLICY.—The Congress re-
4 affirms the finding in section 2(1) of the Land Remote
5 Sensing Policy Act of 1992 (15 U.S.C. 5601(1)) which
6 states that “The continuous collection and utilization of
7 land remote sensing data from space are of major benefit
8 in studying and understanding human impacts on the
9 global environment, in managing the Earth’s natural re-
10 sources, in carrying out national security functions, and
11 in planning and conducting many other activities of sci-
12 entific, economic, and social importance.”.

13 (b) CONTINUOUS LAND REMOTE SENSING DATA
14 COLLECTION.—The Director of OSTP shall take steps in
15 consultation with other relevant Federal agencies to en-
16 sure, to the maximum extent practicable, the continuous
17 collection of space-based medium-resolution observations
18 of the Earth’s land cover and to ensure that the data are
19 made available in such ways as to facilitate the widest pos-
20 sible use.

21 **SEC. 905. SPACE WEATHER.**

22 (a) STRATEGY AND IMPLEMENTATION PLAN.—The
23 Director of OSTP, in coordination with the Administrator
24 and with other relevant Federal agencies, space weather
25 coordinating bodies, industry, academia, and other stake-
26 holders, shall prepare a long-term strategy for a sustain-

1 able space weather program and develop a plan to imple-
2 ment the strategy. The implementation plan shall—

3 (1) define individual agency responsibilities for
4 carrying out the strategy;

5 (2) identify the milestones and schedule re-
6 quired for each agency's contributions;

7 (3) provide an estimate of the resources re-
8 quired for each agency to carry out its responsibil-
9 ities;

10 (4) establish a process for coordinating agency
11 responsibilities, programs, and budgets required for
12 implementing the plan; and

13 (5) identify opportunities for private sector and
14 international contributions to implementing the plan.

15 (b) STUDY ON PREDICTION.—The Director of OSTP
16 shall enter into an arrangement with the National Acad-
17 emies to assess the status of capabilities for space weather
18 prediction and recommend the highest priority basic re-
19 search, infrastructure, and operational needs required to
20 improve the Nation's ability to predict space weather
21 events. The study should also address the benefits of space
22 weather prediction. The Director shall transmit the results
23 of the study to the Congress not later than 18 months
24 after the date of enactment of this Act.

1 **SEC. 906. USE OF OPERATIONAL COMMERCIAL SUB-**
2 **ORBITAL VEHICLES FOR RESEARCH, DEVEL-**
3 **OPMENT, AND EDUCATION.**

4 (a) PLAN.—The Administrator shall prepare a plan
5 describing the processes required to support the potential
6 use of commercial reusable suborbital flight vehicles, once
7 demonstrated and proven successful on an operational
8 basis, for carrying out competitively selected scientific and
9 engineering investigations and educational activities. The
10 plan shall—

11 (1) describe NASA, space flight operator, and
12 supporting contractor responsibilities for developing
13 standard payload interfaces, conducting payload
14 safety analyses, payload integration and processing,
15 payload operations, and safety assurance for NASA-
16 sponsored space flight participants, among other
17 functions required to fly NASA-sponsored payloads
18 and space flight participants on commercial sub-
19 orbital vehicles;

20 (2) identify NASA-provided hardware, software,
21 or services that may be provided to space flight op-
22 erators on a cost-reimbursable basis, through agree-
23 ments entered into under section 203(c)(5) of the
24 National Aeronautics and Space Act of 1958 (42
25 U.S.C. 2473(c)(5)), or on a contractual basis; and

1 (3) describe the United States Government and
2 space flight operator responsibilities for liability and
3 indemnification with respect to commercial sub-
4 orbital vehicle flights that involve NASA-sponsored
5 payloads or activities, NASA-supported space flight
6 participants, or other NASA-related contributions.

7 (b) COMMERCIAL REUSABLE SUBORBITAL CAPABILI-
8 TIES AND RISKS.—The Administrator shall assess and
9 characterize the potential capabilities and performance of
10 commercial reusable suborbital vehicles for addressing sci-
11 entific research, including research requiring access to low
12 gravity and microgravity environments, for carrying out
13 technology demonstrations related to science, exploration,
14 or space operations requirements, and for providing oppor-
15 tunities for educating and training space scientists and en-
16 gineers, once those vehicles become operational. The as-
17 sessment shall also characterize the risks of using poten-
18 tial commercial reusable suborbital flights to NASA-spon-
19 sored researchers, investigators, and scientific investiga-
20 tions and flight hardware. The Administrator shall make
21 a determination on the need to enter into arrangements
22 with commercial reusable suborbital service providers for
23 flights or flight services to acquire analytical data to in-
24 form the assessment.

1 (c) TRANSMITTAL.—The plan and assessment de-
2 scribed in subsections (a) and (b) shall be transmitted to
3 the Congress not later than 1 year after the date of enact-
4 ment of this Act.

5 (d) INDEMNIFICATION AND LIABILITY.—The Admin-
6 istrator shall not proceed with a request for proposals,
7 award any contract, commit any United States Govern-
8 ment funds, or enter into any other agreement for the pro-
9 vision of a commercial reusable suborbital vehicle launch
10 service until all indemnification and liability issues associ-
11 ated with the use of such systems by the United States
12 Government shall have been addressed and the Adminis-
13 trator has provided to the Congress a report describing
14 the indemnification and liability provisions that are
15 planned to be included in such contracts or agreements.

16 **SEC. 907. STUDY ON EXPORT CONTROL MATTERS RELATED**
17 **TO UNITED STATES ASTRONAUT SAFETY AND**
18 **NASA MISSION OPERATIONS.**

19 (a) ESTABLISHMENT.—The Director of OSTP, in
20 consultation with the Administrator and other relevant
21 Federal agencies, shall conduct a study to examine the
22 need for a process for granting real-time, limited waivers
23 to export control license restrictions or regulations that
24 are necessary for United States Government entities and
25 contractors to enter into technical discussions and to share

1 technical data with foreign government entities and con-
2 tractors to resolve anomalies that may—

3 (1) threaten the safety of United States astro-
4 nauts aboard cooperative crewed spacecraft such as
5 the ISS; or

6 (2) impair the operations of international civil
7 research and other spacecraft that involve the na-
8 tional interests of the United States.

9 (b) TRANSMITTAL.—The results of the study shall be
10 transmitted to the Congress not later than 1 year after
11 the date of enactment of this Act.

12 **SEC. 908. AMENDMENT TO THE NATIONAL AERONAUTICS**
13 **AND SPACE ACT OF 1958.**

14 Section 202 of the National Aeronautics and Space
15 Act of 1958 (42 U.S.C. 2472) is amended by adding at
16 the end the following new subsection:

17 “(d) The Administrator and the Deputy Adminis-
18 trator may be retired commissioned military personnel.”.

19 **SEC. 909. NEAR-EARTH OBJECTS.**

20 (a) RESPONSIBLE OFFICIAL.—The Administrator
21 shall designate a responsible official for coordinating
22 NASA’s near-Earth object observation activities and
23 NASA’s interactions with other Federal agencies and
24 international entities on near-Earth object surveys, de-
25 fense, and efforts related to addressing any threats to the

1 United States posed by near-Earth objects. The respon-
2 sible official shall report directly to the Administrator.

3 (b) REAFFIRMATION OF POLICY ON NEAR-EARTH
4 OBJECT SURVEY.—The Congress reaffirms the direction
5 set forth in section 321(d)(1) of the National Aeronautics
6 and Space Administration Authorization Act of 2005 (42
7 U.S.C. 16691(d)(1)) that directed the Administrator “to
8 plan, develop, and implement a Near-Earth Object Survey
9 program to detect, track, catalogue, and characterize the
10 physical characteristics of near-Earth objects equal to or
11 greater than 140 meters in diameter in order to assess
12 the threat of such near-Earth objects to the Earth”.

13 (c) PLAN.—Not later than 270 days after the date
14 of enactment of this Act, the Administrator shall transmit
15 to the Congress a plan for carrying out the direction re-
16 affirmed by subsection (b).

17 (d) AUTHORIZATION OF APPROPRIATIONS.—From
18 the funds authorized for Planetary Science in title I,
19 \$1,000,000 in fiscal year 2012 and \$1,000,000 in fiscal
20 year 2013 shall be for supporting competitively awarded
21 grants for investigation of innovative approaches to car-
22 rying out the congressionally mandated survey of near-
23 Earth objects equal to or greater than 140 meters in di-
24 ameter, and \$5,000,000 in fiscal year 2014 and
25 \$5,000,000 in fiscal year 2015 shall be for preliminary

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- 1 design and development work on an innovative concept for
- 2 carrying out the Congressionally mandated survey of near-
- 3 Earth objects equal to or greater than 140 meters in di-
- 4 ameter.

SECTION-BY-SECTION ANALYSIS OF H.R. 5781,
THE NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION AUTHORIZATION ACT OF 2010

Sec. 1. Short Title

The “National Aeronautics and Space Administration Authorization Act of 2010”.

Sec. 2. Findings

Congress finds that the agency is and should remain a multimission agency, and 16 other findings.

Sec. 3. Definitions

The terms “Administrator”, “ISS”, “NASA”, “NOAA”, and “OSTP” are defined.

TITLE I. AUTHORIZATION OF APPROPRIATIONS**Sec. 101. Fiscal Year 2011**

Authorizes NASA at \$19,000,000,000 for FY 2011. That amount is the same as that in the President’s FY 2011 request.

The authorization includes the following breakdown:

Science: \$5,015,700,000, of which

- \$1,801,800,000 is for Earth Science
- \$1,485,700,000 is for Planetary Science
- \$1,076,300,000 is for Astrophysics
- \$646,900,000 is for Heliophysics
- \$5,000,000 is for Suborbital Augmentation

Aeronautics: \$579,600,000

Space Technology: \$572,200,000

Exploration: \$4,535,300,000 of which

- \$215,000,000 is for Human Research
- \$14,000,000 is for the commercial cargo COTS demonstration program
- \$50,000,000 is for commercial crew transportation-related activities
- \$4,156,300,000 is for the restructured exploration program
- \$100,000,000 is for the loan and loan guarantee program

Space Operations: \$4,594,300,000, of which

- \$989,100,000 is for the Space Shuttle program
- \$2,804,800,000 is for the International Space Station
- \$60,000,000 is for the Post-Shuttle Workforce Transition Initiative
- \$740,400,000 is for Space and Flight Support

Education: \$145,800,000

Cross-Agency Support Programs: \$3,111,400,000

Construction and Environmental Compliance and Restoration: \$407,300,000

Inspector General: \$38,400,000

Sec. 102. Fiscal Year 2012

Authorizes NASA at \$19,450,000,000 for FY 2012. That is the same amount as is projected for FY 2012 in the President’s FY 2011 budget request. The authorization includes the following breakdown:

Science: \$5,278,600,000 of which

- \$1,944,500,000 is for Earth Science
- \$1,547,200,000 is for Planetary Science
- \$1,109,300,000 is for Astrophysics
- \$672,600,000 is for Heliophysics
- \$5,000,000 is for Suborbital Augmentation

Aeronautics: \$598,700,000
 Space Technology: \$1,012,200,000
 Exploration: \$4,881,800,000 of which
 \$215,000,000 is for Human Research
 \$50,000,000 is for commercial crew transportation-related activities
 \$4,516,800,000 is for the restructured exploration program
 \$100,000,000 is for the loan and loan guarantee program
 Space Operations: \$3,930,300,000, of which
 \$86,100,000 is for the Space Shuttle program
 \$3,033,600,000 is for the International Space Station
 \$40,000,000 is for the Post-Shuttle Workforce Transition Initiative
 \$770,600,000 is for Space and Flight Support
 Education: \$145,800,000
 Cross-Agency Support Programs: \$3,189,600,000
 Construction and Environmental Compliance and Restoration: \$373,800,000
 Inspector General: \$39,200,000

Sec. 103. Fiscal Year 2013

Authorizes NASA at \$19,960,000,000 for FY 2013. That is the same amount as is projected for FY 2013 in the President's FY 2011 budget request. The authorization includes the following breakdown:

Science: \$5,569,500,000, of which
 \$2,089,500,000 is for Earth Science
 \$1,591,200,000 is for Planetary Science
 \$1,149,100,000 is for Astrophysics
 \$734,700,000 is for Heliophysics
 \$5,000,000 is for Suborbital Augmentation
 Aeronautics: \$609,400,000
 Space Technology: \$1,059,700,000
 Exploration: \$4,888,500,000 of which
 \$215,000,000 is for Human Research
 \$5,000,000 is for the Exploration Technology and Demonstration program
 \$5,000,000 is for the Exploration Precursor Robotic Missions program
 \$50,000,000 is for commercial crew transportation-related activities
 \$4,513,500,000 is for the restructured exploration program
 \$100,000,000 is for the loan and loan guarantee program
 Space Operations: \$3,993,300,000, of which
 \$3,179,400,000 is for the International Space Station
 \$40,000,000 is for the Post-Shuttle Workforce Transition Initiative
 \$773,900,000 is for Space and Flight Support
 Education: \$145,800,000
 Cross-Agency Support Programs: \$3,276,800,000
 Construction and Environmental Compliance and Restoration: \$376,900,000
 Inspector General: \$40,100,000

Sec. 104. Fiscal Year 2014

Authorizes NASA at \$20,600,000,000 for FY 2014. That is the same amount as is projected for FY 2014 in the President's FY 2011 budget request. The authorization includes the following breakdown:

Science: \$5,794,800,000, of which
 \$2,216,600,000 is for Earth Science

\$1,635,100,000 is for Planetary Science
 \$1,158,700,000 is for Astrophysics
 \$779,400,000 is for Heliophysics
 \$5,000,000 is for Suborbital Augmentation

Aeronautics: \$615,100,000

Space Technology: \$1,063,900,000

Exploration: \$5,106,800,000 of which

\$215,000,000 is for Human Research
 \$10,000,000 is for the Exploration Technology and Demonstration program
 \$10,000,000 is for the Exploration Precursor Robotic Missions program
 \$50,000,000 is for commercial crew transportation-related activities
 \$4,721,800,000 is for the restructured exploration program
 \$100,000,000 is for the loan and loan guarantee program

Space Operations: \$4,062,600,000, of which

\$3,271,900,000 is for the International Space Station
 \$790,700,000 is for Space and Flight Support

Education: \$145,800,000

Cross-Agency Support Programs: \$3,366,500,000

Construction and Environmental Compliance and Restoration: \$403,500,000

Inspector General: \$41,000,000

Sec. 105. Fiscal Year 2015

Authorizes NASA at \$20,990,000,000 for FY 2015. That is the same amount as is projected for FY 2015 in the President's FY 2011 budget request. The authorization includes the following breakdown:

Science: \$5,899,000,000, of which

\$2,282,200,000 is for Earth Science
 \$1,654,400,000 is for Planetary Science
 \$1,131,600,000 is for Astrophysics
 \$825,800,000 is for Heliophysics
 \$5,000,000 is for Suborbital Augmentation

Aeronautics: \$625,300,000

Space Technology: \$1,217,900,000

Exploration: \$5,157,900,000 of which

\$215,000,000 is for Human Research
 \$30,000,000 is for the Exploration Technology and Demonstration program
 \$30,000,000 is for the Exploration Precursor Robotic Missions program
 \$50,000,000 is for commercial crew transportation-related activities
 \$4,732,900,000 is for the restructured exploration program
 \$100,000,000 is for the loan and loan guarantee program

Space Operations: \$4,030,500,000, of which

\$3,232,800,000 is for the International Space Station
 \$797,700,000 is for Space and Flight Support

Education: \$146,800,000

Cross-Agency Support Programs: \$3,462,200,000

Construction and Environmental Compliance and Restoration: \$408,500,000

Inspector General: \$41,900,000

TITLE II. HUMAN SPACE FLIGHT

Subtitle A. Exploration

Sec. 201. Reaffirmation of Exploration Policy

Reaffirms the support of the Congress for the exploration policy articulated in Secs. 401 and 402 of Public Law 110–422.

Sec. 202. Restructured Exploration Program

Directs the Administrator to develop a plan to restructure the current exploration program and develop, test, and demonstrate a government-owned crew transportation system and evolvable heavy lift transportation system in a manner that enables a challenging exploration program, minimizes the human space flight “gap”, seeks efficiencies in program management and reductions in fixed and operating costs, requires a high level of crew safety, contains a robust flight and ground test program, facilitates the transition of Shuttle personnel, makes maximum practicable use of the work completed to date on the Orion, Ares I, heavy lift, and ground support and exploration enabling projects and contracts, and is phased in a manner consistent with available and anticipated resources.

Sec. 203. Space Radiation

Directs the Administrator to develop a space radiation mitigation and management strategy and implementation plan, and to transmit the strategy and plan no later than 12 months after the date of enactment of the Act.

Subtitle B. International Space Station**Sec. 211. Extension of ISS Operations**

Directs the Administrator to take all necessary measures to support the operation and full utilization of the International Space Station (ISS) through at least the year 2020 and to seek to reduce ISS operating costs.

Sec. 212. ISS Research Management Institution

Directs the Administrator to designate an independent, not-for-profit U.S. institution for the management of research carried out on the ISS.

Sec. 213. ISS Research Management Plan.

Directs the Administrator to have the designated institution prepare a management plan and transmit the plan no later than two years after the date of enactment of the Act.

Sec. 214. Outreach Plan for U.S. ISS Research

Directs the Administrator to have the institution prepare a plan for broadening and enhancing the outreach to potential U.S. government, academic, and commercial users of the ISS no later than two years after the date of enactment of the Act.

Sec. 215. ISS Cargo Resupply Requirements and Contingency Capacity Through 2020

Directs the Administrator to conduct an assessment of the ISS Cargo Resupply capacity required to support extended operations of the ISS through 2020 and explore options with its partners for ensuring upmass and downmass needs are addressed in the event that adequate U.S. commercial cargo resupply capabilities are not available during any extended period after the Shuttle is retired.

Sec. 216. Centrifuge

Directs the Administrator to assess innovative options for deploying a variable-gravity centrifuge and to transmit the assessment no later than one year after the date of enactment of the Act.

Sec. 217. Exploration Technology Development Using the ISS

Directs the Administrator to develop a plan for carrying out prioritized activities that support NASA’s long-term plans for exploration beyond low-Earth orbit that require the capabilities of the International Space Station and to transmit the plan no later than 270 days after the date of enactment of this Act.

Sec. 218. Fundamental Space Life Science and Physical Sciences and Related Technology Research

Requires the Administrator to designate a responsible official and to develop a strategic plan for carrying out research in space life and physical sciences and tech-

nology consistent with the priorities and recommendations established by the National Academies in its decadal survey of life and microgravity sciences and to transmit the plan within one year of the enactment of the Act.

Subtitle C. Space Shuttle

Sec. 221. Expanded Scope of Space Shuttle Transition Liaison Office

Renames Space Shuttle Transition Liaison Office to Post-Shuttle Transition Liaison Office and extends life to two years after the last grant is awarded.

Sec. 222. Post-Shuttle Workforce Transition Initiative Grant Program

Authorizes the Administrator to make grants for the establishment, operation, coordination, and implementation of aerospace workforce and community transition strategies.

Sec. 223. Disposition of Orbiter Vehicles

Provides for the disposition of the remaining Space Shuttle orbiter vehicles upon the termination of the Space Shuttle program and provides for priority consideration being given to eligible applicants to display the orbiters at locations with the best potential value to the public, including where the location can advance STEM disciplines, and with an historical relationship with either the launch, flight operations, or processing of the Space Shuttle orbiters.

Subtitle D. Space and Flight Support

Sec. 231. 21st Century Space Launch Complex Initiative

Directs that the Administrator, in carrying out the 21st Century Space Launch Initiative, give priority to activities supporting the restructured exploration program.

Subtitle E. Commercial Crew Transportation

Sec. 241. Affirmation of Policy

Reaffirms the policy of making use of United States commercially provided International Space Station crew transport and crew rescue services; limiting the use of the government system to non-ISS missions once commercial crew transport and crew rescue services meeting safety requirements become operational; and facilitating the transfer of NASA-developed technologies to United States commercial orbital human space transportation companies.

Sec. 242. Commercial Crew and Related Commercial Space Initiatives

Directs NASA to seek opportunities to make use of commercially available crew transportation services provided that service providers meet applicable NASA safety requirements, have completed crewed flight demonstrations, and per-seat cost is not greater than the crew transportation system of the restructured exploration program.

Directs the Administrator to establish requirements for the human-rating of space transportation systems that are equivalent to NASA safety processes and procedures and requires the Administrator to make available NASA-developed technologies and NASA facilities and equipment to assist in the testing and demonstration of commercial crew transportation systems.

Requires that any company seeking to provide commercial crew transport services to NASA enter into an arrangement with NASA that allows NASA to obtain ongoing insight into the design methodologies, processes, technologies, and other information employed in the development and production of a commercial crew transportation system.

Requires the Administrator, before entering into any contracts for the use of commercially available commercial crew transport or crew rescue services, to certify that each commercial provider has demonstrated the safety and reliability of its systems.

Prohibits the Administrator from proceeding with a procurement award for a commercial crew transport and rescue services until sufficient flight experience has been demonstrated and accrued; directs the Administrator to develop and communicate NASA's human-rating requirements to commercial space companies; and directs the Aerospace Safety Advisory Panel to conduct a review.

Prohibits the Administrator from entering into any agreement for a U.S. commercial ISS crew transport or rescue service until all indemnification and liability issues associated with the use of such systems by the U.S. government have been addressed and the Administrator has provided a report describing the indemnification and liability provisions.

Directs the Administrator not to proceed with a procurement award for a commercial ISS crew transport system service if the provider's crew transportation system has a predicted level of safety that is less than that predicted for the restructured exploration program's crew transportation system.

Sec. 243. Federal Assistance for the Development of Commercial Orbital Human Space Transportation Services

Directs the Administrator to establish a program to provide financial assistance in the form of loans or loan guarantees to commercial entities for the costs of development of orbital human space transportation systems.

TITLE III. SCIENCE

Subtitle A. Earth Science

Sec. 301. Earth Science Applications

Directs the Administrator to develop a process for entering into arrangements with other government agencies that seek to benefit from ongoing NASA capabilities related to Earth science applications and decision support systems.

Sec. 302. Essential Space-Based Earth Science and Climate Measurements

Directs the Administrator to enter into an arrangement with the National Academies for a study, to be completed within 18 months after the enactment of this Act, to develop a prioritized list of essential earth science and climate measurements that can be collected with space-based means.

Sec. 303. Commercial Remote Sensing Data Purchases Pilot Project

Directs the Administrator to initiate a pilot project for purchasing commercial remote sensing data to address state, local, regional, and tribal needs.

Subtitle B. Space Science

Sec. 311. Suborbital Programs

Directs the Administrator to designate an individual responsible for leading near-term and long-term strategic planning for the suborbital and airborne program; and provide, within one year after the date of enactment of this Act, a strategic plan to support the full and productive use of NASA's suborbital and airborne assets.

Sec. 312. Explorer Program

Directs the Administrator to enter into an arrangement with the National Academies to conduct a review of the Explorer Program not later than 120 days after the date of enactment of the Act and to submit a plan for responding to the recommendations of the review no later than 16 months after the date of enactment of the Act.

Sec. 313. Radioisotope Thermoelectric Generator Material Requirements and Supply

Directs the Administrator to conduct an analysis of NASA requirements for radioisotope power system material needed to carry out planned, high priority robotic missions in the solar system and other surface exploration activities beyond low-Earth orbit; and to transmit the results of the analysis no later than 180 days after the date of enactment of the Act.

TITLE IV. AERONAUTICS

Sec. 401. Environmentally Friendly Aircraft Research and Development Initiative

Amends Sec. 302 of P.L. 110-422 by directing the Administrator to develop a plan and associated timetable for this initiative, including projected flight test demonstrations, and to transmit the plan within 270 days after the date of enactment of this Act.

Sec. 402. Research on NextGen Airspace Management Concepts and Tools

Directs the Administrator to review at least annually the alignment and timing of NASA's research and development activities in support of the NextGen airspace management modernization initiative.

Sec. 403. Research on Aircraft Cabin Air Quality

Directs the Administrator to initiate research on aircraft cabin air quality, including research on innovative aircraft cabin air quality sensors, that complements research conducted by FAA.

Sec. 404. Research on On-board Volcanic Ash Sensor Systems

Directs the Administrator to conduct a study to assess the feasibility of establishing a project focused on the development of a low-cost, on-board volcanic ash sensor system.

Sec. 405. Aeronautics Test Facilities

Directs the Administrator to develop an agency-wide plan to stabilize and where possible reverse the deterioration of the agency's aeronautics ground test facilities.

Sec. 406. Expanded Research Program on Composite Materials Used in Aerospace

Directs the Administrator to expand NASA's research program on composite materials used in aerospace applications to address such topics as progressive damage analysis and ways to mitigate how the environment interacts with composite materials over time.

TITLE V. SPACE TECHNOLOGY**Sec. 501. Space Technology Program**

Directs the Administrator to establish a space technology program to enable research and development on advanced space technologies and systems that are independent of specific space mission flight projects, including such areas as in-space propulsion, power generation and storage, liquid rocket propulsion, avionics, structures, and materials; enter into an arrangement with the National Academies for a "decadal survey" study to make recommendations on research and development priorities for NASA's space technology program over the next decade; and transmit the results of the study no later than 20 months after the date of enactment of the Act.

TITLE VI. EDUCATION AND OUTREACH**Sec. 601. STEM Education and Training**

Directs the Administrator to develop, conduct, support, promote, and coordinate formal and informal educational and training activities that leverage NASA's unique content expertise and facilities; and designate a Director to oversee and coordinate all NASA programs and activities in support of STEM education and training.

Sec. 602. Assessment of Impediments to Space Science and Engineering Workforce Development for Minority and Underrepresented Groups at NASA

Directs the Administrator to enter into an arrangement for an independent assessment of impediments to space science and engineering workforce development for minority and underrepresented groups at NASA and transmit a report of the assessment not later than 15 months after the date of enactment of this Act.

Sec. 603. Independent Review of the National Space Grant College and Fellowship Program

Directs the Administrator to enter into an arrangement with the National Academies for a review of the National Space Grant College and Fellowship Program and to transmit the results of the review no later than 18 months after the date of the enactment of the Act.

TITLE VII. INSTITUTIONAL CAPABILITIES REVITALIZATION

Sec. 701. Institutional Management

Directs the Administrator to develop a strategy for the maintenance, repair, upgrading, and modernization of the agency's laboratories, facilities and equipment and to transmit the strategy and an implementation plan no later than 180 days after the date of enactment of the Act.

Authorizes the Administrator to establish a capital fund at each of NASA's Centers for modernization of facilities and laboratories.

Sec. 702. James E. Webb Cooperative Education Distinguished Scholar Program

Authorizes the Administrator to establish a national Cooperative Education Program that will complement existing NASA Center-administered cooperative education initiatives. As the "best of the brightest", ten finalists will be selected annually as James E. Webb Cooperative Education Distinguished Scholars.

TITLE VIII. ACQUISITION MANAGEMENT**Sec. 801. Prohibition on Expenditure of Funds When 30 Percent Threshold Is Exceeded**

The National Aeronautics and Space Administration Authorization of 2005 is amended to clarify the starting point of the period at the end of which NASA is prohibited from expending further funds on a project.

Sec. 802. Project and Program Reserves

Directs the Administrator to transmit not later than 180 days after enactment of this Act a report describing NASA's criteria for establishing the amount of reserves at the Project and Program levels.

Sec. 803. Independent Reviews

Directs the Administrator to transmit not later than 270 days after the date of enactment of this Act a report describing internal entities that conduct independent reviews of projects and programs at life cycle milestones and how NASA ensures the independence of members prior to their assignment.

Sec. 804. Avoiding Organizational Conflicts of Interest in Major NASA Acquisition Programs

Directs the Administrator to revise the NASA Supplement to the Federal Acquisition Regulation not later than 270 days after the date of the enactment of this Act to provide uniform guidance and tighten existing requirements for organizational conflicts of interest by contractors in major acquisition programs.

Sec. 805. Report to Congress

Directs the Administrator to transmit a report to Congress on April 30th of each year that provides an estimate of the total termination liability as of the end of the second quarter of the fiscal year for all NASA contracts with a total value in excess of \$200 million.

TITLE IX. OTHER PROVISIONS**Sec. 901. Cloud Computing**

Directs the Comptroller General to transmit a report detailing whether sensitive but unclassified and classified NASA information was processed on a non-Federal cloud computing facility and if so, how NASA ensured the safeguarding of NASA's scientific and technical information.

Sec. 902. Review of Practices to Detect and Prevent the Use of Counterfeit Parts

Directs the Comptroller General to transmit the results of its review of NASA's processes and controls to detect and prevent the use of counterfeit parts in NASA mission projects and related assets no later than one year after the date of enactment of this Act.

Sec. 903. Preservation and Management of Lunar Sites

Directs the OSTP Director, in cooperation with the Administrator and others, to enter into an international dialogue to identify the questions and research needed

to understand the potential adverse impacts of various uses of the Moon on scientific activities and on lunar areas of historical, cultural, or scientific value, and how to prevent or mitigate the impacts. Directs the Administrator, in cooperation with other relevant Federal agencies and stakeholders, to establish a grants program and to provide a report on the results of the international dialog and the establishment of an international framework within two years after the date of the enactment of this Act.

Sec. 904. Continuity of Moderate Resolution Land Imaging Remote Sensing Data

Reaffirms the finding in Section 2 of the Land Remote Sensing Policy Act of 1992, Public Law 102–555, regarding the continuous collection and utilization of land remote sensing data from space.

Requires the Director of OSTP to take steps to ensure the continuous collection of space-based medium resolution observations of the Earth's land cover and that data are made available to facilitate the widest possible use.

Sec. 905. Space Weather

Directs the Director of OSTP to prepare a long-term strategy for a sustainable space weather program and develop a plan to implement the strategy, to enter into an arrangement with the National Academies to assess the status of capabilities for space weather prediction, and transmit the results of these activities no later than 18 months after the date of enactment of the Act.

Sec. 906. Use of Operational Commercial Suborbital Vehicles for Research, Development, and Education

Directs the Administrator to prepare a plan describing the processes required to support the potential use of commercial reusable suborbital flight vehicles for carrying out scientific and engineering investigations and educational activities; assess and characterize the potential capabilities and performance of commercial reusable suborbital vehicles for addressing scientific research; and transmit the plan and assessment within one year after the date of enactment of this Act. Prohibits the Administrator from proceeding with a procurement award for the provision of a commercial reusable suborbital vehicle launch service until all indemnification and liability issues have been addressed and the Administrator has provided a report describing the indemnification and liability provisions that are planned to be included in such contract(s).

Sec. 907. Study on Export Control Matters Related to U.S. Astronaut Safety and NASA Mission Operations

Directs the Director of OSTP to conduct a study to examine the need for a process for granting real-time, limited waivers to export control license restrictions or regulations on matters related to U.S. astronaut safety and NASA mission operations and to transmit the results of the study no later than one year after the date of enactment of this Act.

Sec. 908. Amendment to the National Aeronautics and Space Act of 1958

Amends section 202 to permit the Administrator and Deputy Administrator to be retired commissioned military personnel.

Sec. 909. Near-Earth Objects

Reaffirms the direction codified in P.L. 110–422 and directs the Administrator to designate a responsible official for coordinating NASA's near-Earth object observation activities; directs the Administrator to transmit a plan for carrying out the reaffirmed direction within 270 days after enactment; and authorizes funding for specific activities.

COMMITTEE ON SCIENCE AND TECHNOLOGY
FULL COMMITTEE MARKUP
 July 22, 2010

AMENDMENT ROSTER

H. R. 5781, the *National Aeronautics and Space Administration Authorization Act of 2010*

| No. | Amendment | Summary | Results |
|-----|-------------------------|--|---|
| 1 | Ms. Kosmas (039) | <p>Amends Findings subsection (8).</p> <p>Adds funding to the Commercial Orbital Transportation System (COTS) program and commercial crew transportation-related activities, and cuts restructured exploration program funding.</p> <p>Strikes existing commercial crew and related commercial space initiatives language (Section 242) and replaces with new language related to the development of commercial crew transportation capabilities and services.</p> <p>Strikes the direct loan and loan guarantee program authorized by Section 243 and corresponding authorizations of appropriations.</p> | Defeated by voice vote. |
| 2 | Mr. Sensenbrenner (040) | <p>Amends Section 2 by adding a new finding: "NASA's temperature records substantially overlap with the records of the Climate Research (CRU) at the University of East Anglia."</p> <p>Adds a new Section 304 requiring that the Administrator issue a report to Congress "the extent and degree to which NASA's temperature records overlap with the records at the Climate Research Unit at the University of East Anglia, the reasons for and sources of that overlap, and the possibility that NASA's temperature records have been compromised."</p> | Modified by unanimous consent, and agreed to by voice vote. |
| 3 | Mr. Rohrabacher (047) | <p>Redirects funds from the restructured exploration program and the loan and loan guarantee program to commercial crew transportation-related activities in all five fiscal years.</p> <p>Strikes the direct loan and loan guarantee program authorized by Section 243 and corresponding</p> | Withdrawn. |

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|----|-------------------------|---|---|
| | | authorizations of appropriations. | |
| 4 | Mr. Rohrabacher (046) | Redirects funds from the restructured exploration program to the Commercial Orbital Transportation System (COTS) program in FY 2011. | Defeated by voice vote. |
| 5 | Mr. Grayson (081) | Strikes the direct loan and loan guarantee program authorized by Section 243 and corresponding authorizations of appropriations. | Defeated by roll call vote: Y-6 N-23 |
| 6 | Ms. Kosmas (040) | Adds funding in all five fiscal years for Exploration Technology Development with no offset. Adds a new Section 204 entitled "Development of Technologies and In-Space Capabilities for Beyond Near-Earth Space Missions." | Defeated by voice vote. |
| 7 | Mr. Lujan (065) | Strikes authorization of appropriations that limited funding for Commercial Reusable Suborbital Research project. Amends the Plan language contained in Section 906. Adds new subsections to Section 906 related to commercial reusable suborbital research, including provisions on program management and reporting requirements. | Agreed to by voice vote. |
| 8 | Mr. Broun (001) | Strikes authorizations of appropriations for FY 2014 and FY 2015. | Agreed to by voice vote. |
| 9 | Mr. Sensenbrenner (003) | Amends Section 201 to state that Congress reaffirms its support for the Constellation program. | Defeated by roll call vote: Y-10 N-19 |
| 10 | Mr. Olson (034) | Amends Section 202 to specify that the plan to restructure the exploration program make use of work done to date on "spacesuit development and related life support technology." Also amends Section 202 to specify that the restructured exploration program continue work on spacesuit development. | Agreed to by voice vote. |
| 11 | Ms. Kosmas (041) | Amends Section 202 to specify that the plan to restructure the exploration program take best advantage of "Federal" investments. Also amends Section 202 to require that, in developing the heavy lift launch vehicle, the Administrator "take all appropriate actions to ensure the long-term affordability and sustainability of the heavy left launch vehicle, including consideration of joint use of propulsion | Defeated by voice vote. |

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|----|----------------------------|---|--------------------------|
| | | <p>systems across civil, national security, and commercial vehicles.”</p> <p>Also amends Section 202 to require that the restructured exploration program be implemented in a manner that “provides robust competition in the procurement process.”</p> | |
| 12 | Mr. Wilson/Ms. Fudge (034) | Amends Section 202 to state that “In order to maximize the return on facility investments already made to enable new capabilities, NASA is encouraged to undertake testing at existing facilities and in one location where possible.” | Offered and withdrawn. |
| 13 | Ms. Kosmas (043) | <p>Amends Section 202 by adding a subsection entitled “NASA Launch Support and Infrastructure Modernization Program for the Restructured Exploration Program”</p> <p>Amends Section 231 by detailing the activities for which funding for the 21st Century Space Launch Complex Initiative shall be available.</p> <p>Also amends Section 231 by adding a reporting requirement related to the plan for the implementation of the 21st Century Space Launch Complex Initiative.</p> | Agreed to by voice vote. |
| 14 | Ms. Kosmas (038) | Amends Section 211 by adding a vehicle and component review provision. | Agreed to by voice vote |
| 15 | Ms. Edwards (065) | <p>Strikes Section 212 (ISS Research Management Institution).</p> <p>Amends Section 213 to require that the Administrator, rather than an institution designated under Section 212(a), prepare a United States ISS research management plan.</p> | Withdrawn. |
| 16 | Mr. Sensenbrenner (039) | Amends Section 215(c) to state that “Before relying on ISS partners to upmass or downmass cargo, the Administrator must certify to Congress that no United States or commercial cargo resupply capabilities are available.” | Agreed to by voice vote. |
| 17 | Ms. Kosmas (042) | Adds a new Section directing the Administrator to fly the “Launch-on-Need Shuttle mission currently designated in the Shuttle Flight Manifest dated February 28, 2010, to the ISS in fiscal year 2011...” if certain conditions are met. Also reallocates funding to support the mission. | Agreed to by voice vote. |
| 18 | Mr. Olson (031) | Adds a new Section 221 directing the Administrator to “fly the Launch-on-Need Shuttle mission currently designated in the Shuttle Flight Manifest dated February 28, 2010, to the ISS in | Offered and withdrawn. |

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| | | fiscal year 2011...if the Administrator determines that the mission is necessary to ensure the crew safety and viability of the ISS, and if the Shuttle mission can be flown safely." Also reallocates funding to support the mission. | |
| 19 | Mr. Wu (051) | Amends Section 223 to require that the competitive procedure through which decommissioned orbiter vehicles will be made available for display take into account geographical diversity. | Agreed to by voice vote. |
| 20 | Mr. Wilson/Ms. Fudge/Mr. Wu (033) | Amends Section 223 by striking certain language related to the competitive considerations for the disposition of decommissioned orbiter vehicles. | Agreed to by roll call vote: Y-18 N-14 |
| 21 | Mr. Grayson (079) | Adds a new Section 232 stating that "No funds shall be provided by the Administrator for human space flight activities unless the associated launch takes place at the Kennedy Space Center." | Withdrawn. |
| 22 | Ms. Fudge/Mr. Wilson (070) | Adds a new subsection (a) to Section 243 that directs the Administrator to "enter into an arrangement with the National Academies under which the National Academies shall submit to Congress...a report with details on the feasibility of a commercial space market...." | Withdrawn. |
| 23 | Mr. Grayson (080) | Amends Section 202 by striking language which states that if "one or more United States commercial entities are certified to provide ISS crew transportation and rescue services, the crew transportation system developed under this section shall be available as a backup ISS crew transportation and rescue service as needed but shall not be utilized as the primary means of ISS crew transportation and rescue or otherwise compete with the commercial system for ISS crew transportation and rescue services." Amends Section 241 by striking language which states that Congress affirms the policy of: 1) making use of U.S. commercially provided ISS crew transportation and crew rescue services to the maximum extent practicable; and 2) limiting, to the maximum extent practicable, the use of the system developed under Section 202 to non-ISS missions once commercial crew transportation and crew rescue services that meet safety requirements become operational. Strikes certain language in Section 242 related to Commercial Services Opportunities and NASA | Defeated by voice vote. |

| | | Insight and Oversight Processes. | |
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| 24 | Mr. Matheson (065) | Adds a new Subtitle F stating that "For all programs authorized under [Title II], authorized funds may be obligated only for performance of the programs." | Agreed to by voice vote. |
| 25 | Mr. Rohrabacher (045) | Adds a new Subtitle F directing the Administrator to review and report to Congress on: 1) any technology-related laws that prevent space cooperation with China; and 2) the Shenzhou spacecraft. | Defeated by voice vote. |
| 26 | Ms. Johnson (125) | Amends Section 405 to specify that the Administrator shall transmit the plan required under the Section to Congress not later than 1 year after the date of enactment of the Act. | Agreed to by voice vote. |
| 27 | Mr. Wilson (036) | Amends section 601 by adding "and students in rural schools" to the list of groups the programs are designed to increase student interest and participation. | Agreed to by voice vote. |
| 28 | Ms. Fudge/Mr. Wilson (071) | Amends section 501 by adding that the Space Technology Program shall support "research, development, and demonstration of enabling technologies in support of future exploration missions. | Agreed to by voice vote. |
| 29 | Mr. Lujan (064) | Amends section 601 by adding "with special consideration for minority serving institutions" to the competitive grants for institutions of higher education subparagraph and replaces the "Outreach to Students from Underrepresented Groups" subsection with new language. | Agreed to by voice vote. |
| 30 | Ms. Johnson (126) | Amends section 601 by adding "and recruit minorities that are underrepresented in STEM teaching" to the activities the Administrator is required to consult with the Secretary of Education and the Director of NSF about. | Agreed to by voice vote. |
| 31 | Ms. Edwards (064) | Adds a new section to Title VI of the bill establishing a pilot program for hands-on space science and engineering education and training. | Agreed to by voice vote. |
| 32 | Ms. Fudge (072) | Amends section 701 by adding a new subparagraph requiring the Administrator to make an assessment in relation to the strategy of modifications needed to maximize usage of facilities that offer unique and highly specialized benefits to the aerospace industry and the American public. | Agreed to by voice vote. |
| 33 | Mr. Rohrabacher (048) | Amends section 909 by reaffirming the policy with respect to threats posed by near-Earth objects set forth in the National Aeronautics and Space Administration Act of 2008. | Agreed to by voice vote. |
| 34 | Mr. Rohrabacher | Amends section 909 by reiterating Congress' | Agreed to by |

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| | (049) | support for the use of the Arecibo Observatory for NASA-funded near-Earth object-related activities, and seeks to ensure the availability of the Observatory's planetary radar to support these activities. | voice vote. |
| 35 | Mr. Rohrabacher (044) | Adds a new section to the bill prohibiting NASA personnel or contractors from any exchange or contact with the People's Republic of China or any entity who is headquartered in the People's Republic of China. | Defeated by roll call vote: Y-6 N-20 |
| 36 | Ms. Edwards (063) | Adds a new section to the bill extending the reduction-in-force moratorium created in the National Aeronautics and Space Administration Act of 2008 to December 31, 2015. | Defeated by roll call vote: Y-12 N-18 |
| 37 | Mr. McCaul (002) | Adds a new section to the bill stating a sense of Congress that NASA shall endeavor to carry out, to the extent feasible and technologically possible, the top recommendation from the decadal survey in each mission area. | Agreed to by voice vote. |
| 38 | Mr. Sensenbrenner/Mr. Miller (041) | Adds a new section to the bill requiring ethics programs in the Office of General Counsel and prohibiting the General Counsel from being designated as NASA's ethics officer. | Agreed to by voice vote. |
| 39 | Mr. Peters | Amends Section 203 by adding a new subsection directing the Administrator to transmit a report to Congress on prior radiation research on non-human primates and the justification and rationale for additional research involving non-human primates. | Agreed to by voice vote. |

AMENDMENT**OFFERED BY MS. KOSMAS OF FLORIDA**

Page 6, beginning on line 1, strike “to serve as an independent means—whether primary or backup—of” and insert “to support multiple systems to enable redundant”.

Page 6, line 4, strike “commercial systems” and insert “a single commercial system”.

Page 11, line 12, strike “\$14,000,000” and insert “\$300,000,000”.

Page 11, line 15, strike “\$50,000,000” and insert “\$312,000,000”.

Page 11, line 16, strike “activities;” and insert “activities; and”.

Page 11, line 17, strike “\$4,156,300,000” and insert “\$3,608,300,000”.

Page 11, line 19, strike “; and’” and insert a period.

Page 11, strike lines 20 through 22.

Page 14, line 11, strike “\$50,000,000” and insert “\$500,000,000”.

Page 14, line 12, strike “activities;” and insert “activities; and”.

Page 14, line 13, strike “\$4,516,800,000” and insert “\$4,066,800,000”.

Page 14, line 15, strike “; and’” and insert a period.

Page 14, strike lines 16 through 18.

Page 17, line 9, strike “\$50,000,000” and insert “\$500,000,000”.

Page 17, line 10, strike “activities;” and insert “activities; and”.

Page 17, line 11, strike “\$4,513,500,000” and insert “\$4,063,500,000”.

Page 17, line 13, strike “; and” and insert a period.

Page 17, strike lines 14 through 16.

Page 20, line 7, strike “\$50,000,000” and insert “\$500,000,000”.

Page 20, line 8, strike “activities;” and insert “activities; and”.

Page 20, line 9, strike “\$4,721,800” and insert “\$4,271,800,000”.

Page 20, line 11, strike “; and” and insert a period.

Page 20, strike lines 12 through 14.

Page 23, line 3, strike “\$50,000,000” and insert “\$500,000,000”.

Page 23, line 4, strike “activities;” and insert “activities; and”.

Page 23, line 5, strike “\$4,732,900,000” and insert “\$4,282,900,000”.

Page 23, line 7, strike “; and” and insert a period.

Page 23, strike lines 8 through 10.

Page 48, strike line 3 and all that follows through page 55, line 9, and insert the following (and conform the table of contents accordingly):

1 **SEC. 242. REQUIREMENTS APPLICABLE TO DEVELOPMENT**
2 **OF COMMERCIAL CREW TRANSPORTATION**
3 **CAPABILITIES AND SERVICES.**

4 The Administrator may not undertake procurement
5 of commercially-developed crew transportation services
6 until the following steps are completed:

1 (1) HUMAN RATING REQUIREMENTS.—Not later
2 than 60 days after the date of enactment of this
3 Act, the Administrator shall develop and make avail-
4 able to the public detailed human rating processes
5 and requirements to guide the design of commer-
6 cially-developed crew transportation capabilities that
7 are at least equivalent to proven requirements for
8 crew transportation in use as of the date of enact-
9 ment of this Act.

10 (2) COMMERCIAL MARKET ASSESSMENT.—Not
11 later than 120 days after the date of enactment of
12 this Act, the Administrator shall submit to the ap-
13 propriate committees of the Congress an assessment,
14 conducted, in coordination with the Federal Aviation
15 Administration’s Office of Commercial Space Trans-
16 portation, for purposes of this paragraph, of the po-
17 tential non-Government and non-United States mar-
18 kets for commercially-developed crew and cargo
19 transportation systems and capabilities, including an
20 assessment of the activities associated with potential
21 private sector utilization of the ISS research and
22 technology development capabilities and other poten-
23 tial activities in low-Earth orbit.

24 (3) PROCUREMENT SYSTEM REVIEW.—The Ad-
25 ministrator shall review current Government pro-

1 curement and acquisition practices and processes, in-
2 cluding agreement authorities under the National
3 Aeronautics and Space Act of 1958, to determine
4 the most cost-effective means of procuring commer-
5 cial crew transportation capabilities and related serv-
6 ices in a manner that ensures appropriate account-
7 ability, transparency, and maximum efficiency in the
8 procurement of such capabilities and services. The
9 review shall include an identification of measures to
10 address risk management and means of indemnifica-
11 tion of commercial providers of such capabilities and
12 services, and measures for quality control, safety
13 oversight, and the application of Federal oversight
14 processes within the jurisdiction of other Federal
15 agencies. A description of the proposed procurement
16 process and justification of the proposed procure-
17 ment for its selection shall be included in any pro-
18 posed initiation of procurement activity for commer-
19 cially-developed crew transportation capabilities and
20 services and shall be submitted to the appropriate
21 committees of the Congress before the initiation of
22 any competitive process to procure such capabilities
23 or services.

24 (4) USE OF GOVERNMENT-SUPPLIED CAPABILI-
25 TIES AND INFRASTRUCTURE.—In evaluating any

1 proposed development activity for commercially-de-
2 veloped crew or cargo launch capabilities, the Ad-
3 ministrator shall identify the anticipated contribu-
4 tion of Government personnel, expertise, tech-
5 nologies, and infrastructure to be utilized in support
6 of design, development, or operations of such capa-
7 bilities. This assessment shall include a clear delin-
8 eation of the full requirements for the commercial
9 crew service, including the contingency for crew res-
10 cue. The Administrator shall include details and as-
11 sociated costs of such support as part of any pro-
12 posed development initiative for the procurement of
13 commercially-developed crew or cargo launch capa-
14 bilities or services.

15 (5) FLIGHT DEMONSTRATION AND READINESS
16 REQUIREMENTS.—The Administrator shall establish
17 appropriate milestones and minimum performance
18 objectives to be achieved before authority is granted
19 to proceed to the procurement of commercially-devel-
20 oped crew transportation capabilities or systems.
21 The guidelines shall include a procedure to provide
22 independent assurance of flight safety and flight
23 readiness before the authorization of United States
24 Government personnel to participate as crew on-

1 board any commercial launch vehicle developed pur-
2 suant to this section.

3 (6) COMMERCIAL CREW RESCUE CAPABILI-
4 TIES.—The provision of a commercial capability to
5 provide ISS crew services shall include crew rescue
6 requirements and shall be undertaken through the
7 procurement process initiated in conformance with
8 this section. In the event such development is initi-
9 ated, the Administrator shall make available any rel-
10 evant Government-owned intellectual property deriv-
11 ing from the development of a multi-purpose crew
12 vehicle authorized by this Act to commercial entities
13 involved with such crew rescue capability develop-
14 ment which shall be relevant to the design of a crew
15 rescue capability. In addition, the Administrator
16 shall seek to ensure that contracts for development
17 of the multi-purpose crew vehicle contain provisions
18 for the licensing of relevant intellectual property to
19 participating commercial providers of any crew res-
20 cue capability development undertaken pursuant to
21 this section. If one or more contractors involved with
22 development of the multi-purpose crew vehicle seek
23 to compete in development of a commercial crew
24 service with crew rescue capability, separate legisla-
25 tive authority must be enacted to enable the Admin-

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1 istrator to provide funding for any modifications of
2 the multi-purpose crew vehicle necessary to fulfill
3 the ISS crew rescue function.

Page 55, beginning on line 10, strike section 243
and conform the table of contents accordingly.



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AMENDMENT
OFFERED BY MR. SENSENBRENNER OF
WISCONSIN

Page 9, after line 11, insert the following new paragraph:

1 (18) NASA's temperature records substantially
2 overlap with the records of the Climate Research
3 Unit (CRU) at the University of East Anglia. ~~The~~
4 ~~integrity of the CRU's dataset was compromised by~~
5 ~~the Climategate e-mail scandal.~~

Page 62, after line 20, insert the following new section:

6 **SEC. 304. REPORT ON TEMPERATURE RECORDS.**
7 Not later than one year after the date of enactment
8 of this Act, the Administrator shall issue a report to Con-
9 gress detailing the extent and degree to which NASA's
10 temperature records overlap with the records at the Cli-
11 mate Research Unit at the University of East Anglia, the
12 reasons for and sources of that overlap, and the possibility
13 that NASA's temperature records have been compromised.

☒

AMENDMENT**OFFERED BY MR. ROHRABACHER OF CALIFORNIA**

Page 11, line 15, strike “\$50,000,000” and insert “\$500,000,000”.

Page 11, line 16, strike “activities;” and insert “activities; and”.

Page 11, line 17, strike “\$4,156,300,000” and insert “\$3,806,300,000”.

Page 11, line 19, strike “; and” and insert a period.

Page 11, strike lines 20 through 22.

Page 14, line 11, strike “\$50,000,000” and insert “\$1,400,000,000”.

Page 14, line 12, strike “activities;” and insert “activities; and”.

Page 14, line 13, strike “\$4,516,800,000” and insert “\$3,266,800,000”.

Page 14, line 15, strike “; and” and insert a period.

Page 14, strike lines 16 through 18.

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Page 17, line 9, strike “\$50,000,000” and insert “\$1,400,000,000”.

Page 17, line 10, strike “activities;” and insert “activities; and”.

Page 17, line 11, strike “\$4,513,500,000” and insert “\$3,263,500,000”.

Page 17, line 13, strike “; and” and insert a period.

Page 17, strike lines 14 through 16.

Page 20, line 7, strike “\$50,000,000” and insert “\$1,300,000,000”.

Page 20, line 8, strike “activities;” and insert “activities; and”.

Page 20, line 9, strike “\$4,721,800,000” and insert “\$3,571,800,000”.

Page 20, line 11, strike “; and” and insert a period.

Page 20, strike lines 12 through 14.

Page 23, line 3, strike “\$50,000,000” and insert “\$1,200,000,000”.

Page 23, line 4, strike “activities;” and insert “activities; and”.

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Page 23, line 5, strike “\$4,732,900,000” and insert “\$3,682,900,000”.

Page 23, line 7, strike “; and” and insert a period.

Page 23, strike lines 8 through 10.

Page 55, beginning on line 10, strike section 243 (and conform the table of contents accordingly).



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AMENDMENT

OFFERED BY MR. ROHRABACHER OF CALIFORNIA

Page 11, line 12, strike "\$14,000,000" and insert "\$312,000,000".

Page 11, line 17, strike "\$4,156,300,000" and insert "\$3,858,300,000".



AMENDMENT

OFFERED BY MR. GRAYSON OF FLORIDA

Page 10, line 5, after the first dollar amount, insert
“reduced by \$100,000,000”.

Page 11, line 8, after the first dollar amount, insert
“reduced by \$100,000,000”.

Page 11, line 16, strike “activities;” and insert “ac-
tivities; and”.

Page 11, line 19, strike “; and” and insert a period.

Page 11, strike lines 20 through 22.

Page 13, line 3, after the first dollar amount, insert
“reduced by \$100,000,000”.

Page 14, line 7, after the first dollar amount, insert
“reduced by \$100,000,000”.

Page 14, line 12, strike “activities;” and insert “ac-
tivities; and”.

Page 14, line 15, strike “; and” and insert a period.

Page 14, strike lines 16 through 18.

Page 15, line 22, after the first dollar amount, insert “reduced by \$100,000,000”.

Page 17, line 1, after the first dollar amount, insert “reduced by \$100,000,000”.

Page 17, line 10, strike “activities;” and insert “activities; and”.

Page 17, line 13, strike “; and” and insert a period.

Page 17, strike lines 14 through 16.

Page 18, line 20, after the first dollar amount, insert “reduced by \$100,000,000”.

Page 19, line 24, after the first dollar amount, insert “reduced by \$100,000,000”.

Page 20, line 8, strike “activities;” and insert “activities; and”.

Page 20, line 11, strike “; and” and insert a period.

Page 20, strike lines 12 through 14.

Page 21, line 15, after the first dollar amount, insert “reduced by \$100,000,000”.

Page 22, line 20, after the first dollar amount, insert “reduced by \$100,000,000”.

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Page 23, line 4, strike “activities;” and insert “activities; and”.

Page 23, line 7, strike “; and” and insert a period.

Page 23, strike lines 8 through 10.

Page 55, beginning on line 10, strike section 243 (and conform the table of contents accordingly).



AMENDMENT
OFFERED BY MS. KOSMAS OF FLORIDA

Page 11, after line 22, insert the following (and make the necessary technical and conforming amendments to increase all of the aggregate authorization levels by the amount listed):

1 (F) \$250,000,000 shall be for Exploration
2 Technology Development.

Page 14, after line 18, insert the following (and make the necessary technical and conforming amendments to increase all of the aggregate authorization levels by the amount listed):

3 (E) \$437,300,000 shall be for Exploration
4 Technology Development.

Page 17, after line 16, insert the following (and make the necessary technical and conforming amendments to increase all of the aggregate authorization levels by the amount listed):

5 (G) \$449,000,000 shall be for Exploration
6 Technology Development.

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Page 20, after line 14, insert the following (and make the necessary technical and conforming amendments to increase all of the aggregate authorization levels by the amount listed):

1 (G) \$500,000,000 shall be for Exploration
2 Technology Development.

Page 23, after line 11, insert the following (and make the necessary technical and conforming amendments to increase all of the aggregate authorization levels by the amount listed):

3 (G) \$500,000,000 shall be for Exploration
4 Technology Development.

Page 31, after line 17, insert the following new section (and conform the table of contents accordingly):

5 **SEC. 204. DEVELOPMENT OF TECHNOLOGIES AND IN-SPACE**
6 **CAPABILITIES FOR BEYOND NEAR-EARTH**
7 **SPACE MISSIONS.**

8 (a) DEVELOPMENT AUTHORIZED.—The Adminis-
9 trator may initiate activities to develop the following:

10 (1) Technologies identified as necessary ele-
11 ments of missions beyond low-Earth orbit.

12 (2) In-space capabilities such as refueling and
13 storage technology, orbital transfer stages, innova-
14 tive in-space propulsion technology, communications,

1 and data management that facilitate a broad range
2 of users (including military and commercial) and ap-
3 plications defining the architecture and design of
4 such missions.

5 (3) Spacesuit development and associated life
6 support technology.

7 (4) Flagship missions.

8 (b) INVESTMENTS.—In developing technologies and
9 capabilities under subsection (a), the Administrator may
10 make investments—

11 (1) in space technologies such as advanced pro-
12 pulsion, propellant depots, in situ resource utiliza-
13 tion, and robotic payloads or capabilities that enable
14 human missions beyond low-Earth orbit ultimately
15 leading to Mars;

16 (2) in a space-based transfer vehicle including
17 these technologies with an ability to conduct space-
18 based operations that provide capabilities—

19 (A) to integrate with the Space Launch
20 System and other space-based systems;

21 (B) to provide opportunities for in-space
22 servicing of and delivery to multiple space-based
23 platforms; and

1 (C) to facilitate international efforts to ex-
2 pand human presence to deep space destina-
3 tions;

4 (3) in advanced life support technologies and
5 capabilities;

6 (4) in technologies and capabilities relating to
7 in-space power, propulsion, and energy systems;

8 (5) in technologies and capabilities relating to
9 in-space propellant transfer and storage;

10 (6) in technologies and capabilities relating to
11 in situ resource utilization; and

12 (7) in expanded research to understand the
13 greatest biological impediments to human deep space
14 missions, especially the radiation challenge.

15 (c) UTILIZATION OF ISS AS TESTBED.—The Admin-
16 istrator may utilize the ISS as a testbed for any tech-
17 nology or capability developed under subsection (a) in a
18 manner consistent with the provisions of this Act.

19 (d) COORDINATION.—The Administrator shall coordi-
20 nate development of technologies and capabilities under
21 this section through an overall agency technology ap-
22 proach.



AMENDMENT**OFFERED BY MR. LUJÁN OF NEW MEXICO**

Page 11, lines 1 through 7, strike “of which \$1,000,000” and all that follows through “development platforms”.

Page 14, lines 4 through 6, strike “of which \$1,000,000 shall be for the Commercial Reusable Sub-orbital Research project”.

Page 94, lines 5 through 8, strike “potential use of commercial reusable suborbital flight vehicles, once demonstrated and proven successful on an operational basis” and insert “use of commercial reusable suborbital vehicles”.

Page 96, lines 5 through 15, strike subsection (d) and insert the following:

1 (d) IN GENERAL.—The report of the National Acad-
2 emy of Sciences entitled “Revitalizing NASA’s Suborbital
3 Program: Advancing Science, Driving Innovation and De-
4 veloping Workforce” found that suborbital science mis-
5 sions were critical to building an aerospace workforce ca-
6 pable of meeting the needs of current and future human
7 and robotic space exploration.

1 (e) MANAGEMENT.—The Administrator shall des-
2 ignate an officer or employee of the Space Technology
3 Program to act as the responsible official for the Commer-
4 cial Reusable Suborbital Research Program in the Space
5 Technology Program. The designee shall be responsible for
6 the development of short-term and long-term strategic
7 plans related to the use of commercial reusable suborbital
8 vehicles to support NASA's requirements for competi-
9 tively-selected science, technology demonstration, and edu-
10 cational activities.

11 (f) ESTABLISHMENT.—The Administrator shall es-
12 tablish a Commercial Reusable Suborbital Research Pro-
13 gram within the Space Technology Program that shall
14 fund the development of competitively selected payloads
15 for scientific research, technology development, and edu-
16 cation, and shall provide flight opportunities for those pay-
17 loads to microgravity environments and suborbital alti-
18 tudes that meet the requirements of such investigations.
19 The Commercial Reusable Suborbital Research Program
20 may fund engineering and integration demonstrations,
21 proofs of concept, or experiments for commercial reusable
22 vehicle flights, once the vehicles have met the requirements
23 consistent with subsection (h). The program shall coordi-
24 nate with NASA's Mission Directorates to help achieve
25 NASA's research, technology, and education goals.

1 (g) REPORT.—The Administrator shall submit a re-
2 port annually to the Congress describing progress in car-
3 rying out the Commercial Reusable Suborbital Research
4 program, including the number and type of suborbital mis-
5 sions planned in each fiscal year. The plan and assessment
6 described in subsections (a) and (b) shall be transmitted
7 to the Congress not later than 1 year after the date of
8 enactment of this Act, before the transmittal of which the
9 Administrator shall not be constrained in the execution of
10 this section.

11 (h) INDEMNIFICATION AND LIABILITY.—The Admin-
12 istrator shall not proceed with a request for proposals,
13 award any contract, commit any United States Govern-
14 ment funds, or enter into any other agreement for the pro-
15 vision of a commercial reusable suborbital vehicle launch
16 service of a NASA-sponsored payload or spaceflight par-
17 ticipant until all indemnification and liability issues associ-
18 ated with the use of such systems by the United States
19 Government shall have been addressed and the Adminis-
20 trator has provided to the Congress a report describing
21 the indemnification and liability provisions that are
22 planned to be included in such contracts or agreements.



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AMENDMENT

OFFERED BY MR BROWN

Page 18, line 18, through page 24, line 7, strike sections 104 and 105.

Page 98, line 24, through page 99, line 4, strike “, and \$5,000,000 in fiscal year 2014” and all that follows through “140 meters in diameter”.



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AMENDMENT

OFFERED BY MR SENSEN BRENNER

Page 24, line 11, insert “the Constellation program
and” after “support for”.



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AMENDMENT

OFFERED BY MR. OLSON OF TEXAS

Page 25, line 4, insert “, including spacesuit development and related life support technology,” after “enabling systems”.

Page 30, line 13, insert “, including spacesuit development,” after “exploration program”.



AMENDMENT

OFFERED BY MS. KOSMAS OF FLORIDA

Page 25, line 5, insert “Federal” before “investments”.

Page 27, after line 24, insert the following (and redesignate subsequent provisions accordingly):

1 (C) the Administrator shall take all appropriate
2 actions to ensure the long-term affordability
3 and sustainability of the heavy lift
4 launch vehicle, including consideration of joint
5 use of propulsion systems across civil, national
6 security, and commercial vehicles;

Page 28, after line 24, insert the following (and redesignate subsequent provisions accordingly):

7 (3) provides robust competition in the procurement
8 process;



AMENDMENT
OFFERED BY MR. WILSON OF OHIO AND MS.
FUDGE OF OHIO

Page 28, after line 14, insert the following new paragraph:

1 (7) In order to maximize the return on facility
2 investments already made to enable new capabilities,
3 NASA is encouraged to undertake testing at existing
4 facilities and in one location where possible.

☒

AMENDMENT**OFFERED BY MS. KOSMAS OF FLORIDA**

On page 30, after line 14, insert the following (and redesignate subsequent provisions accordingly):

1 (d) NASA LAUNCH SUPPORT AND INFRASTRUCTURE
 2 MODERNIZATION PROGRAM FOR THE RESTRUCTURED
 3 EXPLORATION PROGRAM.—

4 (1) IN GENERAL.—The Administrator shall
 5 carry out a program to prepare infrastructure at the
 6 Kennedy Space Center that is needed to enable pro-
 7 cessing and launch of the elements of the restruc-
 8 tured exploration program, including simplifying ve-
 9 hicle interfaces and other ground processing and
 10 payload integration areas to minimize overall costs,
 11 enhance safety, and complement the purpose of this
 12 section.

13 (2) ELEMENTS.—The program required by this
 14 section shall include—

15 (A) investments in support of the restruc-
 16 tured exploration program to—

17 (i) improve processing and launch op-
 18 erations at the Kennedy Space Center;

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1 (ii) enhance the overall capabilities of
2 the Eastern Range; and

3 (iii) reduce the long-term cost of oper-
4 ations and maintenance;

5 (B) measures in support of the restruc-
6 tured exploration program to provide multi-
7 vehicle support and improvements in payload
8 processing; and

9 (C) such other measures in support of the
10 restructured exploration program as the Admin-
11 istrator may consider appropriate.

12 (e) REPORT ON NASA LAUNCH SUPPORT AND IN-
13 FRASTRUCTURE MODERNIZATION PROGRAM FOR THE RE-
14 STRUCTURED EXPLORATION PROGRAM.—Not later than
15 180 days after the date of enactment of this Act, the Ad-
16 ministrator shall submit to the appropriate committees of
17 the Congress a report on the plan for the implementation
18 of the program authorized in subsection (d).

Page 47, beginning on line 3, amend section 231 to
read as follows:

19 **SEC. 231. 21ST CENTURY SPACE LAUNCH COMPLEX INITIA-**
20 **TIVE.**

21 (a) PURPOSE.—Funding authorized in title I for the
22 21st Century Space Launch Complex Initiative shall be
23 available to carry out the following activities:

1 (1) Investments to improve civil and national
2 security operations at the Kennedy Space Center
3 and Cape Canaveral Air Force Station to enhance
4 the overall capabilities of the Eastern Range and to
5 reduce the long-term cost of operations and mainte-
6 nance.

7 (2) Measures to provide multivehicle support,
8 improvements in payload processing, and partnering
9 at the Kennedy Space Center and Cape Canaveral
10 Air Force Station.

11 (3) Measures to support the restructured explo-
12 ration program.

13 (4) Such other measures related to launch sup-
14 port and infrastructure modernization at the Ken-
15 nedy Space Center as the Administrator may con-
16 sider appropriate to carry out NASA's launch oper-
17 ations.

18 (b) REPORT ON THE 21ST CENTURY SPACE LAUNCH
19 COMPLEX INITIATIVE.—

20 (1) REPORT REQUIRED.—Not later than 60
21 days after the date of enactment of this Act, the Ad-
22 ministrator shall submit to the appropriate commit-
23 tees of the Congress a report on the plan for the im-
24 plementation of the 21st Century Space Launch
25 Complex Initiative.

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4

1 (2) ELEMENTS.—The report required by this
2 subsection shall include—

3 (A) a description of those initiatives tied to
4 the restructured exploration program;

5 (B) a description of proposed initiatives in-
6 tended to be conducted jointly or in cooperation
7 with Cape Canaveral Air Force Station, Flor-
8 ida, or other installations or components of the
9 United States Government; and

10 (C) a timetable for carrying out activities
11 and initiatives planned for the 21st Century
12 Space Launch Complex Initiative.

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AMENDMENT**OFFERED BY MS. KOSMAS OF FLORIDA**

Page 31, line 21, strike “The Administrator” and insert “(a) IN GENERAL.—The Administrator”.

Page 32, after line 3, insert the following:

- 1 (b) VEHICLE AND COMPONENT REVIEW.—
2 (1) IN GENERAL.—In carrying out subsection
3 (a), the Administrator shall—
4 (A) conduct an in-depth assessment of all
5 essential modules, operational systems and com-
6 ponents, structural elements, and permanent
7 scientific equipment on board or planned for de-
8 livery and installation aboard the ISS, including
9 both United States and international partner
10 elements, to determine anticipated spare or re-
11 placement requirements to ensure complete, ef-
12 fective, and safe function and full scientific uti-
13 lization of the ISS; and
14 (B) provide the completed assessment to
15 the Congress within 90 days after the date of
16 enactment of this Act.

1 (2) REQUIREMENTS OF ASSESSMENT.—The re-
2 sults of the required assessment shall include, at
3 minimum, the following:

4 (A) The identification of spare or replace-
5 ment elements and parts currently produced, in
6 inventory, or on order, and the state of readi-
7 ness and schedule for delivery to the ISS, in-
8 cluding the planned transportation means for
9 such delivery. Each element identified shall in-
10 clude a description of its location, function,
11 criticality for system integrity, and specifica-
12 tions regarding size, weight, and necessary con-
13 figuration for launch and delivery.

14 (B) The identification of anticipated re-
15 quirements for spare or replacement elements
16 not currently in inventory or on order, a de-
17 scription of their location, function, criticality
18 for system integrity, the anticipated cost and
19 schedule for design, procurement, manufacture
20 and delivery, and specifications regarding size,
21 weight, and necessary configuration for launch
22 and delivery, including available launch vehicles
23 capable of transportation of such items to the
24 ISS.

1 (C) The identification of spare or replace-
2 ment parts existing or planned that due to size,
3 weight, and launch configuration can only be
4 carried to the ISS by the Space Shuttle.

5 (3) COMPTROLLER GENERAL.—The Adminis-
6 trator shall enable the Comptroller General to mon-
7 itor and, as appropriate, participate in the assess-
8 ment required by paragraph (1) in such a way as to
9 enable the Comptroller General to provide to the
10 Congress an independent review of the assessment.



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AMENDMENT

OFFERED BY MS. EDWARDS OF MARYLAND

Page 32, beginning on line 4, strike section 212 (and redesignate subsequent sections and conform the table of contents accordingly).

Page 33, beginning on line 21, strike “require” and all that follows through “Administrator” and insert “prepare”.



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AMENDMENT
OFFERED BY MR. SENSENBRENNER OF
WISCONSIN

Page 36, line 3, insert “Before relying on ISS partners to upmass or downmass cargo, the Administrator must certify to Congress that no United States or commercial cargo resupply capabilities are available.” after “Space Shuttle is retired.”.



AMENDMENT**OFFERED BY MS. KOSMAS OF FLORIDA**

Page 43, after line 16, insert the following (and re-designate subsequent provisions and conform the table of contents accordingly):

1 **SEC. 221. CONTINGENT AUTHORIZATION OF ADDITIONAL**
2 **SPACE SHUTTLE MISSION.**

3 (a) SENSE OF THE CONGRESS.—It is the sense of the
4 Congress that it is very important, in view of the extension
5 of the life of the ISS until at least 2020, for the Shuttle
6 fleet to leave the ISS in the best possible configuration
7 for the post-Shuttle era and that NASA should take all
8 necessary steps to ensure the continued viability of the
9 ISS in the event that there are delays in the delivery or
10 inability to deliver critical parts and supplies once the
11 Shuttle is retired.

12 (b) CONTINGENT AUTHORIZATION OF ADDITIONAL
13 SHUTTLE MISSION BEYOND THE PLANNED MANIFEST.—
14 The Administrator is authorized to conduct 1 additional
15 Space Shuttle mission to the ISS beyond the missions con-
16 tained in the flight manifest as of February 1, 2010, if—

17 (1) the Administrator determines that an addi-
18 tional Space Shuttle mission is a useful and nec-

1 essary step to reduce risks to the operation and utili-
2 zation of the ISS that are associated with the retire-
3 ment of the Shuttle fleet; and

4 (2) the conditions in subsection (c) have been
5 met.

6 (c) CONDITIONS.—In order to comply with subsection
7 (b), the Administrator shall determine and certify that all
8 of the following conditions have been met:

9 (1) The importance of conducting the additional
10 Space Shuttle mission to the ISS outweighs the
11 risks associated with conducting a Shuttle mission
12 without a backup Shuttle launch-on-need capability.

13 (2) Any actions resulting from safety inspec-
14 tions and reviews required by NASA's Orbiter Modi-
15 fication Down Period (OMDP) and other safety
16 guidance have been successfully addressed.

17 (3) Workarounds addressing mandatory OMDP
18 requirements, if any, have been identified and the
19 associated risks have been characterized.

20 (4) The Aerospace Safety Advisory Panel has
21 reviewed the safety issues associated with the addi-
22 tional Shuttle mission as well as NASA's plans to
23 mitigate any identified risks.

24 (d) CONTINGENT AUTHORIZATION OF APPROPRIA-
25 TIONS.—In the event that the additional Shuttle flight to

1 the ISS is authorized, funding for the incremental costs
2 associated with the additional mission is authorized as fol-
3 lows from within funds authorized in title I:

4 (1) For fiscal year 2011, \$700,000,000, to be
5 taken in the amounts specified below from within
6 the funding for the following accounts and trans-
7 ferred to the Space Shuttle account:

8 (A) \$175,000,000 from the International
9 Space Station account, except that at least
10 \$50,000,000 shall remain available for funda-
11 mental and applied space life and physical
12 science and technology research.

13 (B) \$525,000,000 from the Restructured
14 Exploration Program account.

15 (2) For Fiscal Year 2012, \$200,000,000, to be
16 taken from within the funding for the International
17 Space Station account and transferred to the Space
18 Shuttle account, except that at least \$50,000,000
19 shall remain available for fundamental and applied
20 space life and physical science and technology re-
21 search.



AMENDMENT**OFFERED BY MR. OLSON OF TEXAS**

Page 43, after line 16, insert the following new section (and make the necessary conforming changes):

1 SEC. 221. LAUNCH-ON-NEED SHUTTLE MISSION.

2 (a) IN GENERAL.—The Administrator shall fly the
3 Launch-on-Need Shuttle mission currently designated in
4 the Shuttle Flight Manifest dated February 28, 2010, to
5 the ISS in fiscal year 2011, but no later than June 1,
6 2011, unless required earlier by an operations contin-
7 gency, if the Administrator determines that the mission
8 is necessary to ensure the crew safety and viability of the
9 ISS, and if the Shuttle mission can be flown safely.

10 (b) FUNDING.—If the Administrator determines that
11 such mission is necessary and can be flown safely, funds
12 to carry out such mission shall be reallocated to such mis-
13 sion as follows:

14 (1) For fiscal year 2011—

15 (A) \$500,000,000 shall be reallocated from
16 section 101(1)(A);

17 (B) \$100,000,000 shall be reallocated from
18 section 101(4)(E);

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1 (C) \$60,000,000 shall be reallocated from
2 section 101(5)(C); and

3 (D) \$40,000,000 shall be reallocated from
4 the 21st Century Launch Complex Initiative
5 under section 101(5)(D).

6 (2) For fiscal year 2012, \$200,000,000 shall be
7 reallocated from section 102(1)(A).



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AMENDMENT

OFFERED BY MR. WU OF OREGON

Page 45, line 18, insert “that takes into account geographical diversity,” after “competitive procedure”.



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AMENDMENT

OFFERED BY MR. WILSON OF OHIO AND MS.

FUDGE OF OHIO And Mr. Wu of Oregon

Page 46, lines 3 and 4, strike "either the launch,
flight operations, or processing of".



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AMENDMENT

OFFERED BY MR. GRAYSON OF FLORIDA

Page 47, after line 8, insert the following new section:

1 **SEC. 232. HUMAN SPACE FLIGHT LAUNCHES.**

2 No funds shall be provided by the Administrator for
3 human space flight activities unless the associated launch
4 takes place at the Kennedy Space Center.



AMENDMENT
OFFERED BY MS. FUDGE OF OHIO AND MR.
WILSON OF OHIO

Page 55, after line 12, insert the following new subsection (and redesignate the subsequent subsections accordingly and make the necessary cross reference corrections):

1 (a) MARKET STUDY.—The Administrator shall enter
2 into an arrangement with the National Academies under
3 which the National Academies shall submit to Congress,
4 not later than 6 months after the date of enactment of
5 this Act, a report with details on the feasibility of a com-
6 mercial space market. Such report shall consider demand
7 for a commercial market transporting humans into space,
8 sustainability of a commercial market transporting hu-
9 mans into space, and the overall feasibility of a commer-
10 cial human spaceflight sector. If this study concludes that
11 market demand is insufficient to support a viable commer-
12 cial human spaceflight industry, funds otherwise allocated
13 for carrying out this section shall be reallocated to fund
14 an Enabling Technology Development and Demonstration
15 program.



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AMENDMENT

OFFERED BY MR. GRAYSON OF FLORIDA

Page 25, beginning on line 15, strike “If” and all that follows through “rescue services.” on line 24.

Page 47, strike lines 13 through 20 and make necessary conforming changes.

Page 48, strike lines 5 through 21 and redesignate subsequent provisions accordingly.

Page 50, beginning on line 9, strike “NASA” and all that follows through “phases.” on line 12.



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AMENDMENT

OFFERED BY MR. MATHESON OF UTAH

Page 60, after line 10, insert the following new subtitle:

1 **Subtitle F—General Provisions**

2 **SEC. 251. USE OF PROGRAM FUNDS.**

3 For all programs authorized under this title, author-
4 ized funds may be obligated only for performance of the
5 programs.



AMENDMENT**OFFERED BY MR. ROHRABACHER OF CALIFORNIA**

At the end of title II, add the following (and conform the table of contents accordingly):

Subtitle F—China**2 SEC. 251. REPORT ON TECHNOLOGY-RELATED LAWS.**

3 (a) IN GENERAL.—Not later than 1 year after the
4 date of enactment of this Act, the Administrator shall con-
5 duct a review and transmit to the Congress a report re-
6 garding any technology-related laws that prevent space co-
7 operation with the People’s Republic of China.

8 (b) SPECIFIC REQUIREMENTS.—The review under
9 subsection (a) shall include an examination of—

10 (1) the laws that would be implicated for
11 Shenzhou to dock with the ISS and whether those
12 laws would need to be amended; and

13 (2) the level of technology transparency re-
14 quired for a country to join the ISS as a full cooper-
15 ating member.

16 SEC. 252. REPORT ON SHENZHOU.

17 (a) IN GENERAL.—Not later than 1 year after the
18 date of enactment of this Act, the Administrator shall con-

1 duct a review and transmit to the Congress a report re-
2 garding the Shenzhou spacecraft.

3 (b) SPECIFIC REQUIREMENTS.—The review under
4 subsection (a) shall include an examination of—

5 (1) the military or dual-use capabilities of the
6 Shenzhou spacecraft, technology, and program;

7 (2) the Shenzhou 7 mission in September 2008,
8 including—

9 (A) how the Shenzhou came to pass very
10 close to the ISS; and

11 (B) an assessment of the real and probable
12 dangers that the Shenzhou 7 posed to the ISS
13 during that mission.



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AMENDMENT
OFFERED BY MS. EDDIE BERNICE JOHNSON OF
TEXAS

Page 72, line 3, insert “The Administrator shall transmit such plan to Congress not later than 1 year after the date of enactment of this Act.” after “test facilities.”.



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AMENDMENT

OFFERED BY MR. WILSON OF OHIO

Page 75, line 9, insert “and students in rural schools” after “minority students”.



AMENDMENT
OFFERED BY MS. FUDGE OF OHIO AND MR.
WILSON OF OHIO

Page 73, line 2, strike “; and” and insert a semi-colon.

Page 73, line 7, strike the period and insert “; and”.

Page 73, after line 7, insert the following new paragraph:

- 1 (4) research, development, and demonstration
- 2 of enabling technologies in support of future explo-
- 3 ration missions.



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AMENDMENT**OFFERED BY MR. LUJÁN OF NEW MEXICO**

Page 77, lines 2 through 4, strike “(as defined” and all that follows through “1001(a))” and insert “, with special consideration for minority serving institutions”.

Page 79, line 23, through page 80, line 4, amend subsection (e) to read as follows:

1 (e) OUTREACH TO STUDENTS FROM UNDERREP-
2 RESENTED GROUPS.—The Administrator shall seek to en-
3 sure that program participants include minority and
4 underrepresented groups, including students from a high-
5 need local education agency as defined in 2102(2) of the
6 Elementary and Secondary Education Act of 1965 (20
7 U.S.C. 6602(3)).



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AMENDMENT
OFFERED BY MS. EDDIE BERNICE JOHNSON OF
TEXAS

Page 80, line 11, insert “, and recruit minorities that are underrepresented in STEM teaching” after “education and training”.



AMENDMENT
OFFERED BY MS. EDWARDS OF MARYLAND

Page 83, after line 3, insert the following new section:

1 **SEC. 604. HANDS-ON SPACE SCIENCE AND ENGINEERING**
2 **EDUCATION AND TRAINING.**

3 (a) PILOT PROJECTS.—

4 (1) IN GENERAL.—Not later than 180 days
5 after the date of enactment of this Act, the Adminis-
6 trator shall competitively select pilot projects that
7 test and demonstrate new forms of collaborative and
8 hands-on education and training projects related to
9 aeronautics, exploration, science, space operations,
10 and human spaceflight, that serve to stimulate and
11 engage students in science and engineering, and that
12 foster skills including engineering, teamwork, project
13 management, and problem solving. In particular, the
14 pilot projects shall emphasize engineering and tech-
15 nology-related education and training. The pilot
16 projects shall include a breadth of activities that
17 range in scope and complexity and shall also test
18 and demonstrate selection, evaluation, mentoring,
19 and related tools and services required to support

1 the projects. The program shall be directed at serv-
2 ing undergraduates. The Administrator may include
3 broader participation from pre-collegiate and grad-
4 uate students, as appropriate. To the extent prac-
5 ticable, the initiative shall also be accessible to
6 NASA's young science, technical, and project man-
7 agement professionals.

8 (2) PROJECTS.—Pursuant to subsection (b),
9 the pilot projects shall be carried out through com-
10 petitive solicitations. The duration of a project
11 awarded under the pilot program shall be no more
12 than 4 years. The pilot projects program shall—

13 (A) include a range of projects of varying
14 scope and complexity;

15 (B) provide participants with experience in
16 areas such as—

17 (i) formulating, planning, designing,
18 developing, testing and integrating, and
19 operating mission or flight hardware;

20 (ii) systems engineering;

21 (iii) analyzing data from a mission or
22 investigation; and

23 (iv) documentation, reporting, and re-
24 views;

1 (C) include defined and measurable objec-
2 tives;

3 (D) provide mentoring for participants;

4 (E) provide for evaluation of the project
5 and documentation of the outcomes of the
6 project and its contribution to education and
7 training; and

8 (F) encourage outreach to and partner-
9 ships with universities, Federal agencies, pri-
10 vate entities, and other institutions involved in
11 student collaborations and hands-on training
12 and education, including organizations that
13 focus on engaging young girls in science and
14 engineering hands-on education and training
15 activities.

16 (3) EMPHASIS ON PARTICIPATION OF INDIVID-
17 UALS FROM UNDERREPRESENTED MINORITY POPU-
18 LATIONS.—The Administrator shall make it an em-
19 phasis of the pilot projects to seek the involvement
20 of participants from underserved and underrep-
21 resented minority populations.

22 (4) FLIGHT OPPORTUNITIES AND ACCESS TO
23 SPACE.—The Administrator shall ensure, to the ex-
24 tent practicable, the availability and accessibility of

1 platforms for flying and launching into space stu-
2 dent's collaborative and hands-on projects.

3 (5) FORUM FOR PARTICIPANT PRESEN-
4 TATIONS.—The Administrator shall organize a
5 forum for students and other participants in the
6 pilot projects to discuss and present their work, at
7 an appropriate stage of the project, and to engage
8 with other students and young professionals involved
9 in ongoing collaborative and hands-on training ac-
10 tivities related to space science and engineering, aer-
11 onautics, space exploration, and human spaceflight.

12 (6) WORKSHOP.—The Administrator shall orga-
13 nize a workshop or workshops involving the competi-
14 tively-selected pilot project teams for the purposes of
15 collecting information on the results of the pilot
16 projects (including on selection, evaluation tools and
17 mentoring services) and identifying lessons learned
18 and best practices for NASA-supported collaborative
19 and hands-on education and training projects.

20 (7) REPORT AND STRATEGY.—Not later than 3
21 years after the date of enactment of this Act, the
22 Administrator shall transmit to the Committee on
23 Science and Technology of the House of Representa-
24 tives and the Committee on Commerce, Science, and
25 Transportation of the Senate a report—

1 (A) on the outcomes of existing student
2 collaborative and hands-on projects such as
3 those being conducted as part of NASA's
4 science programs;

5 (B) on the results of the pilot projects; and

6 (C) on best practices of NASA's student
7 collaborations and hands-on education and
8 training activities.

9 The report shall define decision criteria, a strategy,
10 and a process for extending successful projects or
11 transitioning them into an ongoing, competitive pro-
12 gram.

13 (b) INFORMATION EXCHANGE.—The Administrator
14 shall support mission directorates sponsoring student col-
15 laborative and hands-on education and training projects
16 in exchanging information, sharing knowledge, and
17 leveraging activities, as appropriate.

18 (c) AUTHORIZATION OF APPROPRIATIONS.—There
19 are authorized to be appropriated to the Administrator
20 such sums as may be necessary for fiscal years 2011,
21 2012, 2013, and 2014 to carry out this section, to remain
22 available until expended.



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AMENDMENT
OFFERED BY MS. FUDGE OF OHIO AND MR.
WILSON OF OHIO

Page 83, after line 17, insert the following new subparagraph:

1 (C) OTHER CONSIDERATIONS.—The strat-
2 egy shall also include an assessment of modi-
3 fications needed to maximize usage of facilities
4 that offer unique and highly specialized benefits
5 to the aerospace industry and the American
6 public.

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AMENDMENT**OFFERED BY MR. ROHRABACHER OF CALIFORNIA**

Page 98, after line 12, insert the following new subsection (and redesignate the subsequent subsections accordingly):

1 (c) REAFFIRMATION OF POLICY WITH RESPECT TO
2 THREATS POSED BY NEAR-EARTH OBJECTS.—The Con-
3 gress reaffirms the direction set forth in section 804 of
4 the National Aeronautics and Space Administration Au-
5 thorization Act of 2008 (42 U.S.C. 17794) that directed
6 the Director of the Office of Science and Technology Pol-
7 icy by October 15, 2010, to—

8 (1) develop a policy for notifying Federal agen-
9 cies and relevant emergency response institutions of
10 an impending near-Earth object threat, if near-term
11 public safety is at risk; and

12 (2) recommend a Federal agency or agencies to
13 be responsible for—

14 (A) protecting the United States from a
15 near-Earth object that is expected to collide
16 with Earth; and

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1 (B) implementing a deflection campaign, in
2 consultation with international bodies, should
3 one be necessary.



AMENDMENT**OFFERED BY MR. ROHRABACHER OF CALIFORNIA**

Page 98, after line 12, insert the following new subsection (and redesignate the subsequent subsections accordingly):

1 (c) ARECIBO OBSERVATORY.—Congress reiterates its
2 support for the use of the Arecibo Observatory for NASA-
3 funded near-Earth object-related activities. The Adminis-
4 trator shall coordinate with the Director of the National
5 Science Foundation to ensure the availability of the Arecibo
6 Observatory’s planetary radar to support these activities.
7 ties.



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AMENDMENT**OFFERED BY MR. ROHRABACHER OF CALIFORNIA**

At the end of the bill, add the following new section
(and conform the table of contents accordingly):

1 SEC. 910. PROHIBITION ON CONTACT WITH CHINA.

2 The Administrator shall prohibit any exchange or
3 contact between NASA programs or personnel, including
4 contractors, with representatives of the People's Republic
5 of China or any entity who is headquartered in the Peo-
6 ple's Republic of China.



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AMENDMENT

OFFERED BY MS. EDWARDS OF MARYLAND

At the end of the bill, add the following new section:

1 **SEC. 910. REDUCTION-IN-FORCE MORATORIUM.**

2 Section 1108 of the National Aeronautics and Space
3 Administration Authorization Act of 2008 (122 Stat.
4 4810) is amended by striking “December 31, 2010” and
5 inserting “December 31, 2015”.



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AMENDMENT**OFFERED BY** McClain

At the end of the bill, add the following new section:

1 SEC. 910. SENSE OF CONGRESS.

2 It is the sense of Congress that NASA shall endeavor
3 to carry out, to the extent feasible and technologically pos-
4 sible, the top recommendation from the decadal survey in
5 each mission area.



AMENDMENT**OFFERED BY MR. SENSENBRENNER OF WIS-
CONSIN AND MR. MILLER OF NORTH CARO-
LINA**

At the end of the bill, add the following new section:

1 **SEC. 910. ETHICS PROGRAMS IN THE OFFICE OF GENERAL**
2 **COUNSEL.**

3 (a) REAFFIRMATION OF RESPONSIBILITIES OF
4 COUNSEL.—The legal staff of the Office of General Coun-
5 sel of NASA is reminded that as Government attorneys
6 they have a special obligation to instruct NASA staff to
7 comply with applicable Federal law and regulations.

8 (b) BIENNIAL ETHICS TRAINING FOR COUNSEL.—All
9 NASA counsel shall be required to receive ethics training
10 in the legal obligations of Government attorneys on a bien-
11 nial basis.

12 (c) CERTIFICATION OF TRAINING.—Certification of
13 participation in such a program shall be included in each
14 counsel's personnel record.

15 (d) DESIGNATED ETHICS OFFICER.—The General
16 Counsel of NASA may not serve as NASA's designated
17 ethics officer.



AMENDMENT ^{H.R.} TO 5781

OFFERED BY MR. PETERS OF MICHIGAN

Page 31, after line 17, insert the following:

(d) RADIATION RESEARCH ON NON-HUMAN PRIMATES. —

(1) IN GENERAL.— The Administrator shall transmit to the Congress not later than 12 months after the date of enactment of this Act a report on prior radiation research on non-human primates and the justification and rationale for any additional research involving non-human primates.

(2) CONSULTATION.—In preparing the report, the Administrator shall consult with other Government agencies that have previously conducted radiation research on non-human primates.