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REPORT
110–702

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT OF 2008

JUNE 9, 2008.—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

[To accompany H.R. 6063]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to whom was referred the bill (H.R. 6063) 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. AMENDMENT

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 2008".

(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 FOR FISCAL YEAR 2009

Sec. 101. Fiscal year 2009.

TITLE II—EARTH SCIENCE

Sec. 201. Goal.
Sec. 202. Governance of United States Earth observations activities.
Sec. 203. Decadal survey missions.
Sec. 204. Transitioning experimental research into operational services.
Sec. 205. Landsat thermal infrared data continuity.
Sec. 206. Reauthorization of Glory Mission.
Sec. 207. Plan for disposition of Deep Space Climate Observatory.

TITLE III—AERONAUTICS

Sec. 301. Environmentally friendly aircraft research and development initiative.
Sec. 302. Research alignment.
Sec. 303. Research program to determine perceived impact of sonic booms.
Sec. 304. External review of NASA's aviation safety-related research programs.
Sec. 305. Interagency research initiative on the impact of aviation on the climate.
Sec. 306. Research program on design for certification.
Sec. 307. Aviation weather research.
Sec. 308. Joint Aeronautics Research and Development Advisory Committee.
Sec. 309. Funding for research and development activities in support of other mission directorates.
Sec. 310. University-based centers for research on aviation training.

TITLE IV—INTERNATIONAL EXPLORATION INITIATIVE

Sec. 401. Sense of Congress.
Sec. 402. Stepping stone approach to exploration.
Sec. 403. Lunar outpost.
Sec. 404. Exploration technology development.
Sec. 405. Exploration risk mitigation plan.
Sec. 406. Exploration crew rescue.
Sec. 407. Participatory exploration.
Sec. 408. Science and exploration.

TITLE V—SPACE SCIENCE

Sec. 501. Technology development.
Sec. 502. Provision for future servicing of observatory-class scientific spacecraft.
Sec. 503. Mars exploration.
Sec. 504. Importance of a balanced science program.
Sec. 505. Restoration of radioisotope thermoelectric generator material production.
Sec. 506. Assessment of impediments to interagency cooperation on space and Earth science missions.
Sec. 507. Assessment of cost growth.
Sec. 508. Outer planets exploration.

TITLE VI—SPACE OPERATIONS

Subtitle A—International Space Station

Sec. 601. Utilization.
Sec. 602. Research management plan.
Sec. 603. Contingency plan for cargo resupply.

Subtitle B—Space Shuttle

Sec. 611. Flight manifest.
Sec. 612. Disposition of shuttle-related assets.
Sec. 613. Space Shuttle transition liaison office.

Subtitle C—Launch Services

Sec. 621. Launch services strategy.

TITLE VII—EDUCATION

Sec. 701. Response to review.
Sec. 702. External review of Explorer Schools program.

TITLE VIII—NEAR-EARTH OBJECTS

Sec. 801. In general.

Sec. 802. Findings.
Sec. 803. Requests for information.
Sec. 804. Establishment of policy.
Sec. 805. Planetary radar capability.
Sec. 806. Arecibo Observatory.

TITLE IX—COMMERCIAL INITIATIVES

Sec. 901. Sense of Congress.
Sec. 902. Commercial crew initiative.

TITLE X—REVITALIZATION OF NASA INSTITUTIONAL CAPABILITIES

Sec. 1001. Review of information security controls.
Sec. 1002. Maintenance and upgrade of Center facilities.
Sec. 1003. Assessment of NASA laboratory capabilities.

TITLE XI—OTHER PROVISIONS

Sec. 1101. Space weather.
Sec. 1102. Space traffic management.
Sec. 1103. Study of export control policies related to civil and commercial space activities.
Sec. 1104. Astronaut health care.
Sec. 1105. National Academies decadal surveys.
Sec. 1106. Innovation prizes.
Sec. 1107. Commercial space launch range study.
Sec. 1108. NASA outreach and technology assistance program.

SEC. 2. FINDINGS.

The Congress finds, on this, the 50th anniversary of the establishment of the National Aeronautics and Space Administration, 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) Investment in NASA's programs will promote innovation through research and development, and will improve the competitiveness of the United States.

(3) Investment in NASA's programs, like investments in other Federal science and technology activities, is an investment in our future.

(4) Properly structured, NASA's activities can contribute to an improved quality of life, economic vitality, United States leadership in peaceful cooperation with other nations on challenging undertakings in science and technology, national security, and the advancement of knowledge.

(5) NASA should assume a leadership role in a cooperative international Earth observations and research effort to address key research issues associated with climate change and its impacts on the Earth system.

(6) NASA should undertake a program of aeronautical research, development, and where appropriate demonstration activities with the overarching goals of—

(A) ensuring that the Nation's future air transportation system can handle up to 3 times the current travel demand and incorporate new vehicle types with no degradation in safety or adverse environmental impact on local communities;

(B) protecting the environment;

(C) promoting the security of the Nation; and

(D) retaining the leadership of the United States in global aviation.

(7) Human and robotic exploration of the solar system will be a significant long term 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.

(8) Developing United States human space flight capabilities to allow independent American access to the International Space Station, and to explore beyond low Earth orbit, is a strategically important national imperative, and all prudent steps should thus be taken to bring the Orion Crew Exploration Vehicle and Ares I Crew Launch Vehicle to full operational capability as soon as practicable.

(9) NASA's scientific research activities have contributed much to the advancement of knowledge, provided societal benefits, and helped train the next generation of scientists and engineers, and those activities should continue to be an important priority.

(10) NASA should make a sustained commitment to a robust long-term technology development activity. Such investments represent the critically important "seed corn" on which NASA's ability to carry out challenging and productive missions in the future will depend.

(11) NASA, through its pursuit of challenging and relevant activities, can provide an important stimulus to the next generation to pursue careers in science, technology, engineering, and mathematics.

(12) Commercial activities have substantially contributed to the strength of both the United States space program and the national economy, and the devel-

opment of a healthy and robust United States commercial space sector should continue to be encouraged.

(13) 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 market place and the United States to undertake cooperative programs in science and human space flight in an effective and efficient manner.

SEC. 3. DEFINITIONS.

In this Act:

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

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

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

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

TITLE I—AUTHORIZATION OF APPROPRIATIONS FOR FISCAL YEAR 2009

SEC. 101. FISCAL YEAR 2009.

(a) BASELINE AUTHORIZATION.—There are authorized to be appropriated to NASA for fiscal year 2009 $19,210,000,000, as follows:

(1) For Science, $4,932,200,000, of which—

(A) $1,518,000,000 shall be for Earth Science, including $29,200,000 for Suborbital activities and $2,500,000 for carrying out section 313 of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155);

(B) $1,483,000,000 shall be for Planetary Science, including $486,500,000 for the Mars Exploration program, $2,000,000 to continue planetary radar operations at the Arecibo Observatory in support of the Near-Earth Object program, and $5,000,000 for radioisotope material production, to remain available until expended;

(C) $1,290,400,000 shall be for Astrophysics, including $27,300,000 for Suborbital activities;

(D) $640,800,000 shall be for Heliophysics, including $50,000,000 for Suborbital activities; and

(E) $75,000,000 shall be for Cross-Science Mission Directorate Technology Development, to be taken on a proportional basis from the funding subtotals under subparagraphs (A), (B), (C), and (D).

(2) For Aeronautics, $853,400,000, of which $406,900,000 shall be for system-level research, development, and demonstration activities related to—

(A) aviation safety;

(B) environmental impact mitigation, including noise, energy efficiency, and emissions;

(C) support of the Next Generation Air Transportation System initiative; and

(D) investigation of new vehicle concepts and flight regimes.

(3) For Exploration, $3,886,000,000, of which $100,000,000 shall be for the activities under sections 902(b) and 902(d); and $737,800,000 shall be for Advanced Capabilities, including $106,300,000 for the Lunar Precursor Robotic Program, $276,500,000 for International Space Station-related research and development activities, and $355,000,000 for research and development activities not related to the International Space Station.

(4) For Education, $128,300,000.

(5) For Space Operations, $6,074,700,000, of which—

(A) $150,000,000 shall be for an additional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer to the International Space Station;

(B) $100,000,000 shall be to augment funding for International Space Station Cargo Services to enhance research utilization of the International Space Station, to remain available until expended; and

(C) $50,000,000 shall be to augment funding for Space Operations Mission Directorate reserves and Shuttle Transition and Retirement activities.

(6) For Cross-Agency Support Programs, $3,299,900,000.

(7) For Inspector General, $35,500,000.

(b) ADDITIONAL AUTHORIZATION TO ADDRESS HUMAN SPACE FLIGHT GAP.—In addition to the sums authorized by subsection (a), there are authorized to be appropriated for the purposes described in subsection (a)(3) $1,000,000,000 for fiscal year 2009, to be used to accelerate the initial operational capability of the Orion Crew Exploration Vehicle and the Ares I Crew Launch Vehicle and associated ground support systems, to remain available until expended.

TITLE II—EARTH SCIENCE

SEC. 201. GOAL.

The goal for NASA's Earth Science program shall be to pursue a program of Earth observations, research, and applications activities to better understand the Earth, how it supports life, and how human activities affect its ability to do so in the future. In pursuit of this goal, NASA's Earth Science program shall ensure that securing practical benefits for society will be an important measure of its success in addition to securing new knowledge about the Earth system and climate change. In further pursuit of this goal, NASA shall assume a leadership role in developing and carrying out a cooperative international Earth observations-based research and applications program.

SEC. 202. GOVERNANCE OF UNITED STATES EARTH OBSERVATIONS ACTIVITIES.

(a) STUDY.—The Director of the OSTP shall enter into an arrangement with the National Academies for a study to determine the most appropriate governance structure for United States Earth Observations programs in order to meet evolving United States Earth information needs and facilitate United States participation in global Earth Observations initiatives.

(b) REPORT.—The Director shall transmit the study to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 18 months after the date of enactment of this Act, and shall provide OSTP's plan for implementing the study's recommendations not later than 24 months after the date of enactment of this Act.

SEC. 203. DECADAL SURVEY MISSIONS.

(a) IN GENERAL.—The missions recommended in the National Academies' decadal survey "Earth Science and Applications from Space" provide the basis for a compelling and relevant program of research and applications, and the Administrator should work to establish an international cooperative effort to pursue those missions.

(b) PLAN.—The Administrator shall prepare a plan for submission to Congress not later than 270 days after the date of enactment of this Act that shall describe how NASA intends to implement the missions recommended as described in subsection (a), whether by means of dedicated NASA missions, multi-agency missions, international cooperative missions, data sharing, or commercial data buys, or by means of long-term technology development to determine whether specific missions would be executable at a reasonable cost and within a reasonable schedule.

SEC. 204. TRANSITIONING EXPERIMENTAL RESEARCH INTO OPERATIONAL SERVICES.

(a) SENSE OF CONGRESS.—It is the sense of the Congress that experimental NASA sensors and missions that have the potential to benefit society if transitioned into operational monitoring systems be transitioned into operational status whenever possible.

(b) INTERAGENCY PROCESS.—The Director of OSTP, in consultation with the Administrator, the Administrator of NOAA, and other relevant stakeholders, shall develop a process to transition, when appropriate, NASA Earth science and space weather missions or sensors into operational status. The process shall include coordination of annual agency budget requests as required to execute the transitions.

(c) RESPONSIBLE AGENCY OFFICIAL.—The Administrator and the Administrator of NOAA shall each designate an agency official who shall have the responsibility for and authority to lead NASA's and NOAA's transition activities and interagency coordination.

(d) PLAN.—For each mission or sensor that is determined to be appropriate for transition under subsection (b), NASA and NOAA shall transmit to Congress a joint plan for conducting the transition. The plan shall include the strategy, milestones, and budget required to execute the transition. The transition plan shall be transmitted to Congress not later than 60 days after the successful completion of the mission or sensor critical design review.

SEC. 205. LANDSAT THERMAL INFRARED DATA CONTINUITY.

(a) PLAN.—In view of the importance of Landsat thermal infrared data for both scientific research and water management applications, the Administrator shall prepare a plan for ensuring the continuity of Landsat thermal infrared data or its equivalent, including allocation of costs and responsibility for the collection and distribution of the data, and a budget plan. As part of the plan, the Administrator shall provide an option for developing a thermal infrared sensor at minimum cost to be flown on the Landsat Data Continuity Mission with minimum delay to the schedule of the Landsat Data Continuity Mission.

(b) DEADLINE.—The plan shall be provided to Congress not later than 60 days after the date of enactment of this Act.

SEC. 206. REAUTHORIZATION OF GLORY MISSION.

(a) REAUTHORIZATION.—Congress reauthorizes NASA to continue with development of the Glory Mission, which will examine how aerosols and solar energy affect the Earth's climate.

(b) BASELINE REPORT.—Pursuant to the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155), not later than 90 days after the date of enactment of this Act, the Administrator shall transmit a new baseline report consistent with section 103(b)(2) of such Act. The report shall include an analysis of the factors contributing to cost growth and the steps taken to address them.

SEC. 207. PLAN FOR DISPOSITION OF DEEP SPACE CLIMATE OBSERVATORY.

(a) PLAN.—NASA shall develop a plan for the Deep Space Climate Observatory (DSCOVR), including such options as using the parts of the spacecraft in the development and assembly of other science missions, transferring the spacecraft to another agency, reconfiguring the spacecraft for another Earth science mission, establishing a public-private partnership for the mission, and entering into an international cooperative partnership to use the spacecraft for its primary or other purposes. The plan shall include an estimate of budgetary resources and schedules required to implement each of the options.

(b) CONSULTATION.—NASA shall consult, as necessary, with other Federal agencies, industry, academic institutions, and international space agencies in developing the plan.

(c) REPORT.—The Administrator shall transmit the plan required under subsection (a) to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 180 days after the date of enactment of this Act.

TITLE III—AERONAUTICS

SEC. 301. ENVIRONMENTALLY FRIENDLY AIRCRAFT RESEARCH AND DEVELOPMENT INITIATIVE.

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) Noise levels on takeoff and on airport approach and landing that do not exceed ambient noise levels in the absence of flight operations in the vicinity of airports from which such commercial aircraft would normally operate, without increasing energy consumption or nitrogen oxide emissions compared to aircraft in commercial service as of the date of enactment of this Act.

(2) Significant reductions in greenhouse gas emissions compared to aircraft in commercial services as of the date of enactment of this Act.

SEC. 302. RESEARCH ALIGNMENT.

In addition to pursuing the research and development initiative described in section 301, the Administrator shall, to the maximum extent practicable within available funding, align the fundamental aeronautics research program to address high priority technology challenges of the National Academies' Decadal Survey of Civil Aeronautics, and shall work to increase the degree of involvement of external organizations, and especially of universities, in the fundamental aeronautics research program.

SEC. 303. RESEARCH PROGRAM TO DETERMINE PERCEIVED IMPACT OF SONIC BOOMS.

(a) IN GENERAL.—The ability to fly commercial aircraft over land at supersonic speeds without adverse impacts on the environment or on local communities would open new markets and enable new transportation capabilities. In order to have the

basis for establishing an appropriate sonic boom standard for such flight operations, a research program is needed to assess the impact in a relevant environment of commercial supersonic flight operations.

(b) ESTABLISHMENT.—The Administrator shall establish a cooperative research program with industry, including the conduct of flight demonstrations in a relevant environment, to collect data on the perceived impact of sonic booms that would enable the promulgation of a standard that would have to be met for overland commercial supersonic flight operations.

SEC. 304. EXTERNAL REVIEW OF NASA'S AVIATION SAFETY-RELATED RESEARCH PROGRAMS.

(a) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for an independent review of NASA's aviation safety-related research programs. The review shall assess whether—

(1) the programs have well-defined, prioritized, and appropriate research objectives;

(2) the programs are properly coordinated with the safety research programs of the Federal Aviation Administration and other relevant Federal agencies;

(3) the programs have allocated appropriate resources to each of the research objectives; and

(4) suitable mechanisms exist for transitioning the research results from the programs into operational technologies and procedures and certification activities in a timely manner.

(b) REPORT.—Not later than 14 months after the date of enactment of this Act, the Administrator shall submit 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 on the results of the review.

SEC. 305. INTERAGENCY RESEARCH INITIATIVE ON THE IMPACT OF AVIATION ON THE CLIMATE.

(a) IN GENERAL.—The Administrator, in coordination with the United States Climate Change Science Program and other appropriate agencies, shall establish a research initiative to assess the impact of aviation on the climate and, if warranted, to evaluate approaches to mitigate that impact.

(b) RESEARCH PLAN.—Not later than 1 year after the date of enactment of this Act, the participating Federal entities shall jointly develop a plan for the research initiative that contains objectives, proposed tasks, milestones, and a 5-year budgetary profile.

(c) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for conducting an independent review of the interagency research program plan, and shall provide the results of that review to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 2 years after the date of enactment of this Act.

SEC. 306. RESEARCH PROGRAM ON DESIGN FOR CERTIFICATION.

(a) PROGRAM.—Not later than 6 months after the date of enactment of this Act, NASA, in consultation with other appropriate agencies, shall establish a research program on methods to improve both confidence in and the timeliness of certification of new technologies for their introduction into the national airspace system.

(b) RESEARCH PLAN.—Not later than 1 year after the date of enactment of this Act, as part of the activity described in subsection (a), NASA shall develop a plan for the research program that contains objectives, proposed tasks, milestones, and a 5-year budgetary profile.

(c) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for conducting an independent review of the research program plan, and shall provide the results of that review to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 2 years after the date of enactment of this Act.

SEC. 307. AVIATION WEATHER RESEARCH.

The Administrator shall establish a program of collaborative research with NOAA on convective weather events, with the goal of significantly improving the reliability of 2-hour to 6-hour aviation weather forecasts.

SEC. 308. JOINT AERONAUTICS RESEARCH AND DEVELOPMENT ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—A joint Aeronautics Research and Development Advisory Committee (in this section referred to as the "Advisory Committee") shall be established.

(b) DUTIES.—The Advisory Committee shall—

(1) make recommendations regarding the coordination of research and development activities of NASA and the Federal Aviation Administration;

(2) make recommendations for and monitor development and implementation of processes for transitioning research and development from NASA and the Federal Aviation Administration to external entities for further development as appropriate;

(3) make recommendations regarding the status of the activities of NASA and the Federal Aviation Administration's research and development programs as they relate to the recommendations contained in the National Research Council's 2006 report entitled "Decadal Survey of Civil Aeronautics", and the recommendations contained in subsequent National Research Council reports of a similar nature; and

(4) not later than March 15 of each year, transmit a report to the Administrator, the Administrator of the Federal Aviation Administration, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate on the Advisory Committee's findings and recommendations under paragraphs (1), (2), and (3).

(c) MEMBERSHIP.—The Advisory Committee shall consist of 10 members, none of whom shall be a Federal employee, including—

(1) 5 members selected by the Administrator; and

(2) 5 members selected by the Chair of the Federal Aviation Administration's Research, Engineering, and Development Advisory Committee (REDAC).

(d) SELECTION PROCESS.—Initial selections under subsection (c) shall be made within 3 months after the date of enactment of this Act. Vacancies shall be filled in the same manner as provided in subsection (c).

(e) CHAIRPERSON.—The Advisory Committee shall select a chairperson from among its members.

(f) COORDINATION.—The Advisory Committee shall coordinate with the advisory bodies of other Federal agencies, which may engage in related research activities.

(g) COMPENSATION.—The members of the Advisory Committee shall serve without compensation, but shall receive travel expenses, including per diem in lieu of subsistence, in accordance with sections 5702 and 5703 of title 5, United States Code.

(h) MEETINGS.—The Advisory Committee shall convene, in person or by electronic means, at least 4 times per year.

(i) QUORUM.—A majority of the members serving on the Advisory Committee shall constitute a quorum for purposes of conducting the business of the Advisory Committee.

(j) DURATION.—Section 14 of the Federal Advisory Committee Act shall not apply to the Advisory Committee.

SEC. 309. FUNDING FOR RESEARCH AND DEVELOPMENT ACTIVITIES IN SUPPORT OF OTHER MISSION DIRECTORATES.

Research and development activities performed by the Aeronautics Research Mission Directorate with the primary objective of assisting in the development of a flight project in another Mission Directorate shall be funded by the Mission Directorate seeking assistance.

SEC. 310. UNIVERSITY-BASED CENTERS FOR RESEARCH ON AVIATION TRAINING.

Section 427(a) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155) is amended by striking "may" and inserting "shall".

TITLE IV—INTERNATIONAL EXPLORATION INITIATIVE

SEC. 401. SENSE OF CONGRESS.

It is the sense of Congress that the President of the United States should invite America's friends and allies to participate in a long-term international initiative under the leadership of the United States to expand human and robotic presence into the solar system, including the exploration and utilization of the Moon, near Earth asteroids, Lagrangian points, and eventually Mars and its moons, among other exploration and utilization goals.

SEC. 402. STEPPING STONE APPROACH TO EXPLORATION.

In order to maximize the cost-effectiveness of the long-term exploration and utilization activities of the United States, the Administrator shall take all necessary steps to ensure that activities in its lunar exploration program shall be designed

and implemented in a manner that gives strong consideration to how those activities might also help meet the requirements of future exploration and utilization activities beyond the Moon. The timetable of the lunar phase of the long-term international exploration initiative shall be determined by the availability of funding and agreement on an international cooperative framework for the conduct of the international exploration initiative. However, once an exploration-related project enters its development phase, the Administrator shall seek, to the maximum extent practicable, to complete that project without undue delays.

SEC. 403. LUNAR OUTPOST.

(a) ESTABLISHMENT.—As NASA works toward the establishment of a lunar outpost, NASA shall make no plans that would require a lunar outpost to be occupied to maintain its viability. Any such outpost shall be operable as a human-tended facility capable of remote or autonomous operation for extended periods.

(b) DESIGNATION.—The United States portion of the first human-tended outpost established on the surface of the Moon shall be designated the "Neil A. Armstrong Lunar Outpost".

(c) CONGRESSIONAL INTENT.—It is the intent of Congress that NASA shall make use of commercial services to the maximum extent practicable in support of its lunar outpost activities.

SEC. 404. EXPLORATION TECHNOLOGY DEVELOPMENT.

(a) IN GENERAL.—A robust program of long-term exploration-related technology research and development will be essential for the success and sustainability of any enduring initiative of human and robotic exploration of the solar system.

(b) ESTABLISHMENT.—The Administrator shall establish and maintain a program of long-term exploration-related technology research and development that is not tied to specific flight projects and that has a funding goal of at least 10 percent of the total budget of the Exploration Systems Mission Directorate.

(c) GOALS.—The long-term technology program shall have the goal of having at least 50 percent of the funding allocated to external grants and contracts with universities, research institutions, and industry.

SEC. 405. EXPLORATION RISK MITIGATION PLAN.

(a) PLAN.—The Administrator shall prepare a plan that identifies and prioritizes the human and technical risks that will need to be addressed in carrying out human exploration beyond low Earth orbit and the research and development activities required to address those risks. The plan shall address the role of the International Space Station in exploration risk mitigation and include a detailed description of the specific steps being taken to utilize the International Space Station for that purpose.

(b) REPORT.—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 the plan described in subsection (a) not later than one year after the date of enactment of this Act.

SEC. 406. EXPLORATION CREW RESCUE.

In order to maximize the ability to rescue astronauts whose space vehicles have become disabled, the Administrator shall enter into discussions with the appropriate representatives of spacefaring nations who have or plan to have crew transportation systems capable of orbital flight or flight beyond low Earth orbit for the purpose of agreeing on a common docking system standard.

SEC. 407. PARTICIPATORY EXPLORATION.

(a) IN GENERAL.—The Administrator shall develop a technology plan to enable dissemination of information to the public to allow the public to experience missions to the Moon, Mars, or other bodies within our solar system by leveraging advanced exploration technologies. The plan shall identify opportunities to leverage technologies in NASA's Constellation systems that deliver a rich, multi-media experience to the public, and that facilitate participation by the public, the private sector, nongovernmental organizations, and international partners. Technologies for collecting high-definition video, 3-dimensional images, and scientific data, along with the means to rapidly deliver this content through extended high bandwidth communications networks shall be considered as part of this plan. It shall include a review of high bandwidth radio and laser communications, high-definition video, stereo imagery, 3-dimensional scene cameras, and Internet routers in space, from orbit, and on the lunar surface. The plan shall also consider secondary cargo capability for technology validation and science mission opportunities. In addition, the plan shall identify opportunities to develop and demonstrate these technologies on the International Space Station and robotic missions to the Moon, Mars, and other solar system bodies.

(b) REPORT.—Not later than 270 days after the date of enactment of this Act, the Administrator shall submit the plan to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

SEC. 408. SCIENCE AND EXPLORATION.

It is the sense of Congress that NASA's scientific and human exploration activities are synergistic, i.e. science enables exploration and human exploration enables science. The Congress encourages the Administrator to coordinate, where practical, NASA's science and exploration activities with the goal of maximizing the success of human exploration initiatives and furthering our understanding of the Universe that we explore.

TITLE V—SPACE SCIENCE

SEC. 501. TECHNOLOGY DEVELOPMENT.

The Administrator shall establish a cross-Directorate long-term technology development program for space and Earth science within the Science Mission Directorate for the development of new technology. The program shall be independent of the flight projects under development. NASA shall have a goal of funding the cross-Directorate technology development program at a level of 5 percent of the total Science Mission Directorate annual budget. The program shall be structured to include competitively awarded grants and contracts.

SEC. 502. PROVISION FOR FUTURE SERVICING OF OBSERVATORY-CLASS SCIENTIFIC SPACECRAFT.

The Administrator shall take all necessary steps to ensure that provision is made in the design and construction of all future observatory-class scientific spacecraft intended to be deployed in Earth orbit or at a Lagrangian point in space for robotic or human servicing and repair.

SEC. 503. MARS EXPLORATION.

Congress reaffirms its support for a systematic, integrated program of exploration of the Martian surface to examine the planet whose surface is most like Earth's, to search for evidence of past or present life, and to examine Mars for future habitability and as a long-term goal for future human exploration. To the extent affordable and practical, the program should pursue the goal of launches at every Mars launch opportunity, leading to an eventual robotic sample return.

SEC. 504. IMPORTANCE OF A BALANCED SCIENCE PROGRAM.

It is the sense of Congress that a balanced and adequately funded set of activities, consisting of NASA's research and analysis grants programs, technology development, small, medium-sized, and large space science missions, and suborbital research activities, contributes to a robust and productive science program and serves as a catalyst for innovation. It is further the sense of Congress that suborbital flight activities, including the use of sounding rockets, aircraft, and high-altitude balloons, offer valuable opportunities to advance science, train the next generation of scientists and engineers, and provide opportunities for participants in the programs to acquire skills in systems engineering and systems integration that are critical to maintaining the Nation's leadership in space programs. The Congress believes that it is in the national interest to expand the size of NASA's suborbital research program.

SEC. 505. RESTORATION OF RADIOISOTOPE THERMOELECTRIC GENERATOR MATERIAL PRODUCTION.

(a) PLAN.—The Director of OSTP shall develop a plan for restarting and sustaining the domestic production of radioisotope thermoelectric generator material for deep space and other space science missions.

(b) REPORT.—The plan developed under subsection (a) shall be transmitted to Congress not later than 270 days after the date of enactment of this Act.

SEC. 506. ASSESSMENT OF IMPEDIMENTS TO INTERAGENCY COOPERATION ON SPACE AND EARTH SCIENCE MISSIONS.

(a) ASSESSMENT.—The Administrator shall enter into an arrangement with the National Academies to assess impediments to the successful conduct of interagency cooperation on space and Earth science missions, to provide lessons learned and best practices, and to recommend steps to help facilitate successful interagency collaborations on space and Earth science missions.

(b) REPORT.—The report of the assessment carried out under subsection (a) shall be transmitted to the Committee on Science and Technology of the House of Rep-

resentatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 15 months after the date of enactment of this Act.

SEC. 507. ASSESSMENT OF COST GROWTH.

(a) STUDY.—The Administrator shall enter into an arrangement for an independent external assessment to identify the primary causes of cost growth in the large, medium-sized, and small space and Earth science spacecraft mission classes, and make recommendations as to what changes, if any, should be made to contain costs and ensure frequent mission opportunities in NASA's science spacecraft mission programs.

(b) REPORT.—The report of the assessment conducted under subsection (a) shall be submitted to Congress not later than 15 months after the date of enactment of this Act.

SEC. 508. OUTER PLANETS EXPLORATION.

It is the sense of Congress that the outer solar system planets and their satellites can offer important knowledge about the formation and evolution of the solar system, the nature and diversity of these solar system bodies, and the potential for conditions conducive to life beyond Earth. NASA should move forward with plans for an Outer Planets flagship mission to the Europa-Jupiter system or the Titan-Saturn system as soon as practicable within a balanced Planetary Science program.

TITLE VI—SPACE OPERATIONS

Subtitle A—International Space Station

SEC. 601. UTILIZATION.

The Administrator shall take all necessary steps to ensure that the International Space Station remains a viable and productive facility capable of potential United States utilization through at least 2020 and shall take no steps that would preclude its continued operation and utilization by the United States after 2016.

SEC. 602. RESEARCH MANAGEMENT PLAN.

(a) RESEARCH MANAGEMENT PLAN.—The Administrator shall develop a research management plan for the International Space Station. The plan shall include a process for selecting and prioritizing research activities (including fundamental, applied, commercial, and other research) for flight on the International Space Station. This plan shall be used to prioritize resources such as crew time, racks and equipment, and United States access to international research facilities and equipment. The plan shall also identify the organization to be responsible for managing United States research on the International Space Station, including a description of the relationship of the management institution with NASA (e.g., internal NASA office, contract, cooperative agreement, or grant), the estimated length of time for the arrangement, and the budget required to support the management institution. The plan shall be developed in consultation with other Federal agencies, academia, industry, and other relevant stakeholders. The plan shall be transmitted to Congress not later than 12 months after the date of enactment of this Act.

(b) ACCESS TO NATIONAL LABORATORY.—The Administrator shall—

(1) establish a process by which to support International Space Station National Laboratory users in identifying their requirements for transportation of research supplies to and from the International Space Station, and for communicating those requirements to NASA and International Space Station transportation services providers; and

(2) develop an estimate of the transportation requirements needed to support users of the International Space Station National Laboratory and develop a plan for satisfying those requirements by dedicating a portion of volume on NASA supply missions to the International Space Station and missions returning from the International Space Station to Earth.

(c) ASSESSMENT.—The Administrator shall—

(1) identify existing research equipment and racks and support equipment that are manifested for flight;

(2) provide a detailed description of the status of research equipment and facilities that were completed or in development prior to being cancelled, and provide the budget and milestones for completing and preparing the equipment for flight on the International Space Station; and

(3) provide the results of the assessment to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce,

Science, and Transportation of the Senate not later than 18 months after the date of enactment of this Act.

(d) ADVISORY COMMITTEE.—Not later than 1 year after the date of enactment of this Act, the Administrator shall establish an advisory panel under the Federal Advisory Committee Act to monitor the activities and management of the International Space Station National Laboratory.

SEC. 603. CONTINGENCY PLAN FOR CARGO RESUPPLY.

(a) IN GENERAL.—The International Space Station represents a significant investment of national resources, and it is a facility that embodies a cooperative international approach to the exploration and utilization of space. As such, it is important that its continued viability and productivity be ensured, to the maximum extent possible, after the Space Shuttle is retired.

(b) CONTINGENCY PLAN.—The Administrator shall develop a contingency plan and arrangements, including use of International Space Station international partner cargo resupply capabilities, to ensure the continued viability and productivity of the International Space Station in the event that United States commercial cargo resupply services are not available during any extended period after the date that the Space Shuttle is retired. The plan shall be delivered to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than one year after the date of enactment of this Act.

Subtitle B—Space Shuttle

SEC. 611. FLIGHT MANIFEST.

(a) BASELINE MANIFEST.—In addition to the Space Shuttle flights listed as part of the baseline flight manifest as of January 1, 2008, the Utilization flights ULF–4 and ULF–5 shall be considered part of the Space Shuttle baseline flight manifest and shall be flown prior to the retirement of the Space Shuttle.

(b) ADDITIONAL FLIGHT TO DELIVER THE ALPHA MAGNETIC SPECTROMETER TO THE INTERNATIONAL SPACE STATION.—In addition to the flying of the baseline manifest as described in subsection (a), the Administrator shall take all necessary steps to fly one additional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer to the International Space Station prior to the retirement of the Space Shuttle.

(c) SPACE SHUTTLE RETIREMENT DATE.—The Space Shuttle shall be retired following the completion of the baseline flight manifest and the flight of the additional flight specified in subsection (b), events that are anticipated to occur in 2010.

SEC. 612. DISPOSITION OF SHUTTLE-RELATED ASSETS.

Not later than 90 days after the date of enactment of this Act, the Administrator shall provide a plan to Congress for the disposition of the remaining Space Shuttle orbiters and other Space Shuttle program-related hardware and facilities after the retirement of the Space Shuttle fleet. The plan shall include a process by which educational institutions and science museums and other appropriate organizations may acquire, through loan or disposal by the Federal Government, Space Shuttle program-related hardware. The Administrator shall not dispose of any Space Shuttle-related hardware prior to the completion of the plan.

SEC. 613. SPACE SHUTTLE TRANSITION LIAISON OFFICE.

(a) ESTABLISHMENT.—The Administrator shall establish an office within NASA's Office of Human Capital Management that shall assist local communities affected by the termination of the Space Shuttle program. The office shall offer technical assistance and serve as a clearinghouse to assist communities in identifying services available from other Federal agencies.

(b) SUNSET.—The Office established under subsection (a) shall cease operations 24 months after the last Space Shuttle flight.

Subtitle C—Launch Services

SEC. 621. LAUNCH SERVICES STRATEGY.

(a) IN GENERAL.—In preparation for the award of contracts to follow up on the current NASA Launch Services (NLS) contracts, the Administrator shall develop a strategy for providing domestic commercial launch services in support of NASA's small and medium-sized Science, Space Operations, and Exploration missions, consistent with current law and policy.

(b) REPORT.—The Administrator shall transmit a report to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing the strategy developed under subsection (a) not later than 90 days after the date of enactment of this Act. The report shall provide, at a minimum—

(1) the results of the Request for Information on small to medium-sized launch services released on April 22, 2008;

(2) an analysis of possible alternatives to maintain small and medium-sized lift capabilities after June 30, 2010, including the use of the Department of Defense's Evolved Expendable Launch Vehicle (EELV);

(3) the recommended alternatives, and associated 5-year budget plans starting in October 2010 that would enable their implementation; and

(4) a contingency plan in the event the recommended alternatives described in paragraph (3) are not available when needed.

TITLE VII—EDUCATION

SEC. 701. RESPONSE TO REVIEW.

(a) PLAN.—The Administrator shall prepare a plan identifying actions taken or planned in response to the recommendations of the National Academies report, "NASA's Elementary and Secondary Education Program: Review and Critique". For those actions that have not been implemented, the plan shall include a schedule and budget required to support the actions.

(b) REPORT.—The plan prepared under subsection (a) shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

SEC. 702. EXTERNAL REVIEW OF EXPLORER SCHOOLS PROGRAM.

(a) REVIEW.—The Administrator shall make arrangements for an independent external review of the Explorer Schools program to evaluate its goals, status, plans, and accomplishments.

(b) REPORT.—The report of the independent external review shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

TITLE VIII—NEAR-EARTH OBJECTS

SEC. 801. IN GENERAL.

The Congress reaffirms the policy direction established in the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155) for NASA to detect, track, catalogue, and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter. NASA's Near-Earth Object program activities will also provide benefits to NASA's scientific and exploration activities.

SEC. 802. FINDINGS.

Congress makes the following findings:

(1) Near-Earth objects pose a serious and credible threat to humankind, as many scientists believe that a major asteroid or comet was responsible for the mass extinction of the majority of the Earth's species, including the dinosaurs, nearly 65,000,000 years ago.

(2) Several such near-Earth objects have only been discovered within days of the objects' closest approach to Earth and recent discoveries of such large objects indicate that many large near-Earth objects remain undiscovered.

(3) Asteroid and comet collisions rank as one of the most costly natural disasters that can occur.

(4) The time needed to eliminate or mitigate the threat of a collision of a potentially hazardous near-Earth object with Earth is measured in decades.

(5) Unlike earthquakes and hurricanes, asteroids and comets can provide adequate collision information, enabling the United States to include both asteroid-collision and comet-collision disaster recovery and disaster avoidance in its public-safety structure.

(6) Basic information is needed for technical and policy decisionmaking for the United States to create a comprehensive program in order to be ready to elimi-

nate and mitigate the serious and credible threats to humankind posed by potentially hazardous near-Earth asteroids and comets.

(7) As a first step to eliminate and to mitigate the risk of such collisions, situation and decision analysis processes, as well as procedures and system resources, must be in place well before a collision threat becomes known.

SEC. 803. REQUESTS FOR INFORMATION.

The Administrator shall issue requests for information on—

(1) a low-cost space mission with the purpose of rendezvousing with, attaching a tracking device, and characterizing the Apophis asteroid, which scientists estimate will in 2029 pass at a distance from Earth that is closer than geostationary satellites; and

(2) a medium-sized space mission with the purpose of detecting near-Earth objects equal to or greater than 140 meters in diameter.

SEC. 804. ESTABLISHMENT OF POLICY.

Not later than 2 years after the date of enactment of this Act, the Director of OSTP shall—

(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 stake; and

(2) recommend a Federal agency or agencies to be responsible for protecting the Nation from a near-Earth object that is anticipated to collide with Earth and implementing a deflection campaign, in consultation with international bodies, should one be required.

SEC. 805. PLANETARY RADAR CAPABILITY.

The Administrator shall maintain a planetary radar that is, at minimum, comparable to the capability provided through the NASA Deep Space Network Goldstone facility.

SEC. 806. ARECIBO OBSERVATORY.

Congress reiterates its support for the use of the Arecibo Observatory for NASA-funded near-Earth object-related activities. The Administrator shall ensure the availability of the Arecibo Observatory's planetary radar to support these activities until the National Academies' review of NASA's approach for the survey and deflection of near-Earth objects, including a determination of the role of Arecibo, that was directed to be undertaken by the Fiscal Year 2008 Omnibus Appropriations Act, is completed.

TITLE IX—COMMERCIAL INITIATIVES

SEC. 901. SENSE OF CONGRESS.

It is the sense of Congress that a healthy and robust commercial sector can make significant contributions to the successful conduct of NASA's space exploration program. While some activities are inherently governmental in nature, there are many other activities, such as routine supply of water, fuel, and other consumables to low Earth orbit or to destinations beyond low Earth orbit, and provision of power or communications services to lunar outposts, that potentially could be carried out effectively and efficiently by the commercial sector at some point in the future. Congress encourages NASA to look for such service opportunities and, to the maximum extent practicable, make use of the commercial sector to provide those services.

SEC. 902. COMMERCIAL CREW INITIATIVE.

(a) IN GENERAL.—In order to stimulate commercial use of space, help maximize the utility and productivity of the International Space Station, and enable a commercial means of providing crew transfer and crew rescue services for the International Space Station, NASA shall—

(1) make use of United States commercially provided International Space Station crew transfer and crew rescue services to the maximum extent practicable, if those commercial services have demonstrated the capability to meet NASA-specified ascent, entry, and International Space Station proximity operations safety requirements;

(2) limit, to the maximum extent practicable, the use of the Crew Exploration Vehicle to missions carrying astronauts beyond low Earth orbit once commercial crew transfer and crew rescue services that meet safety requirements become operational;

(3) facilitate, to the maximum extent practicable, the transfer of NASA-developed technologies to potential United States commercial crew transfer and rescue service providers, consistent with United States law; and

(4) issue a notice of intent, not later than 180 days after the date of enactment of this Act, to enter into a funded, competitively awarded Space Act Agreement with two or more commercial entities for a Phase 1 Commercial Orbital Transportation Services (COTS) crewed vehicle demonstration program.

(b) COTS CREWED VEHICLE DEMONSTRATION PROGRAM AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the program described in subsection (a)(4) $50,000,000 for fiscal year 2009, to remain available until expended.

(c) CONGRESSIONAL INTENT.—It is the intent of Congress that funding for the program described in subsection (a)(4) shall not come at the expense of full funding of the amounts authorized under section 101(a)(3), and for future fiscal years, for Orion Crew Exploration Vehicle development, Ares I Crew Launch Vehicle development, or International Space Station cargo delivery.

(d) ADDITIONAL TECHNOLOGIES AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the provision of International Space Station-compatible docking adaptors and other relevant technologies to be made available to the commercial crew providers selected to service the International Space Station $50,000,000, to remain available until expended.

(e) CREW TRANSFER AND CREW RESCUE SERVICES CONTRACT.—If a commercial provider demonstrates the capability to provide International Space Station crew transfer and crew rescue services and to satisfy NASA ascent, entry, and International Space Station proximity operations safety requirements, NASA shall enter into an International Space Station crew transfer and crew rescue services contract with that commercial provider for a portion of NASA's anticipated International Space Station crew transfer and crew rescue requirements from the time the commercial provider commences operations under contract with NASA through calendar year 2016, with an option to extend the period of performance through calendar year 2020.

TITLE X—REVITALIZATION OF NASA INSTITUTIONAL CAPABILITIES

SEC. 1001. REVIEW OF INFORMATION SECURITY CONTROLS.

(a) REPORT ON CONTROLS.—Not later than one year after the date of enactment of this Act, the Comptroller General 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 review of information security controls that protect NASA's information technology resources and information from inadvertent or deliberate misuse, fraudulent use, disclosure, modification, or destruction. The review shall focus on networks servicing NASA's mission directorates. In assessing these controls, the review shall evaluate—

(1) the network's ability to limit, detect, and monitor access to resources and information, thereby safeguarding and protecting them from unauthorized access;

(2) the physical access to network resources; and

(3) the extent to which sensitive research and mission data is encrypted.

(b) RESTRICTED REPORT ON INTRUSIONS.—Not later than one year after the date of enactment of this Act, and in conjunction with the report described in subsection (a), the Comptroller General 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 restricted report detailing results of vulnerability assessments conducted by the Government Accountability Office on NASA's network resources. Intrusion attempts during such vulnerability assessments shall be divulged to NASA senior management prior to their application. The report shall put vulnerability assessment results in the context of unauthorized accesses or attempts during the prior two years and the corrective actions, recent or ongoing, that NASA has implemented in conjunction with other Federal authorities to prevent such intrusions.

SEC. 1002. MAINTENANCE AND UPGRADE OF CENTER FACILITIES.

(a) IN GENERAL.—In order to sustain healthy Centers that are capable of carrying out NASA's missions, the Administrator shall ensure that adequate maintenance and upgrading of those Center facilities is performed on a regular basis.

(b) REVIEW.—The Administrator shall determine and prioritize the maintenance and upgrade backlog at each of NASA's Centers and associated facilities, and shall develop a strategy and budget plan to reduce that maintenance and upgrade backlog by 50 percent over the next five years.

(c) REPORT.—The Administrator shall deliver a report to Congress on the results of the activities undertaken in subsection (b) concurrently with the delivery of the fiscal year 2011 budget request.

SEC. 1003. ASSESSMENT OF NASA LABORATORY CAPABILITIES.

(a) IN GENERAL.—NASA's laboratories are a critical component of NASA's research capabilities, and the Administrator shall ensure that those laboratories remain productive.

(b) REVIEW.—The Administrator shall enter into an arrangement for an independent external review of NASA's laboratories, including laboratory equipment, facilities, and support services, to determine whether they are equipped and maintained at a level adequate to support NASA's research activities. The assessment shall also include an assessment of the relative quality of NASA's in-house laboratory equipment and facilities compared to comparable laboratories elsewhere. The results of the review shall be provided to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 18 months after the date of enactment of this Act.

TITLE XI—OTHER PROVISIONS

SEC. 1101. SPACE WEATHER.

(a) PLAN FOR REPLACEMENT OF ADVANCED COMPOSITION EXPLORER AT L–1 LAGRANGIAN POINT.—

(1) PLAN.—The Director of OSTP shall develop a plan for sustaining space-based measurements of solar wind from the L–1 Lagrangian point in space and for the dissemination of the data for operational purposes. OSTP shall consult with NASA, NOAA, and other Federal agencies, and with industry, in developing the plan.

(2) REPORT.—The Director shall transmit the plan to Congress not later than 1 year after the date of enactment of this Act.

(b) RESEARCH PROGRAM ON SPACE WEATHER AND AVIATION.—

(1) ESTABLISHMENT.—The Administrator shall, in coordination with the National Science Foundation, NOAA, and other relevant agencies, initiate a research program to—

(A) conduct or supervise research projects on impacts of space weather to aviation, including impacts on communication, navigation, avionic systems, and airline passengers and personnel; and

(B) facilitate the transfer of technology from space weather research programs to Federal agencies with operational responsibilities and to the private sector.

(2) USE OF GRANTS OR COOPERATIVE AGREEMENTS.—The Administrator may use grants or cooperative agreements in carrying out this subsection.

(c) ASSESSMENT OF THE IMPACT OF SPACE WEATHER ON AVIATION.—

(1) STUDY.—The Administrator shall enter into an arrangement with the National Research Council for a study of the impacts of space weather on the current and future United States aviation industry, and in particular to examine the risks for Over-The-Pole (OTP) and Ultra-Long-Range (ULR) operations. The study shall—

(A) examine space weather impacts on at least communications, navigation, avionics, and human health in flight;

(B) assess the benefits of space weather information and services to reduce aviation costs and maintain safety;

(C) provide recommendations on how NASA, NOAA, and the National Science Foundation can most effectively carry out research and monitoring activities related to space weather and aviation; and

(D) provide recommendations on how to integrate space weather information into the Next Generation Air Transportation System.

(2) REPORT.—A report containing the results of the study shall be provided to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

SEC. 1102. SPACE TRAFFIC MANAGEMENT.

(a) IN GENERAL.—As more nations acquire the capabilities for launching payloads into outer space, there is an increasing need for a framework under which information intended to promote safe access into outer space, operations in outer space, and return from outer space to Earth free from physical or radio-frequency interference can be shared among those nations.

(b) DISCUSSIONS.—The Administrator, in consultation with other appropriate agencies of the Federal Government, shall initiate discussions with the appropriate representatives of other spacefaring nations with the goal of determining an appropriate framework under which information intended to promote safe access into outer space, operations in outer space, and return from outer space to Earth free from physical or radio-frequency interference can be shared among those nations.

SEC. 1103. STUDY OF EXPORT CONTROL POLICIES RELATED TO CIVIL AND COMMERCIAL SPACE ACTIVITIES.

(a) REVIEW.—The Director of OSTP shall carry out a study of the impact of current export control policies and implementation directives on the United States aerospace industry and its competitiveness in global markets, and on the ability of United States Government agencies to carry out cooperative activities in science and technology and human space flight, including the impact on research carried out under the sponsorship of those agencies.

(b) CONSULTATION.—In carrying out the study, the Director shall seek input from industry, academia, representatives of the science community, all affected United States Government agencies, and any other appropriate organizations and individuals.

(c) REPORT.—The Director shall provide a report detailing the findings and recommendations of the study to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 9 months after the date of enactment of this Act.

SEC. 1104. ASTRONAUT HEALTH CARE.

(a) SURVEY.—The Administrator shall administer an anonymous survey of astronauts and flight surgeons to evaluate communication, relationships, and the effectiveness of policies. The survey questions and the analysis of results shall be evaluated by experts independent of NASA. The survey shall be administered on at least a biennial basis.

(b) REPORT.—The Administrator shall transmit a report of the results of the survey to Congress not later than 90 days following completion of the survey.

SEC. 1105. NATIONAL ACADEMIES DECADAL SURVEYS.

(a) IN GENERAL.—The Administrator shall enter into agreements on a periodic basis with the National Academies for independent assessments, also known as decadal surveys, to take stock of the status and opportunities for Earth and space science discipline fields and Aeronautics research and to recommend priorities for research and programmatic areas over the next decade.

(b) INDEPENDENT COST ESTIMATES.—The agreements described in subsection(a) shall include independent estimates of the life cycle costs and technical readiness of missions assessed in the decadal surveys whenever possible.

(c) REEXAMINATION.—The Administrator shall request that each National Academies decadal survey committee identify any conditions or events, such as significant cost growth or scientific or technological advances, that would warrant NASA asking the National Academies to reexamine the priorities that the decadal survey had established.

SEC. 1106. INNOVATION PRIZES.

(a) IN GENERAL.—Prizes can play a useful role in encouraging innovation in the development of technologies and products that can assist NASA in its aeronautics and space activities, and the use of such prizes by NASA should be encouraged.

(b) AMENDMENTS.—Section 314 of the National Aeronautics and Space Act of 1958 is amended—

(1) by amending subsection (b) to read as follows:

"(b) TOPICS.—In selecting topics for prize competitions, the Administrator shall consult widely both within and outside the Federal Government, and may empanel advisory committees. The Administrator shall give consideration to prize goals such as the demonstration of the ability to provide energy to the lunar surface from space-based solar power systems, demonstration of innovative near-Earth object survey and deflection strategies, and innovative approaches to improving the safety and efficiency of aviation systems."; and

(2) in subsection (i)(4) by striking "$10,000,000" and inserting "$50,000,000".

SEC. 1107. COMMERCIAL SPACE LAUNCH RANGE STUDY.

(a) STUDY BY INTERAGENCY COMMITTEE.—The Director of OSTP shall work with other appropriate Federal agencies to establish an interagency committee to conduct a study to—

(1) identify the issues and challenges associated with establishing a space launch range and facilities that are fully dedicated to commercial space missions in close proximity to Federal launch ranges or other Federal facilities; and

(2) develop a coordinating mechanism such that States seeking to establish such commercial space launch ranges will be able to effectively and efficiently interface with the Federal Government concerning issues related to the establishment of such commercial launch ranges in close proximity to Federal launch ranges or other Federal facilities.

(b) REPORT.—The Director shall, not later than May 31, 2010, submit 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 on the results of the study conducted under subsection (a).

SEC. 1108. NASA OUTREACH AND TECHNOLOGY ASSISTANCE PROGRAM.

(a) ESTABLISHMENT.—NASA shall contract with an organization that has demonstrated the ability to partner with NASA centers, aerospace contractors, and academic institutions to carry out a program to transfer the knowledge and technology of the space and aeronautics programs to small businesses in communities across the United States. The program shall support the mission of NASA's Innovative Partnerships Program to provide technical assistance through joint partnerships with industry, academia, government agencies, and national laboratories.

(b) PROGRAM STRUCTURE.—In carrying out the program described in subsection (a), the organization shall support the mission of NASA's Innovative Partnerships Program by undertaking the following activities:

(1) Facilitating technology transfer to the private sector to produce viable commercial products.

(2) Creating a network of academic institutions, aerospace contractors, and NASA centers that will commit to donating technical assistance to small businesses.

(3) Creating a network of economic development organizations to increase the awareness and enhance the effectiveness of the program nationwide.

(c) REPORT.—Not later than 1 year after the date of enactment of this Act, and annually thereafter, the Administrator shall submit a report to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing the efforts and accomplishments of the program established under subsection (a) in support of NASA's Innovative Partnerships Program. As part of the report, the Administrator shall provide—

(1) data on the number of small businesses receiving assistance, jobs created and retained, and volunteer hours donated by NASA, contractors, and academic institutions nationwide;

(2) an estimate of the total dollar value of the economic impact made by small businesses that received technical assistance through the program; and

(3) an accounting of the use of funds appropriated for the program.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the program established under subsection (a), $4,000,000 for fiscal year 2009 from the funding available for the Innovative Partnerships Program, to remain available until expended.

II. PURPOSE OF THE BILL

The purpose of this bill is to reauthorize the science, aeronautics, and human space flight programs of the National Aeronautics and Space Administration (NASA) for fiscal year 2009, and address space and aeronautics policy and programmatic issues.

III. BACKGROUND AND NEED FOR THE LEGISLATION

This year marks the 50th anniversary of the establishment of NASA and the dawn of the United States' space program. The NASA Authorization Act of 2005 provided policy and programmatic guidance for NASA that made clear that NASA is and should remain a multimission 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 2008 reaffirms the basic principles espoused in the earlier NASA Authorization, while emphasizing the importance of NASA leadership in Earth observations and research, aeronautics R&D to address critical national needs, and an exploration program strengthened by international cooperation under strong U.S. leadership. The need for the legislation at this time is both the pending expiration of the current authorization and the upcoming change in Administration. Without a clear statement of congressional priorities and policies for NASA, the nation runs the risk of wasting both time and resources as we transition from one Administration to the next.

IV. Hearing Summaries

The House Committee on Science and Technology and its Subcommittee on Space and Aeronautics have held 17 hearings relevant to H.R. 6063 during the 110th Congress.

On Tuesday, February 13, 2007, the Committee on Science and Technology held a hearing to examine the findings and recommendations of the National Academies report, "Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond," also known as the Decadal Survey.

Three witnesses testified: Dr. Richard Anthes, President of the University Corporation for Atmospheric Research (UCAR); Dr. Berrien Moore, Professor and Director of the Institute for the Study of Earth, Oceans, and Space at the University of New Hampshire; the Honorable James Geringer, Director of Policy at the Environmental Systems Research Institute in Wyoming and former Governor of Wyoming.

Chairman Gordon opened the hearing by referring to the conclusions of the Intergovernmental Panel on Climate Change. He stressed the fact that we need a robust system of environmental satellites, investment in which is necessary to be sure that we have the correct data in place to ensure that we make the necessary changes to address climate change.

Ranking Member Hall agreed with Mr. Gordon about the importance of federal planning and funding to ensure the success of future Earth-observing missions and stressed the value in monitoring and measuring drought conditions. He closed by emphasizing his support for the Decadal Survey, though he stated his intention to discover the most important recommendations to implement in light of budget constraints.

Dr. Anthes expressed his concern that the capability of the Earth observation program will dramatically diminish over the next five to ten years. He explained that a lack of funding for the program will result in a decline in the quality of Earth Science research which will decrease the accuracy of weather forecasts and warnings. He closed by describing the recommended plan to undertake 17 new NASA and NOAA missions. Dr. Moore explained that the NASA Earth Science budget has declined by a third since the year 2000. He suggested that NASA invest $10 million per year per mission in order to begin to implement the Decadal Survey. He closed by listing some of the potential benefits to increasing funding, such as monitoring faults and crustal movements, climate predictions,

and urban pollution management. Mr. Geringer addressed the drought situation in the western states, and pointed out that it is more economically sound to invest in satellites and observation information to lessen the effects of a drought than to spend even more federal dollars in drought assistance after the fact. He predicted that the decline in our Earth observation capability will lead to a decline in our competitiveness and have detrimental effects on the nation's agriculture.

On Thursday, March 15, 2007 at 10 a.m., the Committee on Science and Technology held a hearing on the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 Budget Request and NASA's proposed Fiscal Year 2007 Operating Plan.

One witness testified: Dr. Michael D. Griffin, the Administrator of the National Aeronautics and Space Administration.

Dr. Griffin answered questions regarding the difficulties NASA faces with the 2008 budget. All members present agreed that NASA is greatly under-funded, and had questions for the Administrator as to what programs were limited by the budget, as well as the timeline for programs that are scheduled. Chairman of the Committee Bart Gordon (D–TN) was specifically concerned with why NASA's proposed budget was lower than that agreed upon with OMB from the previous year. Gordon stated that NASA's budget, "includes an estimated shortfall of almost a billion dollars in the ISS crew and cargo service funding, does not include funds to address the Space Shuttle program termination and retirement costs past fiscal year 2001," and, additionally that, "it reduces the amount of Space Shuttle reserves available to address remaining Shuttle programming threats during the remaining missions." Dr. Griffin acknowledged the disparities between the previous agreement and the current budget, but would not respond as to whether these changes were due to NASA's own doing or a result of the ideas of the OMB.

Ranking Member Hall (R–TX) focused on the issue of crew safety, requesting to be assured that the CEV crew escape system would be capable of safely jettisoning the entire crew in the event of a catastrophic accident. Dr. Griffin confirmed that this safety measure would be in place. He went on to question Dr. Griffin on the status of the SOFIA mission, which Griffin said to be "back on track."

Congressman Nick Lampson (D–TX), Mr. Hall (R–TX), and Congressman Mark Udall, Chairman of the Space and Aeronautics Subcommittee (D–CO), all had questions addressing the CEV program, such as whether funding was sufficient to continue the program on schedule and the current projected date of launch. CEV had been delayed to March 2015, and when Mr. Lampson asked what monetary amount would be needed in 2008 to move up to a 2014 launch date, Dr. Griffin responded, ". . . the funding we would need to return to the Orion and Ares systems, CEV, to a 2014 capability is not needed in 2008. It would be needed in 2009 and 2010. And the funding requirement would be $350 million in 2009 and $400 million in 2010." He gave a detailed response as to why the launch of CEV was moved to March 2015, which was a question asked by more than one member. He said that this date was chosen after delays due to redirecting funds to the Space Shuttle and Space Station, rescissions for Katrina and other reasons,

and, finally, a decrease in money projected to be available to NASA. The delay was originally predicted to last until September 2015, but lower-priority endeavors were dropped in order to allow for the March date. Because of the approaching five-year hiatus of United States human space flight between the 2010 retirement of the Space Shuttle and the launching of CEV, Congressman Ken Calvert (R–CA) and others were concerned with the lack of a NASA presence in low-Earth orbit. Griffin explained that NASA will be relying on Russians and, he hopes, indigenous commercial transport services to deliver cargo to and from the Space Station. This being said, Mr. Calvert opened questioning regarding the competitiveness of NASA in comparison to emerging space programs, such as in China. Dr. Griffin responded that China's space program, though in its infancy, has 200,000 people working on their program, contrasted with the 75,000 people working on the United States program. His testimony indicated the actuality that the United States may lose much of its dominance in space over the next few years, and that China could be on the Moon before NASA returns. In response to Mr. Udall's questions as to whether research was being done from the Space Station, Dr. Griffin said that there have been several published studies, and that such studies will increase when the Space Station is no longer under construction. Chairman Gordon and Subcommittee Chairman Udall were also interested in NASA's implementation of Earth science research in accordance with the National Academies' recommendations. Griffin did not offer specific plans to address these recommendations, but did say that NASA's priorities are, in his words, "strongly influenced by the Decadal Surveys that we get from the National Academies."

On Thursday, March 22, 2007 at 10:00 a.m., the Committee on Science and Technology, Subcommittee on Space and Aeronautics held a hearing to review the FY 2008 budget request for the Federal Aviation Administration's (FAA) research and development (R&D) programs and to examine current and potential R&D priorities, including support for the Next Generation Air Transportation System (NextGen).

Four witnesses testified: Ms. Victoria Cox, Vice President for Operations Planning, Air Traffic Organization, Federal Aviation Administration; Dr. R. John Hansman, Co-Chair, FAA Research, Engineering and Development Advisory Committee, Professor of Aeronautics and Astronautics, Director, MIT International Center for Air Transportation; Dr. Donald Wuebbles, Chair, Workshop on the Impacts of Aviation on Climate Change, Department Head and Professor, Department of Atmospheric Sciences, University of Illinois-Urbana Champaign; Mr. Steve Alterman, President, Cargo Airline Association, Chairman, Environment Subcommittee, FAA Research, Engineering and Development Advisory Committee.

Chairman Udall noted that the hearing is timely because FAA reauthorization is due this year. He spoke of his concern over NASA's reduced funding commitment to aeronautics research. He also noted that the impact of aviation on climate change is receiving increasing attention. Representative Calvert seconded concerns about NASA's research, and wondered whether FAA's research funding is adequate.

Ms. Cox said that NextGen will enable support of a three-fold increase in airspace demand by 2025. The Operational Evolution Partnership, (OEP), planning document will be published in June. Dr. Hansman reported that the airspace is being stressed by current demand, and delays have been increasing. He was concerned about the loss of national capability in applied aeronautics. He was also concerned about the FAA's capability to quickly implement new technologies. Dr. Wuebbles chaired a workshop on the impacts of aviation on climate change last summer. The workshop conclusion was that further research is warranted, because of the potentially serious impact and because there is much uncertainty. Mr. Alterman agreed with concerns about NASA research, implementation speed, and aviation environmental impact. He promoted the benefits of improved operational procedures such as Continuous Descent Arrivals.

During the question and answer period, Dr. Hansman agreed with Ms. Cox's comment that human factors research will be important for NextGen. Mr. Alterman endorsed ADS–B implementation. He predicted that environmental constraints will prove more binding than capacity constraints. Dr. Hansman said that some research areas have been under funded, such as aircraft icing, fire protection, terminal area safety, and safety-critical software.

Representative Rothman was concerned that airspace usage might some day fill the skies, degrading quality of life. He was particularly concerned about aviation noise. Dr. Wuebbles said that the amount of funding for research on the effects of aviation on climate is "essentially zero." Representative Rohrabacher said that he felt aviation emissions research should emphasize the health of the population today rather than emphasize global climate change. Representative Calvert wondered if the speed of replacement of older, louder and more polluting, aircraft could be increased with some sort of incentives. Dr. Hansman worried that NASA is under funding innovation.

In Questions for the Record, Mr. Alterman said he expects the FAA will have to mandate equipage for NextGen. He felt that the FAA, not the Joint Planning and Development Office (JPDO), should be in charge of NextGen implementation. Ms. Cox reported that the FY 2007 Operating Plan will not drive any adjustments to the FY 2008 R&D plan. The FY 2008 plan includes an additional $10M request for NextGen research on wake vortex and on human factors. About $18 million is being spent by the FAA on aviation environmental research. The FAA plans to support routine unmanned aircraft systems (UAS) access to the national airspace system (NAS) within the 2012–2015 timeframe. Dr. Hansman said that the REDAC would recommend increasing support for UAS research. Dr. Weubbles encouraged the FAA to develop stronger interactions with the academic community.

On Thursday, March 29, 2007, the Committee on Science and Technology, Subcommittee on Space and Aeronautics held a hearing to examine the status of the Next Generation Air Transportation System initiative (also known as NGATS or NextGen) and explore key issues related to the initiative and the interagency Joint Planning and Development Office (JPDO).

Four witnesses testified: Mr. Charles Leader, Director, Joint Planning and Development Office, Federal Aviation Administration

(FAA); Dr. Gerald L. Dillingham, Director, Physical Infrastructure Issues, Government Accountability Office; Hon. John Douglass, President and CEO, Aerospace Industries Association; Dr. Bruce Carmichael, Director, Aviation Applications Program, Research Applications Laboratory, National Center for Atmospheric Research.

In his opening remarks, Chairman Udall noted delays in NextGen developments since last year's hearing. He spoke with concern about NASA's uncertain commitment to its aeronautics program, and NextGen management continuity. Mr. Leader reported that two fundamental NextGen technologies are already beginning implementation: Automatic Dependence Surveillance Broadcast, (ADS–B), and System Wide Information Management, (SWIM). The DOD, DHS and the FAA are each contributing $5 million to a SWIM demonstration this year. He mentioned the near-term release of three important NextGen documents: the Concept of Operations, the Enterprise Architecture, and the Integrated Work Plan. He spoke of the importance of weather research.

Mr. Dillingham discussed JPDO's organizational structure, technical planning, and research funding. He felt that the FAA and JPDO must address the factors that have contributed to the frequent turnover of its JPDO senior management. He urged the JPDO to involve all stakeholders, including active traffic controllers and technicians. Mr. Douglas noted that industry is an essential partner in NextGen and it is important that industry have confidence that the government is committed to NextGen. Dr. Carmichael stated that seventy percent of delays in today's system are attributable to weather. NextGen will integrate the weather programs of the FAA, DOD and NOAA. Dr. Carmichael said that NASA would be a logical weather research partner but doesn't have much funding for it.

Representative Rothman voiced his concern that extreme growth of aviation could erode the quality of life. Representative Calvert spoke of his disappointment in NASA's decreased aeronautics activity.

In the question and answer period, Chairman Udall inquired where additional research funding could be most useful. Mr. Leader answered: safety related issues, human factors, a safety system that is predictive rather than forensic, automation issues and wake vortex work. Dr. Dillingham spoke of the importance of NASA aeronautics facilities. Mr. Douglas agreed, and also spoke of the importance of systems engineering, wake vortex and weather research. Mr. Douglas noted that weather research benefits the Department of Defense, too.

Dr. Dillingham noted that his organization has a study underway addressing the incorporation of unmanned aircraft systems into the air system.

In the questions for the record, Dr. Dillingham was asked if the JPDO should be moved out of the FAA for greater visibility and authority. He felt it should not be, but he suggested having the JPDO director report directly to the FAA Administrator, and making the director an Associate Administrator. He felt that the JPDO should not report to the Secretary of Transportation because that could remove it too far from program implementation. He endorsed Mr. Douglas' suggestion that agencies cooperating with the JPDO should designate a senior program official for JPDO management.

He also felt that the Senior Policy Committee should hold regularly scheduled meetings.

Mr. Douglas felt that the NGATS Institute hadn't developed industry partnership adequately, and this slowed the development of the Concept of Operations. He noted that research and development is key to the success of NextGen; "however, NASA is the only agency capable to (sic) conducting the required R&D, particularly in the required timeframe." He reported that the AIA believes that a business case for necessary equipage by industry is necessary, and "a combination of operational and perhaps financial incentives should be considered."

Mr. Leader reported that the first segment of SWIM will be complete in 2013. The deployment across the NAS of ADS–B is planned to be completed by 2013. The FAA plans to maintain 50 percent of the current system of secondary radars at high-density locations to serve as a back-up. The FAA anticipates reducing, but not eliminating, both VOR and ILS equipment. Some private sector involvement in the provision of key NextGen capabilities is likely.

On Wednesday, May 2, 2007 at 10:00 am, the House Committee on Science and Technology, Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 budget request and plans for space science programs including heliophysics, planetary science (including astrobiology), and astrophysics, as well as issues related to the programs.

Five witnesses testified: Dr. S. Alan Stern who is the Associate Administrator for the NASA Science Mission Directorate; Dr. Lennard Fisk, who is a Thomas M. Donahue Distinguished University Professor of Space Science at the University of Michigan, and is also the Chair of the Space Studies Board of the National Research Council; Dr. Garth Illingworth, who is a professor at the University of California Observatories/Lick Observatory at the University of California, Santa Cruz, and is also the Chair of the Astronomy and Astrophysics Advisory Committee; Dr. Daniel Baker, who is a professor of Astrophysical and Planetary Sciences and the Director of the Laboratory for Atmospheric and Space Physics at the University of Colorado, Boulder; and, finally, Dr. Joseph Burns, an Irving Porter Church Professor of Engineering as well as a Professor of Astronomy and Vice Provost of Physical Sciences and Engineering at Cornell University.

Both Chairman Mark Udall (D–CO) and Ranking Member Ken Calvert (R–CA) opened by expressing concerns about NASA's expanding financial needs which likely will not be met by the organization's shrinking budget, and with hopes of addressing how Congress and NASA could work together to allow NASA to reach its goals in 2008 and beyond.

Dr. Stern provided testimony which was a list of the improvements he has implemented in NASA since taking his position. He expressed a desire to increase the efficiency of scientists within the agency. Dr. Fisk's testimony was primarily concerned with the Science Mission Directorate, and he cited the primary strategic goals to continue with the SMD program as attaining more funding, using that funding in a more cost-effective fashion, and rebalancing the program. Dr. Illingworth also stated, in his testimony, that he believes that NASA should be given a larger budget, but

only under the condition that NASA more effectively estimates costs. Dr. Baker focused on heliophysics, saying the biggest issues facing the heliophysics program are fear of failure, lack of affordable access to space, and the erosion of a trained workforce. He testified the investments to be made to address these issues include more small-scale missions and restoring the budget of the Explorer mission line. Dr. Burns also testified that he believed one of the primary requirements to keep a robust planetary exploration program is a larger budget for NASA.

Mr. Calvert, in hopes of addressing the issue of cost effectiveness, asked how mission costs could be reduced. Dr. Stern replied that Administer Griffin's new policy, requiring a 70 percent confidence level in estimates, will greatly reduce the cost of missions. He also stated they were implementing a minimum experience level for project leaders, assuming that more experienced leaders will have more realistic understanding of funds. Mr. Calvert went further to reiterate that the underestimation of costs, especially long-term costs, for projects, such as the James Webb Space Telescope which is now four times the estimated cost, was a major problem for the NASA budget.

Mr. Udall asked Dr. Stern if he had any suggestions from his space-research experience that might apply to lowering the costs for NASA. Dr. Stern offered that he believes that PIs involved in any project should lessen their other professional responsibilities, primarily focusing on the NASA project until it is completed. He added that he felt it was important to always simplify what they are doing, making adjustments that will keep the project on schedule, saying ". . . what matters is that you get a successful mission out of it, and you know, the best gilded lily that is still a bird on the ground doesn't get you very far in terms of scientific return."

When Mr. Udall asked the panel what the priority should be for appropriations in 2008, all of the panelists agreed that research and analysis, as well as small-scale missions that have big returns and, additionally, get the community excited about NASA, were most important to securing NASA's success as an organization. Dr. Fisk went further, saying that not only does R&A funding need to be increased, but that this program cannot be adequately funded without increasing NASA's budget, in total.

When asked what percentage of NASA's budget should be spent on R&A, Dr. Burns suggested a 25 percent estimate. Dr. Baker said it would be dependent on the discipline, and that it should be analyzed systematically. Dr. Illingworth said he thought the 25 percent number would be a good estimate, but he and Dr. Fisk also agreed it would be discipline-dependent.

In response to Mr. Udall's questioning, the panel agreed that international collaboration could be an answer to some of NASA's budgeting problems. By collaborating on missions and sharing information, some of NASA's load would be lifted; however, all panelists cited ITAR as a possible roadblock in working with other nations. Dr. Illingworth commented that small-scale projects would be especially productive collaborations. This issue was expanded upon, especially addressing cooperation with China's emerging space program, and Dr. Fisk commented that working with China is a wise defensive strategy. Dr. Baker said he is against forcing "unnatural"

cooperation, and that the U.S. must think carefully about the appropriate role for foreign partners in any project.

Mr. Rohrabacher was interested as to whether astronomy has an impact on the decisions made on Earth. Dr. Fisk explained that we do not see 99 percent of the universe, and knowledge of even a small amount of this would enhance knowledge of our own world, which is governed by the same laws of physics as the rest of the universe. Dr. Stern gave examples of how knowledge of basic science may, at first, seem to have little application, but can cause huge changes in the economy, standard of living, and so on. He gave the example of scientists going from "playing with electricity" to providing energy to our homes, appliances, and virtually changing the world as we know it. Mr. Rohrabacher was also concerned about the plans to shut down the Arecibo radio telescope, which can forewarn us of near-Earth objects. Dr. Burns shared the concern, as he is personally associated with the telescope.

On Thursday, May 17, 2007 at 10:00 a.m., the House Committee on Science and Technology, Subcommittee on Space and Aeronautics held a hearing to examine National Aeronautics and Space Administration (NASA) workforce issues and the recommendations of independent review panels for ensuring the health and vitality of the NASA workforce in the 21st century. This was the first in a series of NASA workforce hearings. Later hearings will address Shuttle transition workforce issues and specific legislative proposals.

Four witnesses testified: Ms. Toni Dawsey, who is the Assistant Administrator for Human Capital Management at NASA; Mr. John G. Stewart, who is a Fellow at the National Academy of Public Administration as well as a member of NASA's Multisector Workforce Panel; Dr. David Black who is the Co-Chair for the National Research Council's Committee on Meeting the Workforce Needs for the National Vision for Space Exploration, and, finally; Dr. Lee Stone, the Legislative Representative for the NASA Council of IFPTE Locals of the International Federation of Professional and Technical Engineers.

Ms. Toni Dawsey testified that the NASA Workforce Strategy "articulates three principles underlying [NASA's] workforce strategy: building and sustaining healthy centers, maximizing the use of NASA's people, and evolving a more flexible, scalable workforce." She said that NASA's plan is based on three goals to implement these principles: understanding mission requirements, aligning workforce skills with mission needs, and, finally, enabling more efficient human resources operations. The first goal is being addressed by enhancing workforce planning capabilities, the second by reshaping the workforce by encouraging retirements and attracting new talent, and the third by providing retraining and skill development to current employees.

Mr. John G. Stewart testified NASA's Multisector Workforce Panel offers six conclusions and recommendations for the improvement of NASA's workforce. He advised that NASA should use strategic planning mechanisms in order to determine how many and what kind of employees are critical to aeronautics, scientific and Vision-related responsibilities. He also stated that NASA must not only make workforce plans regarding civil servants, but also contractor organizations, and that its acquisition and human capital

planning processes must be integrated. He also suggested NASA use a formal process when hiring either a permanent civil servant or a term employee. The Workforce panel, he said, developed a 12 factor framework to assist NASA in maintaining healthy centers. Additionally, he encouraged NASA to make use of the NASA Flexibility Act of 2004. Finally, he suggested the controversial idea that Congress provide NSA with an emergency authority to invoke retirement to meet work restructuring needs, granted those employees meet certain criteria.

Mr. Black offered testimony as co-chair of the National Research Council's Committee on Issues Affecting the Future of the U.S. Space Science and Engineering Workforce. He said this committee looked at two distinct time frames when making recommendations: the following five years, and then 2012 and beyond. He offered that NASA needs hands-on training for their workforce in areas which will achieve its programs' goals and keep them within budget and on schedule. The skill areas they specifically want to see increased or strengthened are systems engineering and program project management, which he described as skill that cannot be developed without large amounts of experience, as opposed to simple classroom learning. The Committee also noted that NASA is only a small part of the "aerospace ecosystem," and that they should attempt to work with other elements to define and understand key issues.

Dr. Lee Stone's testimony focused on the importance of increasing NASA's budget, stating that, "NASA is not facing a workforce crisis. It is facing a fiscal crisis." He explains that 36,000 civil servants were working for NASA during the first lunar missions, while a far smaller number are currently employed. The operating budget, he stated, is also much lower. He also discussed the reduction of NASA's older workforce, which he believed is an unnecessary goal. The IFPTE offered seven recommendations to improve NASA's workforce. First, that Congress should fund NASA at the highest authorized level possible, adding hundreds of millions for science, exploration systems, and aeronautics, and tens of millions for education and critical faculties. Stone also offered that NASA should fund civil service salaries directly from the centers, provide stability for the current workforce, recruit young employees while the older staff is still available to pass on knowledge, and encourage voluntary buyouts and post-employment extension of medical coverage. He stated opposition to the closing of centers, streamlining of RIF procedures, terminating retirement eligible employees, and conversion of permanent positions to term positions.

There was an emphasis throughout the hearing on recruiting young talent, and though the panelists disagreed on how to handle the older workforce, all agreed that recruiting a young workforce was essential for the success of NASA's programs.

On Thursday, June 28, 2007 at 10:00 am, the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 budget request and plans for the Earth science and applications programs, and issues related to the programs.

Four witnesses testified: Dr. Michael H. Freilich, who is the director of the Earth Science Division of the Science Mission Direc-

torate for NASA.; Dr. Richard A. Anthes who is the President of the Universities Corporation for Atmospheric Research; Dr. Eric J. Barron, who is the dean of Jackson School of Geosciences at the University of Texas, Austin, and, finally; Dr. Timothy W. Foresman, the president of the International Center for Remote Sensing Education.

First, Dr. Freilich testified that NASA's primary Earth science goal is "to advance Earth systems science and to use this understanding sufficiently to address societal issues." Dr. Anthes stated that the highest priority is that "NASA commit to and begin to implement its recommended decadal missions," which he identified as extremely relevant to current warming and climate problems. Dr. Barron believes climate change research is essential to NASA's earth science program, and stated that the current NASA budget could not possibly address all of the necessary recommendations of the Decadal Survey, advocating an increase in the NASA budget. Lastly, Dr. Foresman's testimony focused primarily on the Earth Science Application Program's failure to gain ground on technological applications of Earth-monitoring, such as Google Earth and World Wind, and encouraged NASA to be at the forefront of these kinds of technologies.

When asked by Chairman Udall (D–CO) whether they saw an appropriate balance in the Earth Science budget, both Dr. Anthes and Dr. Barron agreed that though there is balance in the appropriation of funds within the budget, that budget is extremely limited. Dr. Barron, at several instances, reinforced that a major problem facing NASA's earth science program is an inconsistency of measurements. He explained that if NASA is under-funded, and certain data is taken sporadically, as opposed to in a continuous fashion, it is likely that the previous data will be useless, and therefore a further waste of NASA's funds. Dr. Freilich agreed with this concern, saying, "it is essential for us to redeem the Nation's previous investment in these time series by continuing them where necessary."

Congressman Nick Lampson (D–TX) asked a long line of questions, initially dealing with the NASA–NOAA joint projects, which, according to the panel, are facing funding difficulties within both organizations. He was also curious as to why the follow-on for the QuikSCAT satellite, which monitors hurricanes, was postponed until 2013. Mr. Barron responded that the Decadal Survey was aware of the budgetary restraints of NASA and had to prioritize, putting important projects such as the follow-on aside for even higher priority projects.

Chairman Udall asked whether the land cover data record would be consistent or if there would be a gap before the launch of the LDCM. Dr. Freilich responded that though there would be a gap and NASA was attempting to minimize that gap to no more than 6–12 months.

All panelists were supportive of some kind of international collaboration on Earth Science research and applications, and Congressman Tom Feeney (R–FL) asked whether international collaboration on projects would be hindered by ITAR. Mr. Freilich offered that the scope of the problem necessitated international cooperation, and that the challenges of ITAR were hindersome, but surmountable, listing several examples of successful NASA collabora-

tions with foreign nations. Mr. Anthes warned that we cannot rely entirely on international partnerships, stating "It would be like having a military that relied on international partnerships."

Mr. Freilich explained that the Earth Science Applied Science division is working with U.S. Group on Earth Observations to use the information gathered by NASA for societal benefit. Building on this, Mr. Foresman offered insights into applications of the program, especially web applications and visualization tools that would help to monitor the number of trees in an area, to prevent deforestation, and even to help with humanitarian issues, such as the genocide in Darfur. He believes that monitoring systems similar to those developed by Google could be unsurpassed in their ability to quicken the U.S. response to such issues.

Chairman Udall's final question was directed at Dr. Freilich. He asked how NASA plans to implement the suggestions from the Decadal Survey, the ongoing NPOESS Nunn-McCurdy changes, and international collaborations. He was also curious as to the timeline for these projects. Dr. Freilich responded that though the 2008 budget has already been developed, NASA plans to address the input of all three in the 2009 budget.

On Tuesday, July 24, 2007 at 10:00 a.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 budget request and plans for the Space Shuttle and International Space Station (ISS) programs, the status of the programs, and issues related to the programs.

Four witnesses testified: Mr. William Gerstenmaier, who is the Associate Administrator for the Space Operations Mission Directorate at NASA; Mr. Tommy Holloway, who is the Chairman of the ISS Independent Safety Task Force; Dr. G. Paul Neitzel, who is a Professor of Fluid Mechanics at the Georgia Institute of Technology; Ms. Christina Chaplain, who is the Director of Acquisition and Sourcing Management for the Government Accountability Office.

Chairman Udall (D–CO) raised concerns about the budget cuts for NASA during this critical time for the International Space Station (ISS) and Space Shuttle program. He also expressed concern regarding NASA's lack of a well defined research plan for the ISS. Ranking Member Feeney (R–FL) echoed Chairman Udall's concerns about funding, discussed future alternatives to the Space Shuttle, and stressed how important space exploration is to the United States and the world.

Mr. Gerstenmaier provided testimony on the activities aboard the ISS and how they directly support the future of space exploration. In his testimony Mr. Holloway reported on the observations and recommendations of the International Space Station Independent Safety Task Force. Dr. Neitzel discussed the concerns of the external research community regarding the ISS and shuttle programs in his testimony. Ms. Chaplain's testimony focused on the challenges faced by NASA in completing and sustaining the International Space Station and retiring the Space Shuttle, and she focused on delays in the shuttle launch schedule and the replacement of the shuttle.

Chairman Udall and Ranking Member Feeney had questions about the logistical support for the ISS and the Commercial Orbital Transportation Services (COTS) program. The panelists agreed that logistical support is an issue and that depending entirely on COTS would be a mistake. Ranking Member Feeney also focused on the possibility of debris hitting the ISS, which Mr. Gerstenmaier confirmed as a possible hazard and discussed the different methods utilized to avoid debris.

Congressman Nick Lampson (D–TX) focused on the status of the Alpha Magnetic Spectrometer (AMS). Mr. Gerstenmaier expanded on the inability to fly AMS to the ISS saying that due to the *Columbia* accident and the reconstituted shuttle flight manifest, NASA had to delete the AMS from the ISS. Dr. Neitzel commented on the potential fallout with international partners due to not using the device on the ISS. Congressman Rohrabacher (R–CA) asked questions regarding the research done on the ISS and how the station is being utilized. The discussions focused on research being limited due to a limited budget and using the ISS and international partners as a way to increase the pool of money available. Dr. Neitzel mentioned that there is very little funding currently available for research and that the timeline would be prohibitive, but with additional funding it could be possible to revitalize some of the research that was originally planned to be done on the ISS.

Congressman Lampson then focused his questions on a variety of issues regarding the schedule of the shuttle launches. Mr. Gerstenmaier felt that the United Space Alliance worker strike wouldn't affect the shuttle launch schedule and that in general there were sufficient contingency plans to prevent changes in the schedule. The panel was in agreement that with the proper funding from Congress it was still possible to add an additional shuttle flight, but that as time passed it became increasingly difficult. Ranking Member Feeney had questions on whether it was technically feasible to have additional space shuttle flights and Mr. Gerstenmaier assured him that the problem was with the budget and that the space shuttle wasn't entirely necessary for future flights. Congressman Lampson asked about plans for shuttle contingency flights and the witness panel agreed that the two contingency flights should be considered as part of the baseline schedule.

Ranking Member Feeney's final question was with regard to how NASA can make the transition of employee and workforce skills as seamless as possible leading into future missions. The witness panel was in agreement that all of the skills from personnel involved in the ISS were valuable skills that would be essential to future missions. Their main concern was in the ability to retain these people and their skill sets.

Chairman Udall's final questions focused on the Status of the Hubble Servicing Mission. Mr. Gerstenmaier felt that the teams were well prepared for the mission thanks to their experience on the ISS. He didn't foresee any threats to delaying the launch date for this particular mission as it was more likely that shuttle missions would

On Thursday, September 6, 2007 at 10:00 a.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to examine the results of two reports on the National Aeronautics and Space Administration's (NASA)

astronaut medical and behavioral health care system. The first, the report of the NASA Astronaut Health Care System Review Committee, provided an independent assessment of NASA's medical and behavioral health care system. The second, a Johnson Space Center internal review considered opportunities for lessons learned in light of the incident involving NASA astronaut Lisa Nowak. The hearing explored the findings and recommendations of these reports and any actions NASA planned to take in response to them.

Four witnesses testified on the first panel: Col. Richard E. Bachmann, Jr., who is the Chair of the NASA Astronaut Health Care System Review Committee and the Commander and Dean of the U.S. Air Force School of Aerospace Medicine; Dr. Richard S. Williams, the Chief Health and Medical Officer of NASA; Dr. Ellen Ochoa, who is the Director of Flight Crew Operations at NASA Johnson Space Center; Mr. Bryan O'Connor, who is the Chief of Safety and Mission Assurance at NASA.

One witness testified on the second panel: Dr. Michael Griffin, who is the Administrator for NASA.

Chairman Udall (D–CO) emphasized that it is critically important that NASA provide astronauts with the best possible medical and behavioral care and quoted some of the concerns that arose from an independent review panel. Ranking Member Feeney (R–FL) echoed Chairman Udall's concerns and also expressed concerns regarding flight surgeons and astronauts being hesitant to report major crew medical or behavioral problems. Full Committee Chairman Gordon (D–TN)and Full Committee Ranking Member Hall (R–TX) both expressed similar concerns and thanked the Subcommittee for holding the hearing.

Col. Bachmann provided testimony regarding the findings of the NASA Astronaut Health Care System Review Committee. Dr. Williams' testimony provided insight into the NASA Astronaut Medical and Behavioral Health Care Program and their plans regarding the NASA Astronaut Health Care System Review Committee and the internal review at Johnson Space Center. In her testimony, Dr. Ochoa went into detail about her experience in preparing for space missions and how seriously all astronauts and flight surgeons take their preparation. Mr. O'Connor testified on the subject of space flight crew safety.

Chairman Udall asked Col. Bachmann about the contrast between the review committee's findings and Dr. Williams' testimony. Col. Bachmann elaborated on the reasoning behind their findings, but could only speculate at the reason for a difference in their testimonies.

Ranking Member Feeney asked about alcohol being a problem leading up to a mission. Mr. O'Connor confirmed that if a member of the crew was impaired it would be a problem, but that it was highly unlikely for that to occur. Ranking Member Feeney also had a question regarding the differences seen between the two different studies. Mr. O'Connor accredited this to the different ways that the studies were performed.

Ranking Member Hall had a string of questions and discussions with Mr. O'Connor regarding the scope of Mr. O'Connor's investigation, the lack of anonymity of the survey, Mr. O'Connor's belief that there has ever been any alcohol abuse, and about the policies in place at NASA to ensure employee openness.

Congressman Lampson (D–TX) established that Col. Bachmann's committee could not determine how extensive any alcohol problems were. Congressman Lampson and Congressman Bonner (R–AL) asked questions regarding how open the astronauts were in their safety recommendations. Col. Bachmann and Dr. Ochoa felt that the survey was representative of how the astronauts felt and that there were sufficient programs in place to allow astronauts to provide feedback.

In the second panel, Dr. Michael Griffin testified about the importance of holding NASA's workforce to the highest personal conduct standards, about steps being taken to provide for the behavioral health of astronauts, and about the alcohol abuse allegations.

Chairman Udall's questioning was largely a discussion with Dr. Griffin about recommendations based on previous surveys and the plans for future surveys. Dr. Griffin made it clear that a major priority for him is to have an atmosphere where NASA astronauts and flight doctors are comfortable bringing up concerns.

Ranking Member Feeney asked about how some of the problems related to safety might be cultural problems. Dr. Griffin agreed that this could be a problem and that they are working to fix all of those issues.

Full Committee Ranking Member Hall asked questions regarding how authentic the reports were from the various anonymous surveys. Dr. Griffin agreed that there wasn't much more that he could do other than to encourage employees to come forth with concerns or issues.

Full Committee Chairman Gordon and Dr. Griffin concluded the hearing with a brief discussion regarding the charter of the NASA Astronaut Health Care System Review Committee.

The Committee held a hearing on NASA policy regarding the agency's management of the National Aviation Operations Monitoring Service (NAOMS). NAOMS has been in the press due to NASA's refusal to release the data to an Associated Press (AP) reporter, offering the rationale that release of the information might undermine the flying public's confidence in the aviation system because it relates to safety. NASA's Administrator Michael Griffin has formally distanced himself from that rationale, but he has not yet made it clear when or even whether NASA will publicly release this data. The hearing sought to further illuminate the details of this issue.

Two witnesses testified on the first panel: Dr. Michael Griffin, Administrator, National Aeronautics and Space Administration; Mr. Jim Hall, Managing Partner, Hall and Associates LLC, and Former Chairman, National Transportation Safety Board (NTSB).

Two witnesses testified on the second panel: Mr. Robert S. Dodd, Safety Consultant and President, Dodd & Associates LLC; Dr. Jon A. Krosnick, Frederic O. Glover Professor in Humanities and Social Sciences, Stanford University; and finally, Captain Terry McVenes, Executive Air Safety Chairman, Air Line Pilots Association.

In his opening statement, Chairman Bart Gordon noted that air traffic is expected to double by 2025, and the importance of maintaining air safety. He was troubled by NASA's failure to release the NAOMS results and was concerned by the fact that NASA cited protection of private companies as a reason for withholding infor-

mation. He stated that he hoped the hearing would result in a reconstruction of the report and project by NASA and FAA.

Ranking Member Ralph Hall emphasized that, though the data from the survey must be released in order to inform the public, it should be "scrubbed" to protect specific individuals and businesses. He was confident in NASA's ability to carry out these efforts, and supportive of Dr. Griffin.

Mr. Griffin said he was displeased with the wording of NASA's public statement addressing the NAOMS issue. He indicated NASA was protecting private interest over public safety and was unrepresentative of NASA's intentions. NASA, under the Freedom of Information Act, is required to protect the anonymity of those who reported data for the survey, but not the results, themselves. He stated that all data that can be legally released will be. However, he also made it clear that he thought the survey methodology was questionable; neither the data nor the method had been peer-reviewed. He denied reports that NAOMS funding was prematurely cut. He stated that NASA's goal was to create algorithms that could be implemented for use by the FAA to analyze data and that the NAOMS results were much more extreme than those extrapolated from other aviation and aeronautics research methods. He said, in response to some suspicion that data had been destroyed, that Battelle, the prime contractor, has all of the original information on hand at their location, apart from NASA, and will be releasing a public report shortly.

Mr. Jim Hall expressed the importance of open and transparent exchange of information to aviation safety. He stated that the intent of the 1996 White House Commission on Aviation Safety and Security was to improve safety through open safety research and communication and that NASA's refusal to release results "flies in the face of aviation history, responsible government, and common sense."

When Mr. Gordon asked Administrator Griffin why he could not release the results that day, as there had been ample time for lawyers to review the information, and NASA had certified that the information was confidential, he responded that it still had identifiable individuals indicated and that it was not certified. Mr. Gordon was frustrated that the Committee was not provided the materials from the survey indicating that certain people or airlines are identifiable. Mr. Griffin said that the data could potentially be released by the end of the year, and assured Mr. Gordon he would submit examples for the record.

Congressman Hall asked Mr. Griffin whether he believed the release of confidential data would discourage pilots and aviation specialists from reporting to NASA and FAA in the future. Mr. Griffin said the data, in its present form, would have that effect. Congressman Hall then asked Mr. Hall what other systems evaluate aviation safety and whether or not these systems are reliable. Hall responded that NASA has the ASRS system, which is confidential. He said this fact made it questionable that NAOMS could not achieve similar confidentiality.

Congressman Costello made it clear that it is a priority of the Congress to encourage the release of these reports, saying that NASA's media response stating the data contained in the survey could have an adverse response to the aviation industry has re-

duced public confidence in aviation. He asked whether Administer Griffin had requested that Battelle work on scrubbing the information around-the-clock in order to release the report as soon as possible. Dr. Griffin said he had not, but that he had encouraged them to make it a priority.

Similarly, Congressman Sensenbrenner inquired as to what center was responsible for delay in releasing the survey, which was finished in 2005 and Congressman Mitchell of the Transportation and Infrastructure Committee asked why NASA would invest $11 million in a survey that did not meet NASA's standards. Mr. Griffin said the survey was supervised by the Ames Research Center, and that NASA had not managed the project well, due to other priorities. Congressman Sensenbrenner made clear that he believed this to be a "mess of NASA's own causing." Congressman Udall was similarly critical. He elucidated the fact that Dr. Griffin had said funding was not cut short, yet the data was not peer reviewed and in a form that could be used. He said if the project was properly completed, the data should be available. Mr. Miller asked the administrator if he disagreed with Mr. Dodd, principle investigator for the NAOMS project, who, in his testimony said the data was valid. Mr. Griffin did disagree, and went on to site an example where the survey indicated a flight landed for unruly passengers several times a day, though, in fact, it has only been reported to have happened once or twice since 9/11.

Congressman Ehlers made a statement indicating that he thought the media embellished the findings of the survey, and that, despite the findings, flight is still the safest form of travel in the United States. Mr. Dodd, in his statement, suggested that Congress fund a NAOMS-like program, separate from NASA, so that, in the future, the program is unbiased. Mr. Krosnick stated that NAOMS was, in fact, peer reviewed, is a very accurate and commendable program, was cut short, and that airlines and pilots would definitely not be identifiable, were the data released. Mr. McVenes, on the other hand, testified the data did not correlate well with other data, and that NAOMS was only a test of the methodology. He suggested NASA complete its peer-review of the data. Mr. Krosnick also indicated that the methodology had been reviewed by OMB and approved, and that NASA had indicated it was to be a permanent monitoring program, not a short-term investigation. Both Mr. Krosnick and Mr. Dodd indicated that the project was cut short due to funding.

On Thursday, November 8, 2007 at 10:00 a.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to examine the status of NASA's Near-Earth Object survey program, review the findings and recommendations of NASA's report to Congress, Near-Earth Object Survey and Deflection Analysis of Alternatives, and to assess NASA's plans for complying with the requirements of Section 321 of the NASA Authorization Act of 2005.

One witness testified on the first panel: Honorable Luis G. Fortuño, Resident Commissioner, Puerto Rico.

Six witnesses testified on the second panel: Dr. James Green, Science Mission Directorate, NASA; Dr. Scott Pace, Program Analysis and Evaluation, NASA; Dr. Donald K.Yeomans, Jet Propulsion Laboratory; Dr. Donald B. Campbell, Cornell University; Dr. J. An-

thony Tyson, University of California, Davis; Mr. Russell "Rusty" Schweickart, B612 Foundation.

Chairman Udall outlined several questions he hoped to address by the end of the hearing, including: to what extent planetary radar capabilities are relevant in addressing NEOs, whether or not NASA funding facilities other than the Air Force's Pan-STARSS project is cost effective, the time table and scope of the NEO survey, whether deflection technologies are a priority, and, finally the degree to which other international bodies are making an effort to detect NEO's. He was troubled by one NASA witness's statement that NASA would, at Congress's request, implement a more aggressive NEO program, because, he said, Congress has already made an unambiguous request of NASA to do this. Congressman Feeney explained that NASA cannot currently afford to run the NEO program on the scale that has been requested by Congress. He found it concerning that Arecibo's NSF funding is dwindling, as this observation device is an important tool of the NEO program.

Congressman Fortuño's testimony endorsed continuing efforts at the Arecibo facility, stating that he introduced H.R. 3737 to insure that NASA and NSF collaborate to continue funding. He said that Arecibo's radar is the "world's most powerful instrument for post-discovery characterization . . . of Near-Earth asteroids." Mr. Feeney asked Mr. Fortuño the economic impact on Puerto Rico if Arecibo is closed; Mr. Fortuño estimated $50 million for the area. Congressman Rohrabacher then stated that, in addition to its use for the NEO program, Arecibo is providing the science community with information that would be much more costly to gather by other means.

Dr. Green explained that the number of NEO's detected by NASA is already approaching the 90 percent discovery goal, however, as was later brought up in other witness testimonies, he was referring to large NEOs, not those in the 140 meter range. He stated that once NASA discovers a NEO, the program assesses its potential for impacting the Earth. He mentioned that no international facilities have the radar capabilities possessed by Arecibo and Goldstone and that currently there are no NEO detection efforts outside of NASA, though the UN has established a working group on NEOS.

Green said that in NASA's report to Congress, the agency supported continuing the program, looking for potential dual use ground-based telescopes as well as partnering with other agencies. He cited the Air Force Pan-STARS as one intended partnership. Mr. Lampson questioned whether international space agencies were concerned with NEO's, and Dr. Green responded that despite the fact that they are not currently carrying out detection programs, it "comes up on every agenda."

Mr. Pace stressed that "NASA cannot initiate a new program beyond Spaceguard" due to "budget constraints." He stated that to reach the 90% goal would require new data management infrastructure and a dedicated facility. He said that the nation should not be concerned about the 5 to 10 year lapse in reaching the legislative goal, because impacts only happen approximately once ever 5,000 years. NASA has outlined a NEO survey program that could be implemented by 2020, but he warned that the proposed budget for this project would need more rigorous analysis. He said that

without augmentation, the NEO Spaceguard survey program is unable to satisfy the requirements of the Authorization Act.

Mr. Yeomans indicated that the largest efforts of the NEO's program should be directed at the asteroids that are slightly larger than 140 meters, which are more abundant than the very large asteroids and could be extremely hazardous. He said detecting all asteroids of this size is not a realistic expectation of the survey program, in its current form. He explained what radar data would be needed to accurately project the motion of these objects. He was optimistic that a number of existing technologies can deflect an Earth-threatening asteroid, if given enough time, which could be roughly 20 years in advance. Because of the time needed to do this, he said finding hazardous objects early should be a primary goal of a survey program.

When asked by Mr. Lampson whether the 2020 deadline for 90% detection of NEOs 140 meters and larger was realistic, Mr. Yeomans responded that 2030 would be a more likely, but still acceptable, date. Mr. Tyson agreed with the assessment that a small delay, such as two years, would not make Earth any more susceptible to an impact. All witnesses agreed that detection is a priority and that continuing efforts for detection are crucial.

Mr. Campbell made clear that radar measurements are the best means to survey the characteristics of NEOs. He stated that the Arecibo radar is more than 20 times more sensitive than the Goldstone antenna, and is a necessary contributor to NEO characterization and prediction. He noted that if Cornell cannot find funds to keep the Arecibo Observatory open, it will likely be closed after 2011. He stated that replacing this facility would cost several hundred million dollars.

Mr. Tyson said having a survey system would change the probabilistic worry of near-Earth object collisions to an actionable situation. He stated that the investment is comparatively small when looking at the potential benefits. He suggests the Large Synoptic Survey Telescope Project as an answer to this dilemma, which would be capable of providing orbits for 82% of hazardous objects larger than 140 meters after 10 years of operation.

Mr. Schweickart, who was asked to testify about whether or not NASA had appropriately responded to Congresses requests, said that "NASA completely ignored Congress's

I direction to recommend a search program and supporting budget," and also that the President had signed this request into law. He suggested that NASA again be directed to comply with this law, that NASA investigate deflection of more frequent and smaller NEO's, and that NASA's report was flawed in its failure to understand that a primary deflection and a potential secondary deflection are necessary to remove NEO's from a path towards Earth.

He posited that NASA should submit a new report to Congress, that they should execute a demonstration asteroid deflection mission, and should take over duties of technological developments to be used for protecting the Earth from NEO impacts. Schweickart also proposed that an agency should be assigned the task of using these technologies to protect the Earth, should the need arise.

When asked by Congressman Rohrabacher which agency should be responsible for deflection efforts in the event of a hazardous object being on an orbit towards earth, Mr. Tyson suggested Congress

should hold hearings to get a number of opinions before making that decision.

Mr. Rohrabacher and Mr. Schweickart agreed that NEOs are an issue of public safety which cannot be ignored. Schweickart and Mr. Feeney also concluded that NASA ignored the more complex issue of dealing with smaller asteroids, which are much more statistically likely to need to be deflected, in favor of positing the use of nuclear weapons to deflect larger asteroids, which only pose a problem once every 100,000 years. All of the witnesses supported the idea of multiple forms of detection and were opposed to the closing of Arecibo. They suggested NASA form partnerships with NSF and other agencies to fund these detection operations.

On Wednesday, February 13, 2008 at 10:00am, the Committee on Science and Technology held a hearing on the National Aeronautics and Space Administration's (NASA) Fiscal Year 2009 budget Request and NASA's proposed Fiscal Year 2008 Operating Plan.

One witness testified: Dr. Michael D. Griffin, Administrator, National Aeronautics and Space Administration.

Chairman Gordon began the hearing by noting that their job in this hearing is to take a "hard look" at where NASA is headed and whether that is an appropriate path for the next Administration. He criticized the current Administration for failing to "provide resources to NASA that are adequate for what it has asked NASA to do and what it agreed in the Authorization Act." He also pointed out that the increased funding going into Earth Science missions is actually just being taken from other programs, as the budget request provides no additional funds for these missions. Chairman Gordon's chief concern was leaving an under-funded NASA for the next Administration.

Ranking Member Hall noted that, despite a budget that "continues to treat NASA favorably" (with a 1.8% increase), the agency is under "enormous financial strain" with the retirement of the shuttle, the development of a replacement vehicle, and continued research investments. Mr. Hall realized that "broader federal budget realities make [the possibility of increased funding] very difficult" and believed that, given the situation, Dr. Griffin was "making the right choices" regarding budget priorities.

Space and Aeronautics Subcommittee Chairman Udall echoed Chairman Gordon's concerns that the demands placed upon NASA far exceed the corresponding funding to make those demands a reality. He also leveled criticism at the White House for refusing to pass the bipartisan bill for greater funding for the Constellation Program, which will develop new vehicle technology to replace the shuttle upon its retirement. Mr. Feeney also raised concerns that the administration has not provided adequate funding for NASA.

In his oral testimony, Dr. Griffin responded that efforts are underway to make NASA more open for private investment and the commercial sector, so as to not depend entirely on public funding. Regarding the gap between the shuttle's retirement and the launch of the Orion Crew Exploration Vehicle, he firmly emphasized the "unseemly" necessity of relying on Russian transportation services to the ISS. With some frustration he noted that there currently is "no other viable option." He claimed that the Orion could be ready as early as 2013 and urged Congress to fully fund NASA's space exploration initiative.

During the lengthy question session, a variety of topics were discussed, but the main concern was the gap between the retirement of the shuttle and the development of a replacement manned system. Dr. Griffin responded to these concerns that the replacement system had to be based on an entirely new system, because no current system could be upgraded to meet the new Constellation vehicle requirements. He also emphasized the need to "consolidate our gains" on the Moon before rushing to Mars, as some space policy experts suggest. Dr. Griffin also denied reports that the launch date for a shuttle replacement system was being moved back and that funds are currently being invested in Mars-mission technology. He emphasized that, even with increased funding, the Constellation program's earliest launch date would be 2013.

On Thursday, March 13, 2008 at 2:00 pm, the House Committee on Science and Technology, Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2009 budget request and plans for science programs including Earth science, heliophysics, planetary science (including astrobiology), and astrophysics, as well as issues related to the programs.

Five witnesses testified: Dr. S. Allen Stern, Associate Administrator, NASA Science Mission Directorate; Dr. Lennard A. Fisk, Chair, Space Studies Board, National Research Council; Dr. Berrien Moore III, Executive Director, Climate Central; Chair, Committee on Earth Studies, National Research Council; Dr. Steven W. Squyres, Professor of Astronomy, Cornell University; Dr. Jack O. Burns, Professor, Center for Astrophysics and Space Astronomy, University of Colorado.

Chairman Udall opened the hearing by voicing concerns over the FY09 budget for NASA, which keeps program expectations high while reducing funding. The Chairman stated that, "The basic situation is clear: NASA's challenging new science initiatives are to be built on a budget that increases by only 1 percent through fiscal year 2011, and that assumes only inflationary increase at best in the years beyond that." He also expressed discomfort with NASA taking funds from one program to fund another.

Ranking Member Feeney expressed similar anxieties, but in a slightly more positive tone, stating that the budget makes "a good effort at remedying a number of deficiencies that have been highlighted in recent years." Yet he remained unconvinced that NASA could continue to prove U.S. dominance in space research and exploration without a budget that expresses "a willingness to pay the costs of achieving it."

Dr. Stern, defending the budget, claimed that it sets specific program priorities, controls costs in those projects it targets, rebalances the agency towards a mix of small and large missions, and focuses efforts on finishing incomplete projects before beginning a second project in parallel. Dr. Fisk challenged the assertion that funding was adequate, yet commended the agency for "doing extremely well with what it has," while there is so much more it "could be doing." Dr. Moore critiqued the budget, saying that it "begins to address" imbalances in the agency, but that much more will need to be done "for many budget cycles to come." He also echoed that the program is doing great things with limited resources, and pleaded that Congress increase funding over the Presidential rec-

ommendation to help the agency accomplish "what is expected of it." Dr. Squyres urged that cuts to the Mars program be undone and restored to their levels under the FY08 Congressional Appropriations Act. Dr. Burns expressed misgivings that cuts to the NASA budget will be occurring during a period of great potential discovery.

During the question and answer section, Mr. Udall and Mr. Feeney's questions centered on rising costs and further scheduling delays anticipated with a slimmer budget. Dr. Stern responded that cost-control measures and prioritization would focus agency energies on targeted programs before beginning new ones. Another issue, the issue of ITAR restrictions on international collaboration, was brought up by Mr. Feeney, and Dr. Burns and Dr. Squyers both expressed that the legislation may have unintended consequences in space R&D projects. Dr. Stern, in response to Mr. Rohrabacher's concerns about collisions with near-Earth objects, clarified that Arecibo is not crucial to detecting these objects. Mr. Feeney brought up the newly restructured NPOESS project and its status, which Dr. Stern confirmed was improving, and Dr. Moore characterized as, after clearing many hurdles, finally seeing "the light at the end of the tunnel." Mr. Feeney expressed concerns about the future of NASA's workforce. The panel emphasized the importance of exposing university students to aspects of space research while developing creative ways to inspire younger students to pursue space careers.

On Thursday, April 3, 2008 at 10:00 a.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to review the status of the National Aeronautics and Space Administration's Exploration Initiative and examine issues related to its implementation.

Four witnesses testified: Dr. Richard Gilbrech, Associate Administrator, Exploration Systems Mission Directorate, National Aeronautics and Space Administration; Ms. Cristina Chaplain, Director, Acquisition and Sourcing Management, Government Accountability Office; Dr. Noel Hinners, Independent Aerospace Consultant; Dr. Kathryn Thornton, Professor, Department of Science, Technology and Society and Associate Dean of the School of Engineering & Applied Science, University of Virginia.

Chairman Udall opened the hearing by stating the goal of NASA's Exploration Initiative as the "human and robotic exploration of the solar system." He claimed the program has "suffered from chronic underfunding." Mr. Udall focused on not just finding new money for NASA but making sure it is effectively spent so that the initiative is both "sustainable and worth the money." He argued for better NASA accountability and reporting before Congress and emphasized the need for international collaboration to avoid the "temptation to rerun a space race that we already won."

Mr. Feeney, the Ranking Member, characterized NASA as being at the juncture of a "once-in-a-generation transformation" since the Columbia disaster. He encouraged NASA and the committee to stick to the doable road map in front of them, as outlined in the President's Vision for Space Exploration. He expressed concern at the loss of skilled workers between the retirement of the shuttle and the beginning of the Constellation Program. Echoing Mr. Udall's recommendation, he suggested a close working relationship

with international partners to maximize benefits to the U.S. Dr. Gilbrech urged support for the Congressional budget request and stated that "real progress" is being made on the Constellation Program. He noted the technical challenges of starting a new rocket program, and remarked that the GAO said last year that NASA is "making sound investment decisions" for Constellation. Ms. Chaplain recommended NASA set technical requirements for their designs before they can define cost approximations and schedule timelines. She also pointed out the necessity of NASA having adequate flexibility to respond to technical challenges as they arise. Dr. Hinners suggested that NASA clarify its exploration priorities to reduce misunderstandings regarding the purpose of the moon base. He also criticized the pay-as-you-go system as costing more in the end and stated that it is "not at all clear that NASA can implement an effective lunar exploration program" with the current budget for exploration. Finally, Dr. Thornton encouraged NASA moving beyond low-Earth orbit by using a "stepping stone" approach to reaching Mars. By establishing temporary outposts between Earth and Mars, each landing would "advance the science and technology needed for the next, more ambitious objective." She emphasized that program requirements should first be set before budgets and schedules can be finalized.

Throughout the hearing, both Members and witnesses supported greater collaboration with international partners as a critical component to advance American space exploration goals.

The panel responded to a variety of questions from the Members during the question and answer session, including: the risks involved with CEV/CLV development, the potential to accelerate Constellation with increased funding, the necessity for stability in Congressional funding, the importance of putting humans in space and the ramifications of not allowing funding for research for Mars-only technology. The panel responded that the technical challenge to CEV/CLV development lies in the integration of all of the Orion components, that Constellation development cannot be appreciably accelerated with greater funding but the date could be made more firm, and that humans in space not only inspire future scientists but also allow for operations robots could not perform. All panelists emphasized the need for stability in Congressional funding of NASA to make the program effective. There was a mixed response on the Mars-restrictions in the budget, with Dr. Hinners arguing that Moon-based technology will have "relatively little applicability" to a Mars mission and Dr. Gilbrech countering that technology used on the Moon will "eventually some day pay off" for a mission to Mars.

On Monday, April 7, 2008 at Centennial Hall, Colorado Springs, Colorado at 10:00 a.m.–12:00 p.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to examine the opportunities and challenges of using remote sensing data to benefit public and private sector activities including urban planning, natural resource management, national defense, and homeland security among other application areas.

Four witnesses testified on the first panel: Jack Byers, Deputy Director and Deputy State Engineer, Colorado Division of Water Resources; Simon Montagu, Customer Resource and Support Direc-

tor, Denver Regional Council of Governments; Manuel Navarro, Fire Chief, City of Colorado Springs; Frank Sapio, Director, Forest Health Technology Enterprise Team, U.S. Department of Agriculture Forest Service.

Three witnesses testified on the second panel: Kevin Little, Director, Business Development, Intermap Technologies, Inc.; Matthew O'Connell, President and Chief Executive Officer, GeoEye, Inc.; Jill Smith, President and Chief Executive Officer, DigitalGlobe, Inc.

Chairman Udall brought the hearing to order and stated that the purpose of the hearing was to both explain ways that remote sensing data is being used and how to expand and improve those uses. He noted that the technology is often not given the attention it deserves, and that its application fields encompass homeland security, natural resource management and city planning, among others. His chief concern was improving the delivery of this data to local and federal authorities.

Mr. Feeney, Ranking Member of the Subcommittee, suggested that he would like to hear more about how problems specific to his home state of Florida, such as population growth, wildfires, and land-use impacts could be alleviated with remote sensing data. Echoing comments made by the Chairman, Mr. Feeney noted the wide range of applicable fields where remote sensing plays and important role.

The first panel of witnesses presented the role remote sensing data plays with local governments and agencies. Mr. Byers characterized remote sensing as "highly beneficial in terms of efficient water management," and explained how this technology is being used to classify vegetation, monitor water consumption, and resolve water rights disputes. Representing an urban planning group, Mr. Montagu focused more specifically on city-growth issues and how remote sensing enables effective long-range planning. He urged the subcommittee to make this data more readily available and to continue to purchase important remote sensing data. Mr. Navarro, the third witness, elaborated on how "extremely important" this data is for fire response services, yet lamented that his department lacked the staff to fully utilize all the data. Addressing forestry management concerns, Mr. Sapio highlighted the "accurate, timely and cost effective" results of remote sensing, and detailed how broad-, mid- and fine-scale resolutions assist in assessing forest health, potential fire fuel sources, and monitoring the risks from insects and disease.

Responding to Mr. Udall's question regarding the exact benefit of this technology, the panel noted its consistent and objective quality and its ability to provide a great deal of information at low cost. Ranking Member Feeney addressed two important issues: the potential "gap" in LANDSAT data before the 2011 data continuity mission, and the security and privacy restrictions of widely disseminating this data. The panel responded that covering the gap could be done, albeit at high cost. Regarding privacy, they suggested a delicate balance must be achieved between transparency and security. Despite some misgivings that the data could be misused by terrorist organizations, the general consensus was that the security concern is "critically important" and that a review and tracking process is in place to monitor data users. Responding to

Mr. Udall's question about the federal role in remote sensing, the witnesses pointed out the superior staff, budget and technical capabilities of the federal government, and insisted that federal leadership regarding data collection and distribution are key to maintaining the effectiveness of remote sensing data.

The second panel of witnesses represented the commercial applications of remote sensing data in the private sector. Mr. Little contended that the most important aspect of this technology is that it is highly application-specific and isn't just one technology. Mr. O'Connell characterized the industry as "strong and growing" and emphasized that the commercial sector provides lower cost data than large, government-funded satellite projects. Ms. Smith listed the variety of applications remote sensing data has found on both federal and local levels, and emphasized that the government should not impede or compete with the private sector.

In the question and answer period, the accessibility and cost-effectiveness of commercial data were reiterated as their key advantage. Regarding Mr. Feeney's question about foreign competition, Mr. O'Connell pointed out that the industry is "not looking for a subsidy," but rather a reliable commercial partnership with federal and local governments. When Mr. Udall brought up legislative regulations, the panel universally confirmed that good policies are in place and just need to continue to be enforced. Mr. Udall's final question regarding the use of federal purchasing power to leverage the commercial remote sensing data sector was met with universal approval, with all the panelists agreeing that federal contracts remain an important part of their revenue stream.

On Thursday, April 24, 2008 at 10:30 a.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to examine the status of the International Space Station (ISS) and issues related to its operation and utilization, including the planned and potential uses of the ISS to meet both NASA and non-NASA research needs.

Four witnesses testified on the first panel: Dr. Edward Knipling, Administrator, Agricultural Research Service, U.S. Department of Agriculture; Dr. Louis Stodieck, Director, BioServe Space Technologies, Aerospace Engineering Sciences, University of Colorado; Thomas B. Pickens III CEO, SPACEHAB, Inc; Dr. Cheryl Nickerson, Associate Professor, Center for Infectious Diseases and Vaccinology, The Biodesign Institute, Arizona State University.

Three witnesses testified on the second panel: William Gerstenmaier, Associate Administrator, Space Operations Mission Directorate, National Aeronautics and Space Administration; Ms. Cristina Chaplain, Director, Acquisition and Sourcing Management, Government Accountability Office; Dr. Jeffrey Sutton Director, National Space Biomedical Research Institute.

Chairman Udall opened the hearing on the International Space Station (ISS) by characterizing its development as a "long and at times controversial and frustrating" process. His primary concern was making sure that massive U.S. investment in the Station pays off in both commercial and research dividends. He also argued that the research community, due to funding cuts, has been "largely decimated," and its restoration is a primary concern for NASA and the nation. Continued access to the ISS after shuttle retirement remains a critical component of long-term ISS success.

Mr. Ralph Hall, the Ranking Member, praised the achievement of the ISS as the "most complex and largest laboratory and living facility ever to fly in space." However, he expressed concerns about NASA's commitment to the two contingency flights, the safety of the Russian Soyuz vessel, and NASA's plans to maximize the research potential of the ISS.

The first panel presented to the Subcommittee the research achievements of ISS investments and their commercial applications. Dr. Knipling addressed how the study of cellular mechanics on the ISS can lead to improvements in agriculture, environment, and human health. Arguing that designating the ISS as a national laboratory is not enough, Dr. Stodieck offered three suggestions to the Subcommittee on how to improve the operations on board the ISS: a Congressionally-established independent organization to manage R&D on the ISS, increased funding for non-NASA agencies to use the ISS, and "regular, reliable and frequent" transportation to the Station. Dr. Nickerson commented on how studies of Salmonella on the ISS could have direct applications to improve human health on earth, including new vaccines for Salmonella. Finally, Mr. Pickens pointed out the commercial benefits of microgravity studies which could have a wide array of medical applications, from treating diabetes and Parkinson's to Alzheimer's and cystic fibrosis.

During the question and answer period, the panel deemed consistency, or increases, in funding as the most important condition for continued productivity of the ISS. Ranking Member Hall brought up the possible competition between government or university research and commercial research projects, but the panel insisted that the two work together in relative harmony. Responding to Mr. Lampson's questions, the panel encouraged the Subcommittee to extend the commission of the ISS into 2020, when investments in research projects will be making significant returns. The panel also soothed Mr. Rohrabacher's concerns that the ISS is properly outfitted with appropriate equipment to produce the promised results.

The second panel laid out the achievements of the ISS and how NASA can improve its productivity. Mr. Gerstenmaier highlighted the important role that ISS physics research plays in learning more about physical processes on Earth. Ms. Chaplain touted the program's achievements and its "agility and ingenuity under extreme pressures," while still recommending that NASA remain flexible to minimize scheduling impacts and think out contingency plans to increase efficiency. Dr. Sutton noted the importance of the ISS in doing biomedical research on the long-term effects of humans living in space, and how those results can improve health on Earth.

Chairman Udall began the questioning of the second panel with concerns about the status of the two contingency flights to fly spare parts to the ISS. Mr. Gerstenmaier responded that the lifespan of certain parts can be difficult to project, and that both flights would be dedicated to launching "critical spares," allowing greater flexibility to the scheduled development of commercial flights to the ISS. He also addressed Mr. Hall's concerns about Soyuz safety, saying that Russia and the U.S. are both concerned about its safety features and are collaborating on the issue. Mr. Gerstenmaier demanded that an amendment to the INKSA legislation be "manda-

tory" for the summer if contract placement with Russian manufacturers is to be made in a timely manner. He also rejected Mr. Lampson's hope that the AMS could be flown to the ISS because spare parts have a higher priority. Responding to questions from Mr. Udall and Mr. Rohrabacher, Mr. Gerstenmaier emphasized how mutual Russian-American interest in transporting American crews to the ISS requires that INKSA be amended to streamline the period after Shuttle retirement.

On Thursday, May 1, 2008 at 10:00 a.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics held a hearing to review NASA's current Aeronautics R&D Program, to examine what needs to be done to make it as relevant as possible to the Nation's needs, and in particular to examine R&D challenges related to safety and environmental impacts.

The witnesses before the Subcommittee were assembled in a single panel and consisted of: (1) Dr. Jaiwon Shin, Associate Administrator, Aeronautics Research Mission Directorate, National Aeronautics and Space Administration (2) Carl J. Meade, Co-Chair, Committee for the Assessment of NASA's Aeronautics Research Program, National Research Council, National Academies (3) Preston A. Henne, Senior Vice President, Programs, Engineering and Test, Gulfstream Aerospace Corporation (4) Dr. Ilan Kroo, Professor, Department of Aeronautics and Astronautics, Stanford University.

Chairman Udall opened the hearing by emphasizing the importance of aviation to the nation and lamenting that NASA's Aeronautics R&D program "has been significantly shortchanged in recent years." He commented on the growing challenges facing the future of aviation, including congestion, safety, emissions, noise, and how NASA's aeronautics research can address those concerns. He also recognized the usefulness of the National Academies' Decadal Survey of Civil Aeronautics in forming a productive aeronautics R&D agenda for the future.

Ranking Member Feeney discussed the historical achievements of aeronautics research conducted by the National Advisory Committee on Aeronautics (NACA) and NASA and the proper role of the Federal Government and NASA in carrying out aeronautics research. He emphasized the critical importance of R&D in support of the Next Generation Air Transportation System (NextGen) and of developing safer, more efficient, and more environmentally friendly aircraft.

Dr. Shin explained how NASA's aeronautics program implements the national aeronautics R&D policy by conducting fundamental research and how it supports the development of the NextGen system through a holistic approach that addresses all aspects of the system. Evaluating NASA's entire aeronautics program in light of the 51 key technical challenges contained in the Decadal Survey of Civil Aeronautics, Mr. Meade expressed a mixed position. While NASA's ARMD staff was "dedicated and competent," he pointed out that the directorate, had not "responded in any significant way to the recommendations of the decadal survey" and lacked sufficient funding to pursue all objectives. Speaking on behalf of Gulfstream Aerospace, which designs, builds, and services premium business aircraft, Mr. Henne described the increase in foreign competition as a result of foreign nations' investments in aeronautics research and

stressed the need for the U.S. Federal Government to invest in aeronautics R&D in order to maintain its leadership in the field. Dr. Kroo discussed the technical and environmental challenges facing the aviation industry and the need for both continuing fundamental "long-term research and development of new technologies spanning multiple disciplines" and integrating "the most promising technologies" at the system level and transitioning them "from the lab to the user."

During the question and answer period, the panel told Chairman Udall that the most important aeronautics R&D priorities were technologies to reduce environmental impact, improve safety, and increase fuel efficiencies. Mr. Feeney, the Ranking Member, brought up the issue of restricting foreign access to valuable NASA aeronautics research, but the panel found that in today's global environment with international suppliers, the dividing line would be hard to define. Responding to Mr. Wu's question concerning the availability of wind tunnels in the United States, the panel explained that some wind tunnel testing must still be conducted in Europe and as a result the data produced could be available to others. Mr. Henne and Dr. Kroo emphasized that NASA's aeronautics R&D must incorporate more than basic research in order to meet the nation's needs. Dr. Shin addressed Mr. Feeney's concern that NASA's aeronautics R&D is too concerned with only meeting its own needs, and Mr. Meade responded to his questions on regulating unmanned aerial vehicles. Mr. Rothman questioned Mr. Meade and Dr. Shin about NASA's work to reduce aircraft noise and pollution and Europe's current capability in those areas. Answering Chairman Udall's question on NASA and the FAA's new aviation safety database activity, Dr. Shin spoke about the close collaboration between the airlines, the FAA, and NASA in sharing safety data in support of the project.

V. Committee Actions

On May 15, 2008, H.R. 6063, a bill to reauthorize the National Aeronautics and Space Administration for 2009, was introduced by Congressman Udall and referred to the Committee on Science and Technology. On May 20, 2008, the Subcommittee on Space and Aeronautics met to consider H.R. 6063 and it was reported favorably by a voice vote. On June 4, 2008, the Full Committee met to consider H.R. 6063 and ordered the bill reported, as amended, by a voice vote.

VI. Summary of Major Provisions of the Bill as Reported

Authorizes funding for the National Aeronautics and Space Administration for fiscal year 2009. Funding for fiscal year 2009 is $20.21 billion, including $19.21 in the baseline authorization, and $1 billion in augmented funding to accelerate the development of the Orion Crew Exploration Vehicle (CEV) and Ares I Crew Launch Vehicle (CLV). 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. Establishes remaining flight manifest for Space Shuttle program and adds an additional flight to deliver the Alpha Magnetic Spectrometer to the International Space Station (ISS). In-

cludes provisions to enhance research utilization of the ISS. Contains provisions related to near-Earth objects, education, commercial initiatives—including commercial crew services, NASA institutional capabilities, space weather, space traffic management, innovation prizes, astronaut health care, and study of export control policies. Also establishes a number of reporting and study requirements.

VII. Section-by-Section Analysis of the Bill as Reported

Sec. 1. Short title

The "National Aeronautics and Space Administration Authorization Act of 2008".

Sec. 2. Findings

Congress finds, on this the fiftieth anniversary of the establishment of NASA, that the agency is and should remain a balanced, multimission agency, and 12 other findings.

Sec. 3. Definitions

(1) Administrator—The term "Administrator" means the Administrator of the National Aeronautics and Space Administration.

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

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

TITLE I—AUTHORIZATION OF APPROPRIATIONS FOR FISCAL YEAR 2009

Sec. 101. Fiscal year 2009

Authorizes NASA at $20,210,000,000 for FY 09. This amount is approximately $2.59 billion above the President's FY 2009 request.

The baseline Authorization of $19.21 billion, includes the following breakdown:

Science: $4,932,200,000 of which
- $1,518,000,000 is for Earth Science
- $1,483,000,000 is for Planetary Science
- $1,290,400,000 is for Astrophysics
- $640,800,000 is for Heliophysics

Aeronautics: $853,400,000
Exploration: $3,886,000,000
Education: $128,300,000
Space Operations: $6,074,400,000
Cross-Agency Support Programs: $3,299,900,000
Inspector General: $35,500,000

In addition to the above amounts, the bill authorizes $1,000,000,000 to accelerate the initial operational capability of the Crew Exploration Vehicle and the Crew Launch Vehicle.

TITLE II—EARTH SCIENCE

Sec. 201. Goal

Expresses the sense of the Congress that the goal of NASA's Earth Science program shall be to pursue a leadership role in pro-

viding Earth observations, research, and applications activities to better understand the Earth system.

Sec. 202. Governance of U.S. Earth Observations activities

Requires the Director of the OSTP to task the National Academies with conducting a study to determine the most appropriate governance structure for U.S. Earth Observation programs. Directs the study to be delivered to Congress within 18 months after the enactment of the Act, and for the OSTP to provide an implementation plan of the study's recommendations within 24 months of the enactment of the Act.

Sec. 203. Decadal survey missions

Requires the Administrator to submit a plan describing how NASA intends to implement the recommended missions in the National Academies decadal survey "Earth Sciences and Applications from Space," within 270 days of the enactment of the Act.

Sec. 204. Transitioning experimental research into operational services

Encourages NASA to transition experimental sensors and missions that have the potential to benefit society into operational status whenever possible.

Directs the Director of the OSTP, in consultation with the Administrator of NASA and the Administrator of NOAA, to develop a process for federal agencies to transition NASA Earth science and space weather missions or sensors into operational status. Requires NASA and NOAA to submit a joint plan for each mission or sensor that is determined to be appropriate for transition to Congress within 60 days of the successful completion of the mission or sensor critical design review.

Sec. 205. Landsat thermal infrared data continuity

Requires the Administrator to prepare a plan for ensuring the continuity of Landsat thermal infrared data or its equivalent within 60 days of the enactment of the Act.

Sec. 206. Reauthorization of Glory mission

Reauthorizes NASA to continue with development of the Glory mission and requires the Administrator to submit to Congress a new Baseline Report within 90 days of the enactment of the Act.

Sec. 207. Plan for disposition of Deep Space Climate Observatory

Requires NASA to develop a plan for the Deep Space Climate Observatory (DSCOVR), which shall examine options for the future disposition of the spacecraft and its instruments, and to submit this plan no later than 180 days after the enactment of the Act.

TITLE III—AERONAUTICS

Sec. 301. Environmentally friendly aircraft research and development initiative

Directs the Administrator to establish an initiative with the objective of enabling commercial aircraft performance characteristics such as significant aircraft noise reduction near airports and sig-

nificant reductions in greenhouse gas emissions compared to aircraft currently in commercial service.

Sec. 302. Research alignment

Requires the Administrator, to the maximum extent possible, to align the fundamental aeronautics research program to address high priority technology challenges of the National Academies "Decadal Survey of Civil Aeronautics."

Sec. 303. Research program to determine perceived impact of sonic booms

Requires the Administrator to establish a cooperative research program with industry to collect data on the impact of sonic booms that can be used to develop standards for overland commercial supersonic flight operations.

Sec. 304. External review of NASA's aviation safety-related research programs

Requires the Administrator to arrange for the National Research Council to conduct an independent review of NASA's aviation safety-related research programs, and to submit to Congress a report on the results on this review within 14 months of the enactment of the Act.

Sec. 305. Interagency research initiative on the impact of aviation on the climate

Requires the Administrator, in coordination with the U.S. Climate Change Science Program and other appropriate agencies, to establish a research initiative to assess the impact of aviation on the climate, and if warranted, to evaluate approaches to mitigate that impact. Requires the participating entities to jointly develop a plan for the research program no later than 1 year after the enactment of the Act. Requires the Administrator to arrange for the National Research Council to conduct an independent review of the plan and to provide the results of this review no later than 2 years after the enactment of the Act.

Sec. 306. Research program on design for certification

Requires NASA, in consultation with other appropriate agencies, to establish a research program on methods to improve both the confidence in and the timeliness of certification of new technologies for their introduction into the national airspace system, and to provide a plan for this program no later than 1 year after the enactment of the Act. Requires the Administrator to arrange for the National Research Council to conduct an independent review of the plan and to provide the results of this review no later than 2 years after the enactment of the Act.

Sec. 307. Aviation weather research

Requires the Administrator to establish a research program with NOAA on significantly improving the reliability of 2-hour to 6-hour aviation weather forecasts.

Sec. 308. Joint Aeronautics Research and Development Advisory Committee

Establishes and provides the guidelines for a joint Aeronautics Research and Development Advisory Committee which shall assess and make recommendations regarding the coordination of research and development activities of NASA and the FAA.

Sec. 309. Funding for R&D activities in support of other mission directorates

Establishes that funding for research and development activities performed by the Aeronautics Research Mission Directorate for the flight projects of other Mission Directorates be funded by the Mission Directorate seeking assistance.

Sec. 310. University-based centers for research on aviation training

Changes "may" to "shall" in Section 427(a) of P.L. 109–155.

TITLE IV—INTERNATIONAL EXPLORATION INITIATIVE

Sec. 401. Sense of Congress

Expresses the sense of Congress that the President should invite America's friends and allies to participate in a long term exploration initiative under the leadership of the U.S.

Sec. 402. Stepping stone approach to exploration

Requires the Administrator to take all necessary steps to ensure that the lunar exploration program be designed and implemented in a manner that gives strong consideration to meeting requirements of future exploration and utilization activities beyond the Moon.

Sec. 403. Lunar outpost

Requires that NASA make no plans that would require a lunar outpost to be occupied to maintain its viability. Establishes that the U.S. portion of the first human-tended outpost on the Moon shall be designated the "Neil A. Armstrong Lunar Outpost." Expresses the intent of Congress that NASA shall make use of commercial services to the maximum extent practicable in support of its lunar outpost activities.

Sec. 404. Exploration technology development

Requires the Administrator to establish a program of long-term exploration-related technology research and development that is not tied to specific flight projects with a funding goal of at least ten percent of the budget of the Exploration Systems Mission Directorate, and of having at least fifty percent of the funding allocated to external research institutions.

Sec. 405. Exploration risk mitigation plan

Requires the Administrator to provide a plan identifying the scientific and technical risks that need to be addressed in carrying out human exploration beyond low Earth orbit and the research and development activities required to address those risks, and to provide the plan no later than 1 year following the enactment of the Act.

Sec. 406. Exploration crew rescue

Directs the Administrator to enter into discussions for the purpose of agreeing on a common docking system standard with other spacefaring nations who have or plan to have crew transportation systems.

Sec. 407. Participatory exploration

Requires the Administrator to develop a technology plan to enable dissemination of information to the public for the purpose of fully experiencing NASA's missions to the Moon, Mars and other bodies of our solar system, and to provide Congress with the plan no later than 270 days of the enactment of the Act.

Sec. 408. Science and exploration

Expresses the sense of Congress that NASA's scientific and human exploration activities are synergistic, and encourages the Administrator to coordinate NASA's science and exploration activities to maximize the success of the human exploration initiatives and to further our understanding of the universe.

TITLE V—SPACE SCIENCE

Sec. 501. Technology development

Directs the Administrator to establish a cross-Directorate long-term technology development program for space and Earth science within the Science Mission Directorate and sets a funding goal for the program of five percent of the total Science Mission Directorate annual budget, and directs that it be structured to include competitively awarded grants and contracts in the program.

Sec. 502. Provision for future servicing of observatory-class scientific spacecraft

Directs the Administrator to ensure that provision is made for all future observatory-class scientific spacecraft intended to be deployed in Earth orbit or at Lagrangian points in space for robotic or human servicing and repair.

Sec. 503. Mars exploration

Reaffirms the Congress' support for a systematic and integrated program of scientific exploration of the Martian surface.

Sec. 504. Importance of a balanced science program

Expresses the sense of Congress that a balanced and adequately funded set of activities all contribute to a robust and productive science program and are catalysts for innovation. Expresses the further sense of Congress that suborbital flight activities provide valuable training opportunities and that it is in the national interest to expand the size of NASA's suborbital research program.

Sec. 505. Restoration of RTG material production

Requires the OSTP Director to develop a plan for restarting and sustaining the domestic production of Radioisotope Thermoelectric Generator (RTG) material for deep space and other space science missions and to deliver the plan to Congress within 270 days of the

enactment of the Act. $5,000,000 is authorized for radioisotope material production.

Sec. 506. Assessment of impediments to interagency cooperation on space and earth science missions

Requires the Administrator to arrange for the National Research Council to assess impediments to interagency cooperation on space and Earth science missions and to provide the report to Congress within 15 months of the enactment of the Act.

Sec. 507. Assessment of cost growth

Requires the Administrator to arrange for an independent external assessment to identify the primary causes of cost growth in large, medium, and small space and Earth science spacecraft mission classes and to identify recommendations and to provide the report within 15 months of the enactment of the Act.

TITLE VI—SPACE OPERATIONS

SUBTITLE A—INTERNATIONAL SPACE STATION

Sec. 601. Utilization

Directs the Administrator to take all necessary steps to ensure that the International Space Station (ISS) remains a viable and productive facility of potential U.S. utilization through at least 2020 and to take no steps that would preclude its continued operation and utilization by the U.S. after 2016.

Sec. 602. Research management plan

Requires the Administrator to develop a research management plan for the ISS. Directs the Administrator to establish a process to support ISS National Lab users in identifying requirements for transportation of research supplies to the ISS and to develop an estimate of transportation requirements needed to support users of the ISS National Lab. Directs the Administrator to identify existing research and support equipment that are manifested for flight and to provide a description of the status, budget and milestone of research equipment that were completed or in-development prior to being cancelled. Requires the Administrator to establish an advisory panel under the Federal Advisory Committee Act to monitor the activities and management of the ISS National Lab.

Sec. 603. Contingency plan for cargo resupply

Requires the Administrator to develop a contingency plan and arrangements to ensure the continued viability and productivity of the ISS in the event that U.S. commercial cargo resupply services are not available after the Space Shuttle is retired and to deliver the plan within one year of enactment of the Act.

SUBTITLE B—SPACE SHUTTLE

Sec. 611. Flight manifest

Establishes that the Utilization flights ULF–4 and ULF–5 shall be considered part of the Space Shuttle baseline flight manifest and shall be flown prior to the retirement of the Space Shuttle. Requires the Administrator to take all necessary steps to fly one addi-

tional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer (AMS) to the ISS prior to the retirement of the Space Shuttle. Establishes that the Space Shuttle be retired following the completion of the baseline flight manifest and the additional flight carrying the AMS, events which are anticipated to occur in 2010.

Sec. 612. Disposition of shuttle-related assets

Requires the Administrator to provide a plan for the disposition of the remaining Space Shuttle orbiters and other Space Shuttle program-related hardware and facilities after the retirement of the Space Shuttle fleet and to not dispose of any Space Shuttle-related hardware prior to the completion of the plan, which shall be submitted to Congress within 90 days on the enactment of the Act.

Sec. 613. Space shuttle transition liaison office

Directs the Administrator to establish an office within NASA's Office of Human Capital Management to assist local communities affected by the termination of the Space Shuttle program, which will be operated until 24 months after the last Space Shuttle flight.

SUBTITLE C—LAUNCH SERVICES

Sec. 621. Launch services strategy

Requires the Administrator to develop a strategy for providing launch services in support of NASA's small and medium science, space operations, and exploration missions in preparation for awards to follow up on the current NASA Launch Services contracts and to provide this report within 90 days of the enactment of the Act.

TITLE VII—EDUCATION

Sec. 701. Response to review

Requires the Administrator to develop a plan identifying actions taken or planned in response to the recommendations of the National Academies report, "NASA's Elementary and Secondary Education Program: Review and Critique," and to provide this report within one year of the enactment of the Act.

Sec. 702. External review of explorer school program

Requires the Administrator to arrange for an independent external review of the Explorer Schools program and provide the report within one year of the enactment of the Act.

TITLE VIII—NEAR EARTH OBJECTS

Sec. 801. In general

Expresses Congress' support of the policy direction in P.L. 109–155 for NASA to detect, track, catalogue and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter.

Sec. 802. Findings

Includes findings on the potential threat posed by near-Earth objects and the need to prepare appropriate policies and procedures.

Sec. 803. Requests for information

Directs the Administrator to issue requests for information on a low cost space mission to rendezvous with the Apophis asteroid, and a medium-sized space mission with the purpose of detecting near-Earth objects equal to or greater than 140 meters in diameter.

Sec. 804. Establishment of policy

Requires the OSTP Director to develop a policy for notifying Federal agencies and relevant emergency response institutions of an impending NEO threat if near term public safety is at stake, to recommend a Federal agency or agencies to be responsible for protecting the Nation from a near-Earth object that is anticipated to collide with Earth and implementing a deflection campaign, in consultation with international bodies, should one be required.

Sec. 805. Planetary radar capability

Requires the Administrator to maintain a planetary radar that is, at minimum, comparable to the capability provided through the NASA Deep Space Network Goldstone facility.

Sec. 806. Arecibo observatory

Expresses Congress' support for the use of the Arecibo Observatory for NASA-funded near-Earth object-related activities, and requires the Administrator to ensure the availability of the Arecibo Observatory's planetary radar to support these activities until the National Academies' review of NASA's approach for the survey and deflection of near-Earth objects is completed.

VIII. Committee Views

Sec. 101(a). Baseline authorization for fiscal year 2009

The Committee believes that NASA should be given resources sufficient to safely and effectively carry out the tasks the nation has given it. The current mismatch between funding and responsibilities has led to stresses across all of NASA's program areas. Thus, the baseline authorization for FY 2009 in this bill provides a fiscally responsible inflationary increase of 2.8 percent to the FY 2008 authorization level enacted in the NASA Authorization Act of 2005 [P.L. 109–155]. The baseline authorization for FY 2009 also represents an increase over the FY 2008 Omnibus appropriation for NASA that is consistent with the rate of increase included for R&D agencies in the America COMPETES Act [P.L. 110–69]. The Committee believes strongly that NASA has an important role to play in the nation's innovation agenda.

Sec. 204. Transitioning experimental research into operational services

The Committee continues to stress the need for effective processes to transition NASA research sensors and missions into operational status, when appropriate. Several NASA climate research, space weather, and Earth science missions and sensors have demonstrated their potential to continue benefiting society as long-term operational systems. Although NASA has taken initial steps in coordinating research transitions for operational services, the Committee believes that more concrete planning is needed. The case of

the National Polar Orbiting Environmental Satellite System (NPOESS) is one notable example in which the lack of effective transition planning has cost the U.S taxpayers significant expense, delays, and potential disruptions in sustaining valuable Earth and climate observations. The National Academies Earth science decadal survey underscores the importance of research to operations transitions.

In view of the perspectives conveyed through the National Academies' Earth science decadal survey as well as testimony at Subcommittee hearings, the Committee believes that the issue of transitioning NASA Earth science research into potential NOAA operations requires national-level attention and coordination through OSTP. The Committee recognizes that transitioning research missions and sensors into operational status should not exclude the continued research and science needs as part of an operational system. Any OSTP process for NASA-NOAA transitions should address both long-term scientific measurements required to support research as well as the needs of operational communities. In addition, the Committee recognizes that transitions require considerable coordination and planning, a process that should begin early in a mission project.

Sec. 205. Landsat thermal infrared data continuity

The Committee recognizes the importance of Landsat's long-term data record for climate change research and for the applications that these data have enabled over the thirty five years of the Landsat program's operations. This record has included thermal infrared data since the early 1980s. The Committee believes that the continuity of these thermal infrared data should be retained—especially for their use in water management, which is of increasing national and global importance. The Committee notes that NASA has not fully analyzed options for providing continuity of thermal data; a plan is needed for ensuring the continuity of thermal infrared data or its equivalent. In preparing that plan, NASA should give serious consideration to developing a thermal infrared sensor at minimum cost and flying it on the Landsat Data Continuity mission if it can be done without undue delay or risk to the mission.

Sec. 206. Reauthorization of Glory mission

The Committee is disappointed that the Glory mission has grown in cost thirty percent above the baseline cost estimate reported to Congress at the onset of the project. The Committee was not notified of the thirty percent cost overrun in Glory until at least five months after the agency determined that the mission had exceeded Congressionally-set thresholds, and the Committee expects NASA to adhere to the statutory deadlines for notifying Congress when missions exceed such thresholds and will not look favorably on future reporting delays.

The Committee has reauthorized Glory, because of the mission's importance in ensuring long-time-series measurements related to the Earth's climate, as well as because of the mission's anticipated contributions to understanding the dynamics and factors influencing the Earth's climate. The importance of the Glory mission was emphasized in the National Academies' Earth science decadal survey interim report and again in the final decadal survey. Ac-

cording to the Earth science decadal survey, "The *Glory* mission would provide data essential for climate research and prediction . . . . It would also ensure continuity of the solar irradiance time series, which goes back to 1978 and whose value would be diminished should there be any gap in the measurement." The Committee has reiterated the importance of ensuring the nation's commitment to long-term monitoring and observations of the Earth's systems. The Committee believes it is in the nation's best interest for NASA to complete and launch the Glory mission without further delay.

Sec. 207. Plan for disposition of Deep Space Climate Observatory

The Committee notes that considerable resources and scientific and engineering effort were expended in the development of the Deep Space Climate Observatory [DSCOVR] spacecraft, but that at present the spacecraft hardware is sitting in crates at the NASA Goddard Space Flight Center at a cost of thousands of dollars per month. That is an unacceptable outcome for such an investment of taxpayer funds. NASA needs to seriously examine all credible options for DSCOVR, including public-private partnerships, international collaborations, transfer to another agency, or even use of the hardware for other NASA missions.

Sec. 301. Environmentally friendly aircraft research and development initiative

The Committee recognizes that NASA research has contributed significantly to advances in lower noise and reduced emissions from aircraft. However, the Committee believes that NASA's research, development and demonstration activities in the areas of aircraft noise and greenhouse gas emissions need to be expanded to provide the technological options that will be required in the future, as well as the research results that can assist policymakers in the future promulgation of appropriate aviation policies and procedures. The Committee believes that the effectiveness of the R&D and demonstration activities called for in this section will be greatly enhanced by the active involvement of industry and the nation's universities, and NASA should take steps to encourage such involvement.

Sec. 303. Research program to determine perceived impact of sonic booms

The Committee believes that demonstrating the ability to fly supersonically over land without adverse impact on the environment or on local communities would open up an entirely new flight regime for use by the public and offer significant economic and other benefits. However, the current prohibition against supersonic flight over the United States landmass would need to be lifted for such flight operations to become possible. It is not possible to set an appropriate "sonic boom" standard that would protect the public interest without first obtaining sufficient data on the perceived impact of different sonic boom levels through flight experiments in a relevant environment and by other appropriate means. NASA, in cooperation with industry, is uniquely equipped to carry out such research, and the Committee believes the potential benefits warrant it undertaking such a research initiative.

Sec. 304. External review of NASA's aviation safety-related research programs

The Committee strongly believes that NASA's aviation safety-related research programs are some of the most important activities that NASA undertakes, since they bear directly on the safety of the flying public. The Committee already has the Government Accountability Office reviewing the National Aviation Operations Monitoring Service (NAOMS) aviation safety survey project to assess its methodology and determine whether any safety trends can be discerned from the data collected by NAOMS. However, the Committee believes it is important to have an external review of all of NASA's aviation safety-related research programs—not because the Committee has reason to believe they are deficient, but because the Committee wants to be confident that those programs are properly focused, coordinated, productive, and have adequate resources to carry out the needed research. In that regard, the Committee remains troubled by the decline in NASA's support for human factors research, which will be critically important for ensuring the safe operation of future aircraft by pilots, as well as the safe operation of the nation's future air traffic management system. The Committee thus urges NASA to take whatever steps are necessary to ensure that the agency will retain a healthy and productive human factors research program.

Sec. 401. Sense of Congress

The United States is the preeminent spacefaring nation in the world, and the Committee believes that it is in the national interest for it to remain so. However, it is also in the national interest for the United States to carry out its human exploration activities, whether on the International Space Station or in missions to the Moon and beyond, as cooperative endeavors with America's friends and with America's allies. Such an approach will lead to scientific, operational, and geopolitical benefits and should be encouraged. However, the Committee believes that for such an approach to be as productive as possible, the United States needs to engage with the political leadership of its potential partners at the highest levels, and the Committee urges the next President of the United States to do so.

Sec. 404. Exploration technology development

The Committee believes that long-term investments in technology development provide the "seed corn" necessary for a sustainable program of human and robotic exploration of the solar system. Near-term programmatic needs will always compete with the requirement to invest adequately in technologies that will enable future exploration capabilities; however, it is important for the nation to invest in such long-term technology development activities, including such things as life support, habitation systems, in-space propulsion, power systems, avionics, and so forth. The Committee believes that an appropriate goal for such a technology program is to invest at least ten percent of the total Exploration Systems Mission Directorate (ESMD) budget in such technology development activities. The Committee is aware, however, of the current budgetary constraints under which ESMD is operating, and thus the Committee has identified ten percent as a goal rather than a man-

date. Similarly, the Committee believes that the nation's universities, research institutions, and industry have much to contribute to such long-term technology development, and thus the Committee believes that it is an appropriate goal for the agency to allocate at least fifty percent of the funding of such a technology development program to external grants and contracts. At the same time, the Committee recognizes the world-class capabilities of the NASA workforce—as well as the importance of maintaining a competent and engaged workforce at NASA's Centers—and believes that a significant portion of such long-term technology development should thus be carried out by NASA's Centers.

Sec. 406. Exploration crew rescue

The Committee believes that in the future, space faring nations will be well served to have in place the means to enable timely crew rescue in the event space vehicles are disabled or experience other emergencies. The historic 1975 Apollo-Soyuz Test Project, during which an American Apollo spacecraft docked with a Soviet Soyuz spacecraft, illustrates the careful planning and cooperative effort needed to develop a means of enabling the docking of dissimilar spacecraft. The Committee believes that it is important for NASA to initiate discussions with other space faring nations with the intent of agreeing on a common docking system standard that will enable emergency crew rescue in the future.

Sec. 501. Technology development

The Committee is concerned that NASA's lack of investments in cross-Directorate technology will hamper the creativity of scientists and engineers to pursue science objectives as well as the capability for encouraging innovation in NASA's science programs. Several National Academies reports have raised concern about the lack of NASA's investments in technology development to enable future missions. The Committee intends for the technology development program to help reduce technical risk in NASA's science missions, a factor that has often been cited as a major contributor to cost growth and schedule delay. The Committee does not intend for a cross-Directorate technology program to substitute for mission-specific technology development. Rather, the authorized technology development program will enable long lead-time, cross-cutting technologies applicable to missions across the Science Mission Directorate. The program should be open to industry, university, and other research institutions to ensure the inclusion of the widest possible range of innovative technology developments that meet the standards of competitive peer-review. While the Committee believes that five percent of the Science Mission Directorate (SMD) annual budget is an appropriate level for such an activity, the Committee recognizes the current constraints under which SMD is operating and has thus established it as a goal rather than a mandate.

Sec. 502. Provision for future servicing of observatory-class scientific spacecraft

The Committee believes that in the case of future observatory-class scientific spacecraft costing a billion dollars or more that are deployed in low Earth orbit or at a Langrangian point in space, it

will not be acceptable to just write off the investment/scientific loss if it would have been possible to send astronauts or robotic spacecraft to make a simple repair. NASA has come to a similar recognition, as evidenced by its decision to install a docking ring on the James Webb Space Telescope. To quote the head of NASA's Science Mission Directorate at the time that decision was made: "However, what if you have a bad day when you put this thing a million miles out and everything folds out except for an antenna . . . it gets stuck? Or a solar panel doesn't fold out completely, and you say, 'gee, I wish we could send an astronaut just to give it a kick?'" Similarly, as was the case with Hubble, there may be future observatory-class spacecraft whose scientific objectives could be greatly enhanced if they had the capability of being serviced. Thus, the Committee believes that NASA, in consultation with the science community, should determine what the most appropriate approach should be to ensuring that provision is made for such capabilities in future observatory-class spacecraft. The most appropriate approach is likely to vary for each mission, and in some cases may be as simple as a grappling fixture or docking ring. The Committee leaves it to the expertise and judgment of NASA and the science community to determine the most appropriate approaches. Finally, the Committee does not intend this provision to apply to missions currently under development.

Sec. 504. Importance of a balanced science program

Over the past year, NASA has started to revitalize its suborbital science program, which uses sounding rockets, aircraft, and high-altitude balloons to conduct a variety of Earth and space science experiments. This development is particularly welcome, because these activities not only advance scientific knowledge, but provide valuable opportunities to train the next generation of scientists and engineers, particularly in systems engineering and integration skills that are critical to successful conduct of science missions. We urge NASA to continue its commitment to a robust suborbital program and to expand its size.

In addition, the Committee recognizes that the emergence of a commercial suborbital reusable launch vehicle industry will create additional opportunities beyond previous suborbital experiment platforms to pursue unique and/or more affordable scientific investigations, including iterative and/or human-tended missions and experiments. These new commercial capabilities may also be useful to mature technology readiness and provide other risk reduction for major space and earth science flight programs. The Committee believes that NASA should start to plan for such opportunities.

Sec. 505. Restoration of radioisotope thermoelectric generator material production

The Committee believes that the absence of a nationally-produced source of radioisotope thermoelectric generator (RTG) material will seriously compromise the nation's future opportunities to explore the Universe and our leadership in space science. Without this material, the United States will not be able to continue to explore the outer planets of the solar system and their satellites, to send more capable rovers to explore planetary surfaces, or to conduct other compelling exploration activities. RTGs are used as

power sources for deep space missions traveling to destinations beyond Jupiter where solar power is insufficient and may be used for long-duration exploration of planetary surfaces. United States production of the nuclear material used in RTGs, plutonium-238, ceased several years ago. The United States has relied on purchasing plutonium-238 from Russia, however, the availability of procuring additional material from Russia is highly uncertain, and Russia has indicated that it is going to reduce its production. The Office of Science and Technology Policy needs to develop a plan to rectify this problem if the U.S. is to maintain a viable and robust program of robotic exploration of the outer solar system and long-duration scientific exploration of planetary surfaces.

Sec. 507. Assessment of cost growth

The Committee is concerned about the number of Earth and space science missions that have exceeded the Congressionally-set thresholds for cost growth and schedule delays set in PL 109–155. Several missions have exceeded 15 percent of their baseline cost estimates and/or have been delayed by six months or longer, and one mission (Glory) has exceeded 30 percent of its baseline estimate. The increases in the cost of missions currently under development limits NASA's science programs from conducting other science activities and, in some cases, affects the overall balance of a discipline area. NASA needs to assess the root causes of cost increases, determine if they are systemic, and take aggressive actions to prevent further cost growth and schedule slips.

Sec. 601. Utilization

The Committee supports the full productive use of the International Space Station (ISS) to support fundamental research, applied research to enable NASA's long-term exploration goals, commercial research, and other non-NASA Federally funded research. The Committee believes it is in the nation's best interest to ensure the productive utilization of the significant investment and engineering capability of the ISS, which is the world's only on-orbit microgravity laboratory. NASA's current plans support the utilization and operation of the ISS through 2016, a timeline that provides only 6 years of full operational capability following the planned completion of the Space Station by 2010. Ceasing operation of the Space Station by 2016 will foreclose opportunities that could yield benefits to society and will also minimize the return on investment for the United States and the international partners that have contributed laboratories and facilities as part of the ISS. In addition, the Committee recognizes that the relationships and cooperative framework that have been established and fostered through the development and assembly of the ISS are an important baseline for the United States' future international exploration initiatives and should be sustained.

Sec. 602. Research management plan

The Committee believes that NASA needs to take immediate action in preparing for the full utilization of the ISS. NASA and the partners of the ISS plan to support a 6-person crew on the Station in 2009 and full assembly of the Station is anticipated to be completed in 2010. The NASA Authorization Act of 2005 designated

the ISS as a National Laboratory. Two Federal agencies have signed Memoranda of Understanding to participate as National Laboratory users and others have expressed interest.

In recent years, NASA cut funding for ISS research activities and canceled research facilities that had been completed or in development to support research on the ISS. The Committee believes that NASA needs to reinvigorate the research community and the pipeline of experiments to be conducted on the ISS. NASA needs to have a plan in place for managing the utilization of the Space Station to support its internal research requirements, those of NASA-funded researchers, and those of the ISS National Laboratory users. Transportation and access to the ISS will enable the productive utilization of the Station; plans need to be developed for supporting the transportation needs of ISS National Laboratory users.

Sec. 603. Contingency plan for cargo resupply

The Committee supports NASA's decision to secure cargo resupply needs to the International Space Station through commercial services. However, to ensure the continued viability and productivity of the International Space Station in the event commercial cargo resupply services are not available during any extended period after the date that the Space Shuttle is retired, the Committee believes that it is important for NASA to have a contingency plan and arrangements in place by which other options can be invoked, including the use of international partner assets such as the European Automated Transfer Vehicle (ATV) and Japanese H-II Transfer Vehicle (HTV).

Sec. 611. Flight manifest

The Committee has had ample testimony on the necessity of ensuring that critical spares and equipment are delivered to the International Space Station (ISS) after the retirement of the Space Shuttle to maintain the viability of that orbiting facility. The original four-year gap that was built into the President's Vision for Space Exploration (VSE) between the retirement of the Space Shuttle and the availability of the Crew Exploration Vehicle [which is now a five-year gap], as well as the current lack of operational commercial cargo services make it imperative that NASA fly the ULF–4 and ULF–5 missions to the ISS to minimize the risk to the continued viability of the ISS that the gap has created. It would be extremely short-sighted and imprudent to jeopardize a $50 billion national investment—as well as additional significant international investment—by forgoing flights that have already been budgeted for and for which space exists in the flight manifest.

The Alpha Magnetic Spectrometer (AMS) science experiment, sponsored by the U.S. Department of Energy (DOE), is a 16–nation collaborative effort. At a reported investment of over $1.5 billion, the instrument has taken 500 physicists from around the world 12 years to build. In the aftermath of the Columbia accident, NASA notified DOE that it would not be able to launch the 15,000 pound AMS on the Space Shuttle to the ISS due to technical and schedule constraints even though it had originally committed to fly the AMS to the ISS. However, integration activities have continued to date and completion is scheduled for December 2008. NASA has indicated on numerous occasions that the Space Shuttle manifest is

fully subscribed with hardware and supplies needed to safely maintain the ISS in the post-Shuttle era and that flying AMS on one of the few remaining scheduled Space Shuttle flights would mean bumping other critical ISS hardware and spares needed to maintain the ISS. Alternative transportation to the ISS using other means than the Space Shuttle has been explored and, according to NASA, would require extensive modifications to the AMS and added costs. Because of the science that only AMS can provide, particularly looking for evidence of how the universe was formed, and because of the Committee's view that the United States should honor its international science and technology commitments, the Committee believes that flying AMS to the ISS warrants the addition of another flight prior to the retirement of the Space Shuttle.

The Committee believes strongly that the Space Shuttle retirement should be based on the completion of its flight manifest rather than being determined by an arbitrary, budget-driven date of September 2010. The Committee notes that its approach is fully consistent with the approach taken in the President's Vision for Space Exploration, which directed the Administrator to "retire the Space Shuttle as soon as assembly of the International Space Station is completed, planned for the end of this decade." However, the Committee does not intend the lack of a specific calendar date to be construed as willingness on the part of the Committee to fly the Shuttle indefinitely, and the Committee believes, based on NASA's analyses, that barring problems it should prove possible to complete the manifest called out in this bill in 2010, and that significant additional funding should not be required beyond the roughly $300 million NASA estimates will be needed to carry out the AMS mission [of which the FY 2009 funding requirement is estimated to be $150 million]. However, the Committee believes it would be unwise to ordain a "date certain" for completion of the manifest. The Committee takes quite seriously the *Columbia* Accident Investigation Board's finding that "schedule pressure" and the need to meet an arbitrary milestone by a particular date helped contribute to the conditions that led to the *Columbia* accident. The Committee does not want to see such a situation arise again.

Sec. 612. Disposition of Shuttle-related assets

Once the Space Shuttle is retired, there will be a significant number of Shuttle-related artifacts that would be of interest to museums, science centers, educational institutions, and other organizations, and the Committee wants to ensure that NASA has developed a process by which those entities will be able to acquire—either by loan or by disposition by the federal government—those artifacts for display or for other educational purposes. The Committee has no interest in overseeing the disposition of each asset or having the Administrator seek Congressional approval for each disposition decision. However, the Committee does want NASA to provide an overall plan for the disposition process so that it can have confidence that the legitimate interests of appropriate outside organizations in getting access to Shuttle-related artifacts are recognized and properly accommodated and that artifacts of interest are not inadvertently destroyed or otherwise disposed of without prior review.

Sec. 803. Requests for information

The Committee recognizes that acquiring details on the nature of the Apophis asteroid from space and the demonstration of techniques such as rendezvousing and tagging of the asteroid with a radio beacon could prove critical for a deflection mission, if one were deemed necessary. Pooling ideas for such approaches is a necessary first step and a request for information provides a mechanism for acquiring initial concepts. Similarly, the Committee notes that a medium-sized space mission with the purpose of contributing to a survey of 90 percent of near-Earth objects 140 meters in diameter or larger, as directed in the 2005 NASA Authorization Act, could potentially complete the job faster than a ground-based survey and NASA should solicit ideas for such approaches. While scientists estimate that the risk of Apophis colliding with Earth to be small, the proximity of the asteroid to Earth in the near future provides an opportunity to develop and validate tools and techniques that could advance our capability to respond to an impending asteroid collision with Earth, should the situation occur.

Sec. 804. Establishment of a policy

The Committee believes that the nation must take steps to develop a policy for addressing near-Earth objects anticipated to collide with Earth. Although existing Congressional policy directs NASA to detect, track, catalogue, and characterize near-Earth objects, there is no process in place for communicating and coordinating a response among Federal agencies and emergency response institutions should an object be discovered to be on a collision course with Earth. At present, no agency or agencies are charged with the responsibility for protecting the nation from a near-Earth object, including executing a deflection campaign and working with relevant international entities on such matters.

Sec. 805. Planetary radar capability

The Committee believes that it is in the interest of the nation to retain a NASA capability in planetary radar. NASA's planetary radar, which is part of the Deep Space Network's (DSN) facility in Goldstone, California, is one of only two planetary radars in the world, the other being at the Arecibo Observatory in Puerto Rico. Planetary radar is used to track, characterize, and refine the trajectories of near-Earth objects, processes that are essential to estimating the chances that a potentially hazardous asteroid will collide with Earth. The radars are also used to conduct planetary research. The world's two planetary radars are complementary; one is a steerable system that can track objects across an area of the sky and the other is a stationary system with powerful sensitivity. The Committee wants to ensure that adequate provision is made for the need to retain a planetary radar capability when the DSN is upgraded.

Congressional policy established in P.L. 109–155 directs NASA to expand its search for near-Earth objects from those 1 kilometer in diameter or larger, as included in earlier Congressional direction, to objects that are 140 meters in diameter or larger. The Committee recognizes that this expanded search is expected to lead to an increase in objects that fall into the potentially hazardous category; those objects will need to be assessed for their risk of Earth

impact. The Committee believes that the NASA planetary radar is a critical part of the infrastructure necessary for NASA to implement Congressional policy on near-Earth objects. In addition, the Committee emphasizes the need to ensure that the availability of detailed data on potentially hazardous objects be collected in as timely a fashion as possible to support estimates of the potential risks that such objects may pose to public safety.

Sec. 902. Commercial crew initiative

The Committee believes that the development of a commercial crew transfer and services capability for low Earth orbit operations is in the national interest, as is the development of a commercial cargo services capability. The Committee thus supports Commercial Orbital Transportation Services (COTS) demonstration programs in both areas. While the Committee is authorizing limited funds in FY 2009 for the Phase 1 COTS crewed vehicle demonstration program, it envisions the program to be multi-year in nature, as has been the case with the Phase 1 COTS cargo demonstration program, with additional funding to be authorized in future years and expended if appropriate performance milestones are achieved. In addition to the main awards, the Committee would encourage NASA to contemplate making additional smaller awards to encourage the demonstration of commercial crewed vehicle capabilities by other emerging space transportation companies.

Sec. 1001. Review of information security controls

Research generated at NASA facilities is heavily sought after by those intent on causing disruption at a highly visible government agency or gaining a competitive technical advantage by avoiding costly and time-consuming research. The risks are real: NASA's Deputy Chief Information Officer (CIO) for Information Technology Security recently reported that for March 2008 alone, over one billion scans of NASA systems were made by external entities with the likely intent of scanning for vulnerabilities in NASA systems that they could quickly exploit. Because of the integrated manner by which computer networks are intertwined in how NASA conducts its business—in research, development of spacecraft, and control of crewed and robotic—missions the Committee believes that an independent review by the Government Accountability Office of NASA's information security controls is urgently needed.

Sec. 1102. Space traffic management

Given that more and more nations are undertaking civil and commercial space launch operations, the Committee believes that it is important to ensure that information intended to promote safe access, re-entry, and in-space operations by civil and commercial entities can be shared among those nations in an appropriate way. The Committee is not recommending a specific approach, and instead asks NASA to work with other government agencies as appropriate to initiate discussions with other nations to determine an appropriate framework under which such information can be shared.

Sec. 1103. Study of export control policies related to civil and commercial space activities

There has been ample testimony and findings by expert witnesses and independent commissions expressing the belief that the current export control policies are having an adverse impact on the competitiveness of the U.S. aerospace industry and on the ability of agencies and researchers to carry out international cooperative activities in science and technology without a countervailing positive impact on national security. The Committee believes that it is important for the Office of Science and Technology Policy to conduct an assessment of the impact of the current export control policies related to civil and commercial space activities and develop appropriate recommendations.

Sec. 1104. Astronaut health care

The Committee received comprehensive testimony from Col. Richard Bachmann, Jr., chair of the independent review of NASA's astronaut health care system that stressed the importance of anonymous surveys when attempting to monitor the effectiveness of that health care system and ensure its continued effectiveness.

Sec. 1107. Commercial launch range study

A number of states are contemplating or actively planning the development of commercial space launch ranges. While the Federal Aviation Administration's Office of Commercial Space Transportation provides guidance and licensing information related to the establishment of commercial spaceports, there are cases where the proximity of the proposed commercial launch range to a federal launch range or facility, such as is the case in Florida, can complicate the planning process and raise special issues. The Committee believes that the Office of Science and Technology Policy should develop coordination mechanisms to ease the difficulties states face in such situations.

IX. Cost Estimate

A cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act of 1974 has been timely submitted to the Committee on Science and Technology prior to the filing of this report and is included in Section X of this report pursuant to House Rule XIII, clause 3(c)(3).

H.R. 6063 does not contain new budget authority, credit authority, or changes in revenues or tax expenditures. Assuming that the sums authorized under the bill are appropriated, H.R. 6063 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in Section X of this report.

X. Congressional Budget Office Cost Estimate

H.R. 6063—National Aeronautics and Space Administration Authorization Act of 2008

Summary: H.R. 6063 would authorize the appropriation of $20.2 billion for activities of the National Aeronautics and Space Admin-

istration (NASA) for 2009. CBO estimates that the National Oceanic and Atmospheric Administration (NOAA) and Office of Science and Technology Policy (OSTP) would need an additional $5 million over the 2009–2013 period under the bill for planning and reporting requirements related to space research. Assuming appropriation of the authorized and necessary amounts, CBO estimates that implementing H.R. 6063 would cost $20.1 billion over the 2009–2013 period. Enacting H.R. 6063 would not affect direct spending or revenues.

H.R. 6063 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 6063 is shown in the following table. The costs of this legislation fall within budget functions 250 (general science, space, and technology), 300 (natural resources and environment), and 800 (general government).

	By fiscal year, in millions of dollars—					
	2009	2010	2011	2012	2013	2009–2013
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
National Aeronautics and Space Administration:						
Space Operations:						
Authorization Level	6,075	0	0	0	0	6,075
Estimated Outlays	4,495	1,458	61	30	0	6,044
Science:						
Authorization Level	4,932	0	0	0	0	4,932
Estimated Outlays	2,861	1,726	197	49	49	4,882
Exploration:						
Authorization Level	3,886	0	0	0	0	3,886
Estimated Outlays	1,904	1,788	78	38	38	3,846
Cross-Agency Support:						
Authorization Level	3,300	0	0	0	0	3,300
Estimated Outlays	1,782	1,485	33	0	0	3,300
Human Space Flight Gap:						
Authorization Level	1,000	0	0	0	0	1,000
Estimated Outlays	740	240	10	5	0	995
Aeronautics:						
Authorization Level	853	0	0	0	0	853
Estimated Outlays	410	393	26	9	9	847
Education:						
Authorization Level	128	0	0	0	0	128
Estimated Outlays	15	54	33	18	6	126
Inspector General:						
Authorization Level	36	0	0	0	0	36
Estimated Outlays	31	5	0	0	0	36
Subtotal:						
Authorization Level	20,210	0	0	0	0	20,210
Estimated Outlays	12,237	7,149	438	149	102	20,076
OSTP and NOAA Activities:						
Estimated Authorization Level	2	2	*	*	*	5
Estimated Outlays	2	2	*	*	*	5
Total Changes:						
Estimated Authorization Level	20,212	2	*	*	*	20,215
Estimated Outlays	12,239	7,151	438	149	103	20,081

Notes.—OSTP = Office of Science and Technology Policy; NOAA = National Oceanic and Atmospheric Administration.
* = less than 500,000.

Basis of estimate: For this estimate, CBO assumes that H.R. 6063 will be enacted before the end of 2008 and that the entire amounts authorized and estimated to be necessary will be appro-

priated. Estimated outlays are based on historical spending patterns for existing programs.

H.R. 6063 would authorize the appropriation of $20.2 billion for activities of NASA in 2009. CBO estimates that the appropriation of that amount, plus an additional $5 million over the 2009–2013 period for NOAA and OSTP reporting requirements, would result in discretionary outlays of $20.1 billion over the 2009–2013 period.

National Aeronautics and Space Administration

For 2008, NASA received an appropriation of $17.3 million. H.R. 6063 would authorize the appropriation of $20.2 billion in 2009 for the following NASA programs, including:

- Space Operations: $6.1 billion to support the International Space Station, final missions and retirement of the Space Shuttle, and launch and rocket propulsion testing;
- Science: $4.9 billion for Earth research and planetary science, planetary radar observations, astrophysics, heliophysics, and suborbital research, and support of the Mars exploration program;
- Exploration: $3.9 billion to support the Ares I launch and Orion crew vehicles, lunar precursor robotic program, exploration risk mitigation research, and other exploration technology;
- Cross-Agency Support: $3.3 billion to manage center and agency concerns, the innovative partnership program, and facilities and laboratory construction and maintenance;
- Human Space Flight Gap: $1 billion to accelerate the initial operating capability of the next-generation space shuttle and associated ground support and launch systems;
- Aeronautics: $853 million to research and develop aircraft safety and capabilities (including evaluating airspace, space weather, and environmental concerns), create a joint aeronautics research and development advisory council, and award university grants;
- Education: $128 million to attract and retain students in the fields of science, technology, engineering, and mathematics; and
- Inspector General: $36 million to conduct investigations into the ongoing operations of the agency.

OSTP and NOAA activities

CBO estimates that an additional $5 million over the 2009–2013 period would be necessary under the bill for NOAA and OSTP planning and reporting requirements concerning export control policies in the aerospace industry; space weather; and other space-related issues.

Intergovernmental and private-sector impact: H.R. 6063 contains no intergovernmental or private-sector mandates as defined in UMRA. The legislation would authorize grants to institutions of higher education, including public universities, to establish one or more center for Research on Aviation Training. Any costs to state, local, or tribal governments would result from complying with conditions of aid.

Estimate prepared by: Federal Costs: Leigh Angres; Impact on State, Local, and Tribal Governments: Neil Hood; Impact on the Private Sector: Amy Petz.

Estimate approved by: Peter H. Fontaine, Assistant Director for Budget Analysis.

XI. Compliance With Public Law 104–4

H.R. 6063 contains no unfunded mandates.

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. 6063 are to authorize the science, aeronautics, and human space flight programs of the National Aeronautics and Space Administration for fiscal year 2009.

XIV. Constitutional Authority Statement

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 6063.

XV. Federal Advisory Committee Statement

The functions of the advisory committees authorized in H.R. 6063 are not currently being nor could they be performed by one or more agencies or by enlarging the mandate of another existing advisory committee.

XVI. Congressional Accountability Act

The Committee finds that H.R. 6063 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. 6063 does not contain any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in clause 9(d), 9(e), or 9(f) 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 2005

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TITLE IV—AERONAUTICS

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Subtitle B—High Priority Aeronautics Research and Development Programs

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SEC. 427. UNIVERSITY-BASED CENTERS FOR RESEARCH ON AVIATION TRAINING.

(a) IN GENERAL.—The Administrator [may] *shall* award grants to institutions of higher education (or consortia thereof) to establish one or more Centers for Research on Aviation Training under cooperative agreements with appropriate NASA Centers.

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NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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TITLE III—MISCELLANEOUS

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PRIZE AUTHORITY

SEC. 314. (a) * * *

[(b) TOPICS.—In selecting topics for prize competitions, the Administrator shall consult widely both within and outside the Federal Government, and may empanel advisory committees.]

(b) TOPICS.—In selecting topics for prize competitions, the Administrator shall consult widely both within and outside the Federal Government, and may empanel advisory committees. The Administrator shall give consideration to prize goals such as the demonstration of the ability to provide energy to the lunar surface from space-based solar power systems, demonstration of innovative near-Earth object survey and deflection strategies, and innovative approaches to improving the safety and efficiency of aviation systems.

* * * * * * *

(i) FUNDING.— (1) * * *

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(4) No prize competition under this section may offer a prize in an amount greater than [$10,000,000] *$50,000,000* unless 30 days have elapsed after written notice has been transmitted to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

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XX. Committee Recommendations

On June 4, 2008, the Committee on Science and Technology favorably reported the National Aeronautics and Space Administration Authorization Act of 2008 by a voice vote, and recommended its enactment.

XXI. PROCEEDINGS OF THE MARKUP BY THE SUBCOMMITTEE ON SPACE AND AERONAUTICS ON H.R. 6063, THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT OF 2008

TUESDAY, MAY 20, 2008

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

The Subcommittee met, pursuant to call, at 10:03 a.m., in room 2318 of the Rayburn House Office Building, Hon. Charlie Melancon (Acting Chairman of the Subcommittee) presiding.

Mr. MELANCON [presiding]. Good morning. Welcome to the markup this morning. The Subcommittee on Space and Aeronautics will come to order.

Pursuant to the notice, the Subcommittee on Space and Aeronautics meets to consider the following measure: H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008. I have some opening remarks and then we will move forward.

We will proceed with the markup beginning with opening statements, and before we get started, I would like to note that Chairman Udall had intended to chair this morning's markup. Unfortunately, he had his flight back east canceled three times due to mechanical problems and had to spend the night back in Colorado. Looking on the bright side, it certainly helps make the case for a strong aeronautics and aviation R&D program, which is what the legislation before us today promotes. Nevertheless, I know that Chairman Udall would have preferred to be here and we will insert his opening remarks into this record of this markup.

[The prepared statement of Chairman Udall follows:]

Udall

OPENING STATEMENT FOR THE MARKUP OF H.R. 6063

CHAIRMAN MARK UDALL [D-CO]

May 20, 2008

Today, the Subcommittee on Space and Aeronautics will mark up H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008. This bill reflects the constructive input of literally dozens of witnesses who testified at the some 17 hearings that the Committee and Subcommittee have held to date on space and aeronautics issues in the 110th Congress. In addition, we have heard from a variety of experts and stakeholders from the space and aeronautics communities over that same period. Their insights have been invaluable as we have worked to craft this bill.

And of course, I have benefited from the collaborative efforts of my colleagues on both sides of the aisle—their efforts have helped make this a better bill. I am very pleased that the result has been a bill that Ranking Member Feeney and I can both embrace, along with Chairman Gordon and Full Committee Ranking Member Hall, who have joined us as original cosponsors of the legislation. The bipartisan nature of this legislation sends an important message to Congress as a whole—as well as to the next President—namely that NASA is a national resource that is worthy of our strong support.

Indeed, this bill reflects the conviction that NASA is as much a contributor to the nation's innovation agenda as any of the agencies put on a doubling path in last year's "America COMPETES Act". Thus the baseline NASA authorization funding level for FY 2009 contained in this bill—$19.21 billion—represents an 11 percent increase over the FY 2008 appropriation for NASA—the same rate of increase in annual funding that is to be found in the America COMPETES Act. Another way of looking at the baseline funding level authorized for NASA in the bill is that it represents simply an inflationary increase—about 2.8 percent—over the authorized level for FY 2008 that was contained in the NASA Authorization Act of 2005, legislation that passed both chambers of Congress by wide margins and was signed into law by the President. We have heard from witness after witness over at least the past year and a half that NASA has not been given the funding it needs to successfully carry out all of the important tasks that the nation has asked of it.

Well, we've listened, and the funding authorized in H.R. 6063 will help point NASA towards a more productive and sustainable future. In addition to the baseline authorization, H.R. 6063 contains a directed funding augmentation intended to help accelerate the date when the Orion Crew Exploration Vehicle and Ares Crew Exploration Vehicle can attain full operational status. I think that it is important to provide that

additional funding—a series of policy failures over a number of years have brought us to the point where we will have an unavoidable gap in the United States' ability to get its astronauts into space independently. That is not a desirable state of affairs, but that is where matters stand. Providing the additional funding in FY 2009 can help narrow that gap while also putting in place the space transportation system that will help us carry out exciting and important exploration missions beyond low Earth orbit in the decades to come. As you can see from the text, there are many provisions in H.R. 6063, and there is not sufficient time to restate all of them in this opening statement.

I would simply focus on a few key thrusts of the legislation. First, NASA is an agency whose programs are strongly relevant to addressing important national needs, whether through its Earth sciences research and applications program, its aeronautics R&D program, or its contributions to peaceful and productive international collaborations in science and human space flight. We need to ensure that NASA remains a balanced, multimission agency, and this legislation takes steps to do so.

Second, NASA has an important role to play in helping to address the research challenges associated with climate change, as well as in helping to apply NASA's research capabilities to meeting other societal needs. This bill provides a path for NASA to follow in fulfilling that role.

Third, NASA's aeronautics program is one of the most relevant activities of the agency due to its impact on our quality of life, public safety, the vitality of the economy, and our national security. We must ensure that NASA's aeronautics program gets the resources it needs to remain relevant, and we need to ensure that NASA's aeronautics program is focused on providing the best return on the taxpayer's investment in it. This bill includes a series of provisions to do just that.

Fourth, a growing number of nations in the world have or will have human space flight programs in the coming years and decades. It is inevitable. America needs to promote a productive, cooperative approach to human space exploration under U.S. leadership. It is an approach that will deliver clear benefits to America in a variety of ways, and this bill includes concrete measures to implement it.

Finally, America's private sector has always been one of its great strengths. NASA should both nurture and embrace the capabilities of the private sector in the conduct of its missions. Thus this bill includes substantive measures to help realize the synergies achievable between government and the private sector. Well, there are many other features of H.R. 6063 that I could mention. In closing, I would simply return to something I said last week when I introduced H.R. 6063, namely that this year marks the 50th anniversary of the birth of the U.S. space program and the establishment of NASA. NASA has accomplished a great deal over the past five decades, and we all can take pride in its achievements. Yet, we dare not become complacent. We need to continue to invest in NASA. We also need to work to ensure that NASA remains relevant to the nation's needs. And we need to continue to give the agency challenging missions to accomplish—missions that bring out the best in us as a nation.

I believe that H.R. 6063 does all of those things, and I hope that Members will support it at today's markup.

Mr. MELANCON. Before I turn to Mr. Feeney for any opening remarks that he would care to make, I would just like to make a few brief comments on why I support this bill.

First, it is a common sense bill that will deliver a balanced and productive space and aeronautics R&D program for the Nation with important initiatives in human space flight, science and aeronautics. It sets NASA on a good course for the future.

Second, it is a fiscally responsible bill. Baseline authorization provides simply an inflationary increase of 2.8 percent over the fiscal year 2008 authorization level that was enacted into law in the NASA Authorization Act of 2005.

Third, it takes clear steps to narrow the human space flight gap that will result after the Space Shuttle is retired by providing additional funding to accelerate the development of the Orion Crew Exploration Vehicle and Ares I Crew Launch vehicle.

And finally, H.R. 6063 will help ensure that NASA's centers are healthy and capable of supporting the agency's challenging missions. In short, I think that it is a good bill and I urge my fellow Members to support it.

[The prepared statement of Mr. Melancon follows:]

Melancon

OPENING STATEMENT

HON. CHARLIE MELANCON [D-LA]

- Before we get started I would like to note that Chairman Udall had intended to chair this morning's markup.

- Unfortunately, he had his flight back East cancelled *three times* due to mechanical problems, and had to spend the night back in Colorado.

- Looking on the bright side, it certainly helps make that case for a strong aeronautics and aviation R&D program, which is what the legislation before us today helps promote.

- Nevertheless, I know that Chairman Udall would have preferred to be here, and we will insert his opening statement into the record of this markup.

- Before I turn to Mr. Feeney for any opening remarks that he would care to make, I'd just like to make a few brief comments on why I support this bill.

- First, it is a common-sense bill that will deliver a balanced and productive space and aeronautics R&D program for the nation, with important initiatives in human space flight, science, and aeronautics.

- It sets NASA on a good course for the future.

- Second, it is a fiscally responsible bill. Its baseline authorization provides simply an inflationary increase of 2.8 percent over the Fiscal Year 2008 authorization level that was enacted into law in the NASA Authorization Act of 2005.

- Third, it takes clear steps to narrow the human space flight "gap" that will result after the Space Shuttle is retired by providing additional funding to accelerate the development of the Orion Crew Exploration Vehicle and Ares I Crew Launch Vehicle.

- And finally, H.R. 6063 will help ensure that NASA's Centers are healthy and capable of supporting the agency's challenging missions.

- In short, I think that this is a good bill and I urge my fellow Members to support it.

Mr. MELANCON. With that, I would like to turn to my good friend, Mr. Feeney, for an opening statement if he would like to make one.

Mr. FEENEY. Thank you, Mr. Chairman.

Today we lay out a bipartisan blueprint for sustaining a healthy and vigorous NASA during the next administration. I thank the Chairman for his leadership and Chairman Udall as well in this effort that I think has netted the Full Committee's support and the Subcommittee's leadership from both sides of the aisle. We can share pride in that accomplishment.

As the Chairman outlined in some detail, this bill provides good stewardship for all of NASA's enterprises: earth and space sciences, aeronautics and human space flight. Considerable care has been devoted to all elements of NASA's portfolio. I look forward to continued success and excellence in all of our NASA endeavors. Each success brings enormous value and prestige to NASA and the American people.

Because I represent the Kennedy Space Center area, I want to particularly note the unambiguous endorsement of America's human space flight program. Five years ago in the aftermath of the *Columbia* accident, we were looking through a glass very darkly, but today we see more clearly human space flight's future. We will complete the International Space Station and then strive to utilize its full potential. We will also set forth to explore beyond low Earth orbit with the Moon as the first of many destinations.

These are ambitious goals. We are a strong, optimistic people willing to take up any challenge, and as this bill highlights, we invite others throughout the world to join us in this journey that America does for all mankind. So thank you, Mr. Chairman, for affirming much needed stability in our direction for the human space flight program.

We would not have achieved this legislative outcome without talented and accomplished staff. I want to thank Staff Director Dick Obermann—and I had the pleasure of touring some of Colorado with Mr. Obermann—and the rest of the Majority staff for their efforts. From the beginning, Mr. Obermann has engaged his Republican counterparts and our entire staff and treated their concerns and suggestions with respect and care and that is why I suspect we will have a relatively smooth hearing this morning. We are appreciative of the tone and the tenor of this approach.

I also want to thank our staff, especially Ed Feddeman and Ken Monroe from the Republican staff whose wisdom and counsel are highly valued.

So we appreciate that, Mr. Chairman. I thank you for holding this markup this morning.

[Statement of Mr. Feeney follows:]

Feeney

Supporting the National Aeronautics and Space Administration Authorization Act of 2008

By Tom Feeney (R-FL), Ranking Member, House Space and Aeronautics Subcommittee

Today, we lay out a bipartisan blueprint for sustaining a healthy and vigorous NASA during the next administration. I thank the Chairman for his leadership in this effort that has netted the support of this committee's and subcommittee's leadership from both sides of the aisle. We can share pride in that accomplishment.

As the Chairman outlined in considerable detail, this bill provides good stewardship for all NASA enterprises – earth and space sciences, aeronautics, and human spaceflight. Considerable care has been devoted to all elements of NASA's portfolio. I look forward to continued success and excellence in all endeavors. Each success brings enormous value and prestige to NASA and the American people.

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I also want to thank Ed Feddeman and Ken Monroe from the Republican staff whose wisdom and counsel are highly valued.

Mr. MELANCON. Thank you, Mr. Feeney. I appreciate your remarks. Does anyone else wish to be recognized?

With that, we will proceed with the first reading of the bill. I would ask unanimous consent that the bill is considered as read and open to amendment at any point and that the Members proceed with amendments in the order of the roster. Without objection, so ordered.

[H.R. 6063 follows:]

H.R. 6063

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

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 2008".

(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 FOR FISCAL YEAR 2009

Sec. 101. Fiscal year 2009.

TITLE II—EARTH SCIENCE

Sec. 201. Goal.
Sec. 202. Governance of United States Earth observations activities.
Sec. 203. Decadal survey missions.
Sec. 204. Transitioning experimental research into operational services.
Sec. 205. Landsat thermal infrared data continuity.
Sec. 206. Reauthorization of Glory mission.
Sec. 207. Plan for disposition of Deep Space Climate Observatory.

TITLE III—AERONAUTICS

Sec. 301. Environmentally friendly aircraft research and development initiative.
Sec. 302. Research alignment.
Sec. 303. Research program to determine perceived impact of sonic booms.
Sec. 304. External review of NASA's aviation safety-related research programs.
Sec. 305. Interagency research initiative on the impact of aviation on the climate.
Sec. 306. Research program on design for certification.
Sec. 307. Aviation weather research.
Sec. 308. Joint Aeronautics Research and Development Advisory Committee.
Sec. 309. Funding for research and development activities in support of other mission directorates.
Sec. 310. University-based centers for research on aviation training.

TITLE IV—INTERNATIONAL EXPLORATION INITIATIVE

Sec. 401. Sense of Congress.
Sec. 402. Stepping stone approach to exploration.
Sec. 403. Lunar outpost.
Sec. 404. Exploration technology development.
Sec. 405. Exploration risk mitigation plan.
Sec. 406. Exploration crew rescue.
Sec. 407. Participatory exploration.
Sec. 408. Science and exploration.

TITLE V—SPACE SCIENCE

Sec. 501. Technology development.
Sec. 502. Provision for future servicing of observatory-class scientific spacecraft.
Sec. 503. Mars exploration.
Sec. 504. Importance of a balanced science program.

Sec. 505. Restoration of radioisotope thermoelectric generator material production.
Sec. 506. Assessment of impediments to interagency cooperation on space and Earth science missions.
Sec. 507. Assessment of cost growth.

TITLE VI—SPACE OPERATIONS

Subtitle A—International Space Station

Sec. 601. Utilization.
Sec. 602. Research management plan.
Sec. 603. Contingency plan for cargo resupply.

Subtitle B—Space Shuttle

Sec. 611. Flight manifest.
Sec. 612. Disposition of shuttle-related assets.
Sec. 613. Space Shuttle transition liaison office.

Subtitle C—Launch Services

Sec. 621. Launch services strategy.

TITLE VII—EDUCATION

Sec. 701. Response to review.
Sec. 702. External review of Explorer Schools program.

TITLE VIII—NEAR-EARTH OBJECTS

Sec. 801. In general.
Sec. 802. Findings.
Sec. 803. Requests for information.
Sec. 804. Establishment of policy.
Sec. 805. Planetary radar capability.
Sec. 806. Arecibo Observatory.

TITLE IX—COMMERCIAL INITIATIVES

Sec. 901. Sense of Congress.
Sec. 902. Commercial crew initiative.

TITLE X—REVITALIZATION OF NASA INSTITUTIONAL CAPABILITIES

Sec. 1001. Review of information security controls.
Sec. 1002. Maintenance and upgrade of Center facilities.
Sec. 1003. Assessment of NASA laboratory capabilities.

TITLE XI—OTHER PROVISIONS

Sec. 1101. Space weather.
Sec. 1102. Space traffic management.
Sec. 1103. Study of export control policies related to civil and commercial space activities.
Sec. 1104. Astronaut health care.
Sec. 1105. National Academies decadal surveys.
Sec. 1106. Innovation prizes.

SEC. 2. FINDINGS.

The Congress finds, on this, the 50th anniversary of the establishment of the National Aeronautics and Space Administration, 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) Investment in NASA's programs will promote innovation through research and development, and will improve the competitiveness of the United States.

(3) Investment in NASA's programs, like investments in other Federal science and technology activities, is an investment in our future.

(4) Properly structured, NASA's activities can contribute to an improved quality of life, economic vitality, United States leadership in peaceful cooperation with other nations on challenging undertakings in science and technology, national security, and the advancement of knowledge.

(5) NASA should assume a leadership role in a cooperative international Earth observations and research effort to address key research issues associated with climate change and its impacts on the Earth system.

(6) NASA should undertake a program of aeronautical research, development, and where appropriate demonstration activities with the overarching goals of—

(A) ensuring that the Nation's future air transportation system can handle up to 3 times the current travel demand and incorporate new vehicle types with no degradation in safety or adverse environmental impact on local communities;

(B) protecting the environment;

(C) promoting the security of the Nation; and

(D) retaining the leadership of the United States in global aviation.

(7) Human and robotic exploration of the solar system will be a significant long term 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.

(8) Developing United States human space flight capabilities to allow independent American access to the International Space Station, and to explore beyond low Earth orbit, is a strategically important national imperative, and all prudent steps should thus be taken to bring the Orion Crew Exploration Vehicle and Ares I Crew Launch Vehicle to full operational capability as soon as practicable.

(9) NASA's scientific research activities have contributed much to the advancement of knowledge, provided societal benefits, and helped train the next generation of scientists and engineers, and those activities should continue to be an important priority.

(10) NASA should make a sustained commitment to a robust long-term technology development activity. Such investments represent the critically important "seed corn" on which NASA's ability to carry out challenging and productive missions in the future will depend.

(11) NASA, through its pursuit of challenging and relevant activities, can provide an important stimulus to the next generation to pursue careers in science, technology, engineering, and mathematics.

(12) Commercial activities have substantially contributed to the strength of both the United States space program and the national economy, and the development of a healthy and robust United States commercial space sector should continue to be encouraged.

(13) It is in the national interest for the United States to have an export control policy that protects the national secu-

rity while also enabling the United States aerospace industry to compete effectively in the global market place and the United States to undertake cooperative programs in science and human space flight in an effective and efficient manner.

SEC. 3. DEFINITIONS.

In this Act:

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

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

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

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

TITLE I—AUTHORIZATION OF APPROPRIATIONS FOR FISCAL YEAR 2009

SEC. 101. FISCAL YEAR 2009.

(a) BASELINE AUTHORIZATION.—There are authorized to be appropriated to NASA for fiscal year 2009 $19,210,000,000, as follows:

(1) For Science, $4,932,200,000, of which—

(A) $1,518,000,000 shall be for Earth Science, including $29,200,000 for Suborbital activities and $2,500,000 for carrying out section 313 of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155);

(B) $1,483,000,000 shall be for Planetary Science, including $486,500,000 for the Mars Exploration program, $2,000,000 to continue planetary radar operations at the Arecibo Observatory in support of the Near-Earth Object program, and $5,000,000 for radioisotope material production, to remain available until expended;

(C) $1,290,400,000 shall be for Astrophysics, including $27,300,000 for Suborbital activities;

(D) $640,800,000 shall be for Heliophysics, including $50,000,000 for Suborbital activities; and

(E) $75,000,000 shall be for Cross-Science Mission Directorate Technology Development, to be taken on a proportional basis from the funding subtotals under subparagraphs (A), (B), (C), and (D).

(2) For Aeronautics, $853,400,000, of which $406,900,000 shall be for system-level research, development, and demonstration activities related to—

(A) aviation safety;

(B) environmental impact mitigation, including noise, energy efficiency, and emissions;

(C) support of the Next Generation Air Transportation System initiative; and

(D) investigation of new vehicle concepts and flight regimes.

(3) For Exploration, $3,886,000,000, of which $100,000,000 shall be for the activities under sections 902(b) and 902(d); and $737,800,000 shall be for Advanced Capabilities, including

$106,300,000 for the Lunar Precursor Robotic Program, $276,500,000 for International Space Station-related research and development activities, and $355,000,000 for research and development activities not related to the International Space Station.

(4) For Education, $128,300,000.

(5) For Space Operations, $6,074,700,000, of which—

(A) $150,000,000 shall be for an additional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer to the International Space Station;

(B) $100,000,000 shall be to augment funding for International Space Station Cargo Services to enhance research utilization of the International Space Station, to remain available until expended; and

(C) $50,000,000 shall be to augment funding for Space Operations Mission Directorate reserves and Shuttle Transition and Retirement activities.

(6) For Cross-Agency Support Programs, $3,299,900,000.

(7) For Inspector General, $35,500,000.

(b) ADDITIONAL AUTHORIZATION TO ADDRESS HUMAN SPACE FLIGHT GAP.—In addition to the sums authorized by subsection (a), there are authorized to be appropriated for the purposes described in subsection (a)(3) $1,000,000,000 for fiscal year 2009, to be used to accelerate the initial operational capability of the Orion Crew Exploration Vehicle and the Ares I Crew Launch Vehicle and associated ground support systems, to remain available until expended.

TITLE II—EARTH SCIENCE

SEC. 201. GOAL.

The goal for NASA's Earth Science program shall be to pursue a program of Earth observations, research, and applications activities to better understand the Earth, how it supports life, and how human activities affect its ability to do so in the future. In pursuit of this goal, NASA's Earth Science program shall ensure that securing practical benefits for society will be an important measure of its success in addition to securing new knowledge about the Earth system and climate change. In further pursuit of this goal, NASA shall assume a leadership role in developing and carrying out a cooperative international Earth observations-based research and applications program.

SEC. 202. GOVERNANCE OF UNITED STATES EARTH OBSERVATIONS ACTIVITIES.

(a) STUDY.—The Director of the OSTP shall enter into an arrangement with the National Academies for a study to determine the most appropriate governance structure for United States Earth Observations programs in order to meet evolving United States Earth information needs and facilitate United States participation in global Earth Observations initiatives.

(b) REPORT.—The Director shall transmit the study to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 18 months after the date of enactment of this Act, and shall provide OSTP's plan for implementing the

study's recommendations not later than 24 months after the date of enactment of this Act.

SEC. 203. DECADAL SURVEY MISSIONS.

(a) IN GENERAL.—The missions recommended in the National Academies' decadal survey "Earth Science and Applications from Space" provide the basis for a compelling and relevant program of research and applications, and the Administrator should work to establish an international cooperative effort to pursue those missions.

(b) PLAN.—The Administrator shall prepare a plan for submission to Congress not later than 270 days after the date of enactment of this Act that shall describe how NASA intends to implement the missions recommended as described in subsection (a), whether by means of dedicated NASA missions, multi-agency missions, international cooperative missions, data sharing, or commercial data buys, or by means of long-term technology development to determine whether specific missions would be executable at a reasonable cost and within a reasonable schedule.

SEC. 204. TRANSITIONING EXPERIMENTAL RESEARCH INTO OPERATIONAL SERVICES.

(a) SENSE OF CONGRESS.—It is the sense of the Congress that experimental NASA sensors and missions that have the potential to benefit society if transitioned into operational monitoring systems be transitioned into operational status whenever possible.

(b) INTERAGENCY PROCESS.—The Director of OSTP, in consultation with the Administrator and the Administrator of NOAA, shall develop a process for Federal agencies to transition, when appropriate, NASA Earth science and space weather missions or sensors into operational status. The process shall include coordination of annual agency budget requests as required to execute the transitions.

(c) RESPONSIBLE AGENCY OFFICIAL.—The Administrator and the Administrator of NOAA shall each designate an agency official who shall have the responsibility for and authority to lead NASA's and NOAA's transition activities and interagency coordination.

(d) PLAN.—For each mission or sensor that is determined to be appropriate for transition under subsection (b), NASA and NOAA shall transmit to Congress a joint plan for conducting the transition. The plan shall include the strategy, milestones, and budget required to execute the transition. The transition plan shall be transmitted to Congress not later than 60 days after the successful completion of the mission or sensor critical design review.

SEC. 205. LANDSAT THERMAL INFRARED DATA CONTINUITY.

(a) PLAN.—In view of the importance of Landsat thermal infrared data for both scientific research and water management applications, the Administrator shall prepare a plan for ensuring the continuity of Landsat thermal infrared data or its equivalent, including allocation of costs and responsibility for the collection and distribution of the data, and a budget plan. As part of the plan, the Administrator shall provide an option for developing a thermal infrared sensor at minimum cost to be flown on the Landsat Data Continuity Mission with minimum delay to the schedule of the Landsat Data Continuity Mission.

(b) DEADLINE.—The plan shall be provided to Congress not later than 60 days after the date of enactment of this Act.

SEC. 206. REAUTHORIZATION OF GLORY MISSION.

(a) REAUTHORIZATION.—Congress reauthorizes NASA to continue with development of the Glory mission, which will examine how aerosols and solar energy affect the Earth's climate.

(b) BASELINE REPORT.—Pursuant to the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155), not later than 90 days after the date of enactment of this Act, the Administrator shall transmit a new baseline report consistent with section 103(b)(2) of such Act. The report shall include an analysis of the factors contributing to cost growth and the steps taken to address them.

SEC. 207. PLAN FOR DISPOSITION OF DEEP SPACE CLIMATE OBSERVATORY.

(a) PLAN.—NASA shall develop a plan for the Deep Space Climate Observatory (DSCOVR), including such options as using the parts of the spacecraft in the development and assembly of other science missions, transferring the spacecraft to another agency, reconfiguring the spacecraft for another Earth science mission, establishing a public-private partnership for the mission, and entering into an international cooperative partnership to use the spacecraft for its primary or other purposes. The plan shall include an estimate of budgetary resources and schedules required to implement each of the options.

(b) CONSULTATION.—NASA shall consult, as necessary, with other Federal agencies, industry, academic institutions, and international space agencies in developing the plan.

(c) REPORT.—The Administrator shall transmit the plan required under subsection (a) to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 180 days after the date of enactment of this Act.

TITLE III—AERONAUTICS

SEC. 301. ENVIRONMENTALLY FRIENDLY AIRCRAFT RESEARCH AND DEVELOPMENT INITIATIVE.

The Administrator shall establish an initiative of research, development, and demonstration, in a relevant environment, of technologies to enable the following commercial aircraft performance characteristics:

(1) Noise levels on takeoff and on airport approach and landing that do not exceed ambient noise levels in the absence of flight operations in the vicinity of airports from which such commercial aircraft would normally operate, without increasing energy consumption or nitrogen oxide emissions compared to aircraft in commercial service as of the date of enactment of this Act.

(2) Significant reductions in greenhouse gas emissions compared to aircraft in commercial services as of the date of enactment of this Act.

SEC. 302. RESEARCH ALIGNMENT.

In addition to pursuing the research and development initiative described in section 301, the Administrator shall, to the maximum extent practicable within available funding, align the fundamental aeronautics research program to address high priority technology challenges of the National Academies' Decadal Survey of Civil Aeronautics.

SEC. 303. RESEARCH PROGRAM TO DETERMINE PERCEIVED IMPACT OF SONIC BOOMS.

(a) IN GENERAL.—The ability to fly commercial aircraft over land at supersonic speeds without adverse impacts on the environment or on local communities would open new markets and enable new transportation capabilities. In order to have the basis for establishing an appropriate sonic boom standard for such flight operations, a research program is needed to assess the impact in a relevant environment of commercial supersonic flight operations.

(a) ESTABLISHMENT.—The Administrator shall establish a cooperative research program with industry, including the conduct of flight demonstrations in a relevant environment, to collect data on the perceived impact of sonic booms that would enable the promulgation of a standard that would have to be met for overland commercial supersonic flight operations.

SEC. 304. EXTERNAL REVIEW OF NASA'S AVIATION SAFETY-RELATED RESEARCH PROGRAMS.

(a) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for an independent review of NASA's aviation safety-related research programs. The review shall assess whether—

(1) the programs have well-defined, prioritized, and appropriate research objectives;

(2) the programs are properly coordinated with the safety research programs of the Federal Aviation Administration and other relevant Federal agencies;

(3) the programs have allocated appropriate resources to each of the research objectives; and

(4) suitable mechanisms exist for transitioning the research results from the programs into operational technologies and procedures and certification activities in a timely manner.

(c) REPORT.—Not later than 14 months after the date of enactment of this Act, the Administrator shall submit 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 on the results of the review.

SEC. 305. INTERAGENCY RESEARCH INITIATIVE ON THE IMPACT OF AVIATION ON THE CLIMATE.

(a) IN GENERAL.—The Administrator, in coordination with the United States Climate Change Science Program and other appropriate agencies, shall establish a research initiative to assess the impact of aviation on the climate and, if warranted, to evaluate approaches to mitigate that impact.

(b) RESEARCH PLAN.—Not later than 1 year after the date of enactment of this Act, the participating Federal entities shall jointly develop a plan for the research initiative that contains objectives, proposed tasks, milestones, and a 5-year budgetary profile.

(c) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for conducting an independent review of the interagency research program plan, and shall provide the results of that review to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 2 years after the date of enactment of this Act.

SEC. 306. RESEARCH PROGRAM ON DESIGN FOR CERTIFICATION.

(a) PROGRAM.—Not later than 6 months after the date of enactment of this Act, NASA, in consultation with other appropriate agencies, shall establish a research program on methods to improve both confidence in and the timeliness of certification of new technologies for their introduction into the national airspace system.

(b) RESEARCH PLAN.—Not later than 1 year after the date of enactment of this Act, as part of the activity described in subsection (a), NASA shall develop a plan for the research program that contains objectives, proposed tasks, milestones, and a 5-year budgetary profile.

(c) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for conducting an independent review of the research program plan, and shall provide the results of that review to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 2 years after the date of enactment of this Act.

SEC. 307. AVIATION WEATHER RESEARCH.

The Administrator shall establish a program of collaborative research with NOAA on convective weather events, with the goal of significantly improving the reliability of 2-hour to 6-hour aviation weather forecasts.

SEC. 308. JOINT AERONAUTICS RESEARCH AND DEVELOPMENT ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—A joint Aeronautics Research and Development Advisory Committee (in this section referred to as the "Advisory Committee") shall be established.

(b) DUTIES.—The Advisory Committee shall—

(1) assess, and make recommendations regarding, the coordination of research and development activities of NASA and the Federal Aviation Administration;

(2) assess, and make recommendations regarding, the status of the activities of NASA and the Federal Aviation Administration's research and development programs as they relate to the recommendations contained in the National Research Council's 2006 report entitled "Decadal Survey of Civil Aeronautics", and the recommendations contained in subsequent National Research Council reports of a similar nature; and

(3) not later than March 15 of each year, transmit a report to the Administrator, the Administrator of the Federal Aviation Administration, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate on the Advisory Committee's findings and recommendations under paragraphs (1) and (2).

(c) MEMBERSHIP.—The Advisory Committee shall consist of 10 members, none of whom shall be a Federal employee, including—

(1) 5 members selected by the Administrator; and

(2) 5 members selected by the Chair of the Federal Aviation Administration's Research, Engineering, and Development Advisory Committee (REDAC).

(d) SELECTION PROCESS.—Initial selections under subsection (c) shall be made within 3 months after the date of enactment of this Act. Vacancies shall be filled in the same manner as provided in subsection (c).

(e) CHAIRPERSON.—The Advisory Committee shall select a chairperson from among its members.

(f) COORDINATION.—The Advisory Committee shall coordinate with the advisory bodies of other Federal agencies, which may engage in related research activities.

(g) COMPENSATION.—The members of the Advisory Committee shall serve without compensation, but shall receive travel expenses, including per diem in lieu of subsistence, in accordance with sections 5702 and 5703 of title 5, United States Code.

(h) MEETINGS.—The Advisory Committee shall convene, in person or by electronic means, at least 4 times per year.

(i) QUORUM.—A majority of the members serving on the Advisory Committee shall constitute a quorum for purposes of conducting the business of the Advisory Committee.

(j) DURATION.—Section 14 of the Federal Advisory Committee Act shall not apply to the Advisory Committee.

SEC. 309. FUNDING FOR RESEARCH AND DEVELOPMENT ACTIVITIES IN SUPPORT OF OTHER MISSION DIRECTORATES.

Research and development activities performed by the Aeronautics Research Mission Directorate with the primary objective of assisting in the development of a flight project in another Mission Directorate shall be funded by the Mission Directorate seeking assistance.

SEC. 310. UNIVERSITY-BASED CENTERS FOR RESEARCH ON AVIATION TRAINING.

Section 427(a) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155) is amended by striking "may" and inserting "shall".

TITLE IV—INTERNATIONAL EXPLORATION INITIATIVE

SEC. 401. SENSE OF CONGRESS.

It is the sense of Congress that the President of the United States should invite America's friends and allies to participate in a long-term international initiative under the leadership of the United States to expand human and robotic presence into the solar system, including the exploration and utilization of the Moon, near Earth asteroids, Lagrangian Points, and eventually Mars and its moons, among other exploration and utilization goals.

SEC. 402. STEPPING STONE APPROACH TO EXPLORATION.

In order to maximize the cost-effectiveness of the long-term exploration and utilization activities of the United States, the Administrator shall take all necessary steps to ensure that activities in its lunar exploration program shall be designed and implemented

in a manner that gives strong consideration to how those activities might also help meet the requirements of future exploration and utilization activities beyond the Moon. The timetable of the lunar phase of the long-term international exploration initiative shall be determined by the availability of funding and agreement on an international cooperative framework for the conduct of the international exploration initiative. However, once an exploration-related project enters its development phase, the Administrator shall seek, to the maximum extent practicable, to complete that project without undue delays.

SEC. 403. LUNAR OUTPOST.

(a) ESTABLISHMENT.—As NASA works toward the establishment of a lunar outpost, NASA shall make no plans that would require a lunar outpost to be occupied to maintain its viability. Any such outpost shall be operable as a human-tended facility capable of remote or autonomous operation for extended periods.

(b) DESIGNATION.—The United States portion of the first human-tended outpost established on the surface of the Moon shall be designated the "Neil A. Armstrong Lunar Outpost".

(c) CONGRESSIONAL INTENT.—It is the intent of Congress that NASA shall make use of commercial services to the maximum extent practicable in support of its lunar outpost activities.

SEC. 404. EXPLORATION TECHNOLOGY DEVELOPMENT.

(a) IN GENERAL.—A robust program of long-term exploration-related technology research and development will be essential for the success and sustainability of any enduring initiative of human and robotic exploration of the solar system.

(b) ESTABLISHMENT.—The Administrator shall establish and maintain a program of long-term exploration-related technology research and development that is not tied to specific flight projects and that has a funding goal of at least 10 percent of the total budget of the Exploration Systems Mission Directorate.

(c) GOALS.—The long-term technology program shall have the goal of having at least 50 percent of the funding allocated to external grants and contracts with universities, research institutions, and industry.

SEC. 405. EXPLORATION RISK MITIGATION PLAN.

(a) PLAN.—The Administrator shall prepare a plan that identifies and prioritizes the scientific and technical risks that will need to be addressed in carrying out human exploration beyond low Earth orbit and the research and development activities required to address those risks. The plan shall address the role of the International Space Station in exploration risk mitigation and include a detailed description of the specific steps being taken to utilize the International Space Station for that purpose.

(b) REPORT.—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 the plan described in subsection (a) not later than one year after the date of enactment of this Act.

SEC. 406. EXPLORATION CREW RESCUE.

In order to maximize the ability to rescue astronauts whose space vehicles have become disabled, the Administrator shall enter into discussions with the appropriate representatives of spacefaring nations who have or plan to have crew transportation systems capable of orbital flight or flight beyond low Earth orbit for the purpose of agreeing on a common docking system standard.

SEC. 407. PARTICIPATORY EXPLORATION.

(a) IN GENERAL.—The Administrator shall develop a technology plan to enable dissemination of information to the public to allow the public to experience missions to the Moon, Mars, or other bodies within our solar system by leveraging advanced exploration technologies. The plan shall identify opportunities to leverage technologies in NASA's Constellation systems that deliver a rich, multimedia experience to the public, and that facilitate participation by the public, the private sector, and international partners. Technologies for collecting high-definition video, 3-dimensional images, and scientific data, along with the means to rapidly deliver this content through extended high bandwidth communications networks shall be considered as part of this plan. It shall include a review of high bandwidth radio and laser communications, high-definition video, stereo imagery, 3-dimensional scene cameras, and Internet routers in space, from orbit, and on the lunar surface. The plan shall also consider secondary cargo capability for technology validation and science mission opportunities. In addition, the plan shall identify opportunities to develop and demonstrate these technologies on the International Space Station and robotic missions to the Moon.

(b) REPORT.—Not later than 270 days after the date of enactment of this Act, the Administrator shall submit the plan to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

SEC. 408. SCIENCE AND EXPLORATION.

It is the sense of Congress that NASA's scientific and human exploration activities are synergistic, i.e. science enables exploration and human exploration enables science. The Congress encourages the Administrator to coordinate, where practical, NASA's science and exploration activities with the goal of maximizing the success of human exploration initiatives and furthering our understanding of the Universe that we explore.

TITLE V—SPACE SCIENCE

SEC. 501. TECHNOLOGY DEVELOPMENT.

The Administrator shall establish a cross-Directorate long-term technology development program for space and Earth science within the Science Mission Directorate for the development of new technology. The program shall be independent of the flight projects under development. NASA shall have a goal of funding the cross-Directorate technology development program at a level of 5 percent of the total Science Mission Directorate annual budget. The program shall be structured to include competitively awarded grants and contracts.

SEC. 502. PROVISION FOR FUTURE SERVICING OF OBSERVATORY-CLASS SCIENTIFIC SPACECRAFT.

The Administrator shall take all necessary steps to ensure that provision is made in the design and construction of all future observatory-class scientific spacecraft intended to be deployed in Earth orbit or at a Lagrangian point in space for robotic or human servicing and repair.

SEC. 503. MARS EXPLORATION.

Congress reaffirms its support for a systematic, integrated program of exploration of the Martian surface to examine the planet whose surface is most like Earth's, to search for evidence of past or present life, and to examine Mars for future habitability and as a long-term goal for future human exploration.

SEC. 504. IMPORTANCE OF A BALANCED SCIENCE PROGRAM.

It is the sense of Congress that a balanced and adequately funded set of activities, consisting of NASA's research and analysis grants programs, technology development, small, medium-sized, and large space science missions, and suborbital research activities, contributes to a robust and productive science program and serves as a catalyst for innovation. It is further the sense of Congress that suborbital flight activities, including the use of sounding rockets, aircraft, and high-altitude balloons, offer valuable opportunities to advance science, train the next generation of scientists and engineers, and provide opportunities for participants in the programs to acquire skills in systems engineering and systems integration that are critical to maintaining the Nation's leadership in space programs. The Congress believes that it is in the national interest to expand the size of NASA's suborbital research program.

SEC. 505. RESTORATION OF RADIOISOTOPE THERMOELECTRIC GENERATOR MATERIAL PRODUCTION.

(a) PLAN.—The Director of OSTP shall develop a plan for restarting and sustaining the domestic production of radioisotope thermoelectric generator material for deep space and other space science missions.

(b) REPORT.—The plan developed under subsection (a) shall be transmitted to Congress not later than 270 days after the date of enactment of this Act.

SEC. 506. ASSESSMENT OF IMPEDIMENTS TO INTERAGENCY COOPERATION ON SPACE AND EARTH SCIENCE MISSIONS.

(a) ASSESSMENT.—The Administrator shall enter into an arrangement with the National Academies to assess impediments to the successful conduct of interagency cooperation on space and Earth science missions, to provide lessons learned and best practices, and to recommend steps to help facilitate successful interagency collaborations on space and Earth science missions.

(b) REPORT.—The report of the assessment carried out under subsection (a) shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 15 months after the date of enactment of this Act.

SEC. 507. ASSESSMENT OF COST GROWTH.

(a) STUDY.—The Administrator shall enter into an arrangement for an independent external assessment to identify the primary

causes of cost growth in the large, medium-sized, and small space and Earth science spacecraft mission classes, and make recommendations as to what changes, if any, should be made to contain costs and ensure frequent mission opportunities in NASA's science spacecraft mission programs.

(b) REPORT.—The report of the assessment conducted under subsection (a) shall be submitted to Congress not later than 15 months after the date of enactment of this Act.

TITLE VI—SPACE OPERATIONS

Subtitle A—International Space Station

SEC. 601. UTILIZATION.

The Administrator shall take all necessary steps to ensure that the International Space Station remains a viable and productive facility capable of potential United States utilization through at least 2020 and shall take no steps that would preclude its continued operation and utilization by the United States after 2016.

SEC. 602. RESEARCH MANAGEMENT PLAN.

(a) RESEARCH MANAGEMENT PLAN.—The Administrator shall develop a research management plan for the International Space Station. The plan shall include a process for selecting and prioritizing research activities (including fundamental, applied, commercial, and other research) for flight on the International Space Station. This plan shall be used to prioritize resources such as crew time, racks and equipment, and United States access to international research facilities and equipment. The plan shall also identify the organization to be responsible for managing United States research on the International Space Station, including a description of the relationship of the management institution with NASA (e.g., internal NASA office, contract, cooperative agreement, or grant), the estimated length of time for the arrangement, and the budget required to support the management institution. The plan shall be developed in consultation with other Federal agencies, academia, industry, and other relevant stakeholders. The plan shall be transmitted to Congress not later than 12 months after the date of enactment of this Act.

(b) ACCESS TO NATIONAL LABORATORY.—The Administrator shall—

(1) establish a process by which to support International Space Station National Laboratory users in identifying their requirements for transportation of research supplies to and from the International Space Station, and for communicating those requirements to NASA and International Space Station transportation services providers; and

(2) develop an estimate of the transportation requirements needed to support users of the International Space Station National Laboratory and develop a plan for satisfying those requirements by dedicating a portion of volume on NASA supply missions to the International Space Station and missions returning from the International Space Station to Earth.

(c) ASSESSMENT.—The Administrator shall—

(1) identify existing research equipment and racks and support equipment that are manifested for flight; and

(2) provide a detailed description of the status of research equipment and facilities that were completed or in development prior to being cancelled, and provide the budget and milestones for completing and preparing the equipment for flight on the International Space Station.

(d) ADVISORY COMMITTEE.—-Not later than 1 year after the date of enactment of this Act, the Administrator shall establish an advisory panel under the Federal Advisory Committee Act to monitor the activities and management of the International Space Station National Laboratory.

SEC. 603. CONTINGENCY PLAN FOR CARGO RESUPPLY.

(a) IN GENERAL.—The International Space Station represents a significant investment of national resources, and it is a facility that embodies a cooperative international approach to the exploration and utilization of space. As such, it is important that its continued viability and productivity be ensured, to the maximum extent possible, after the Space Shuttle is retired.

(b) CONTINGENCY PLAN.—The Administrator shall develop a contingency plan and arrangements, including use of International Space Station international partner cargo resupply capabilities, to ensure the continued viability and productivity of the International Space Station in the event that United States commercial cargo resupply services are not available during any extended period after the date that the Space Shuttle is retired. The plan shall be delivered to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than one year after the date of enactment of this Act.

Subtitle B—Space Shuttle

SEC. 611. FLIGHT MANIFEST.

(a) BASELINE MANIFEST.—In addition to the Space Shuttle flights listed as part of the baseline flight manifest as of January 1, 2008, the Utilization flights ULF–4 and ULF–5 shall be considered part of the Space Shuttle baseline flight manifest and shall be flown prior to the retirement of the Space Shuttle.

(b) ADDITIONAL FLIGHT TO DELIVER THE ALPHA MAGNETIC SPECTROMETER TO THE INTERNATIONAL SPACE STATION.—In addition to the flying of the baseline manifest as described in subsection (a), the Administrator shall take all necessary steps to fly one additional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer to the International Space Station prior to the retirement of the Space Shuttle.

(c) SPACE SHUTTLE RETIREMENT DATE.—The Space Shuttle shall be retired following the completion of the baseline flight manifest and the flight of the additional flight specified in subsection (b), events that are anticipated to occur in 2010.

SEC. 612. DISPOSITION OF SHUTTLE-RELATED ASSETS.

Not later than 90 days after the date of enactment of this Act, the Administrator shall provide a plan to Congress for the disposition of the remaining Space Shuttle orbiters and other Space Shut-

tle program-related hardware and facilities after the retirement of the Space Shuttle fleet. The plan shall include a process by which educational institutions and science museums and other appropriate organizations may acquire, through loan or disposal by the Federal Government, Space Shuttle program-related hardware. The Administrator shall not dispose of any Space Shuttle-related hardware prior to the completion of the plan.

SEC. 613. SPACE SHUTTLE TRANSITION LIAISON OFFICE.

(a) ESTABLISHMENT.—The Administrator shall establish an office within NASA's Office of Human Capital Management that shall assist local communities affected by the termination of the Space Shuttle program. The office shall offer technical assistance and serve as a clearinghouse to assist communities in identifying services available from other Federal agencies.

(b) SUNSET.—The Office established under subsection (a) shall cease operations 24 months after the last Space Shuttle flight.

Subtitle C—Launch Services

SEC. 621. LAUNCH SERVICES STRATEGY.

(a) IN GENERAL.—In preparation for the award of contracts to follow up on the current NASA Launch Services (NLS) contracts, the Administrator shall develop a strategy for providing domestic commercial launch services in support of NASA's small and medium-sized Science, Space Operations, and Exploration missions, consistent with current law and policy.

(b) REPORT.—The Administrator shall transmit a report to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing the strategy developed under subsection (a) not later than 90 days after the date of enactment of this Act. The report shall provide, at a minimum—

(1) the results of the Request for Information on small to medium-sized launch services released on April 22, 2008;

(2) an analysis of possible alternatives to maintain small and medium-sized lift capabilities after June 30, 2010, including the use of the Department of Defense's Evolved Expendable Launch Vehicle (EELV);

(3) the recommended alternatives, and associated 5-year budget plans starting in October 2010 that would enable their implementation; and

(4) a contingency plan in the event the recommended alternatives described in paragraph (3) are not available when needed.

TITLE VII—EDUCATION

SEC. 701. RESPONSE TO REVIEW.

(a) PLAN.—The Administrator shall prepare a plan identifying actions taken or planned in response to the recommendations of the National Academies report, "NASA's Elementary and Secondary Education Program: Review and Critique". For those actions that have not been implemented, the plan shall include a schedule and budget required to support the actions.

(b) REPORT.—The plan prepared under subsection (a) shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

SEC. 702. EXTERNAL REVIEW OF EXPLORER SCHOOLS PROGRAM.

(a) REVIEW.—The Administrator shall make arrangements for an independent external review of the Explorer Schools program to evaluate its goals, status, plans, and accomplishments.

(b) REPORT.—The report of the independent external review shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

TITLE VIII—NEAR-EARTH OBJECTS

SEC. 801. IN GENERAL.

The Congress reaffirms the policy direction established in the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155) for NASA to detect, track, catalogue, and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter. NASA's Near-Earth Object program activities will also provide benefits to NASA's scientific and exploration activities.

SEC. 802. FINDINGS.

Congress makes the following findings:

(1) Near-Earth objects pose a serious and credible threat to humankind, as many scientists believe that a major asteroid or comet was responsible for the mass extinction of the majority of the Earth's species, including the dinosaurs, nearly 65,000,000 years ago.

(2) Several such near-Earth objects have only been discovered within days of the objects' closest approach to Earth and recent discoveries of such large objects indicate that many large near-Earth objects remain undiscovered.

(3) Asteroid and comet collisions rank as one of the most costly natural disasters that can occur.

(4) The time needed to eliminate or mitigate the threat of a collision of a potentially hazardous near-Earth object with Earth is measured in decades.

(5) Unlike earthquakes and hurricanes, asteroids and comets can provide adequate collision information, enabling the United States to include both asteroid-collision and comet-collision disaster recovery and disaster avoidance in its public-safety structure.

(6) Basic information is needed for technical and policy decisionmaking for the United States to create a comprehensive program in order to be ready to eliminate and mitigate the serious and credible threats to humankind posed by potentially hazardous near-Earth asteroids and comets.

(7) As a first step to eliminate and to mitigate the risk of such collisions, situation and decision analysis processes, as

well as procedures and system resources, must be in place well before a collision threat becomes known.

SEC. 803. REQUESTS FOR INFORMATION.

The Administrator shall issue requests for information on—

(1) a low-cost space mission with the purpose of rendezvousing with and characterizing the Apophis asteroid, which scientists estimate will in 2029 pass at a distance from Earth that is closer than geostationary satellites; and

(2) a medium-sized space mission with the purpose of detecting near-Earth objects equal to or greater than 140 meters in diameter.

SEC. 804. ESTABLISHMENT OF POLICY.

The Director of OSTP shall—

(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 stake; and

(2) recommend a Federal agency or agencies to be responsible for protecting the Nation from a near-Earth object that is anticipated to collide with Earth and implementing a deflection campaign, in consultation with international bodies, should one be required.

SEC. 805. PLANETARY RADAR CAPABILITY.

The Administrator shall maintain a planetary radar that is, at minimum, comparable to the capability provided through the NASA Deep Space Network Goldstone facility.

SEC. 806. ARECIBO OBSERVATORY.

Congress reiterates its support for the use of the Arecibo Observatory for NASA-funded near-Earth object-related activities. The Administrator shall ensure the availability of the Arecibo Observatory's planetary radar to support these activities until the National Academies' review of NASA's approach for the survey and deflection of near-Earth objects, including a determination of the role of Arecibo, that was directed to be undertaken by the Fiscal Year 2008 Omnibus Appropriations Act, is completed.

TITLE IX—COMMERCIAL INITIATIVES

SEC. 901. SENSE OF CONGRESS.

It is the sense of Congress that a healthy and robust commercial sector can make significant contributions to the successful conduct of NASA's space exploration program. While some activities are inherently governmental in nature, there are many other activities, such as routine supply of water, fuel, and other consumables to low Earth orbit or to destinations beyond low Earth orbit, and provision of power or communications services to lunar outposts, that potentially could be carried out effectively and efficiently by the commercial sector at some point in the future. Congress encourages NASA to look for such service opportunities and, to the maximum extent practicable, make use of the commercial sector to provide those services.

SEC. 902. COMMERCIAL CREW INITIATIVE.

(a) IN GENERAL.—In order to stimulate commercial use of space, help maximize the utility and productivity of the International

Space Station, and enable a commercial means of providing crew transfer and crew rescue services for the International Space Station, NASA shall—

(1) make use of United States commercially provided International Space Station crew transfer and crew rescue services to the maximum extent practicable, if those commercial services have demonstrated the capability to meet NASA-specified ascent, entry, and International Space Station proximity operations safety requirements;

(2) limit, to the maximum extent practicable, the use of the Crew Exploration Vehicle to missions carrying astronauts beyond low Earth orbit once commercial crew transfer and crew rescue services that meet safety requirements become operational;

(3) facilitate, to the maximum extent practicable, the transfer of NASA-developed technologies to potential United States commercial crew transfer and rescue service providers, consistent with United States law; and

(4) issue a notice of intent, not later than 180 days after the date of enactment of this Act, to enter into a funded, competitively awarded Space Act Agreement with two or more commercial entities for a Phase 1 Commercial Orbital Transportation Services (COTS) crewed vehicle demonstration program.

(b) COTS AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the program described in subsection (a)(4) $50,000,000 for fiscal year 2009, to remain available until expended.

(c) CONGRESSIONAL INTENT.—It is the intent of Congress that funding for the program described in subsection (a)(4) shall not come at the expense of full funding for Orion Crew Exploration Vehicle development, Ares I Crew Launch Vehicle development, or International Space Station cargo delivery.

(d) ADDITIONAL TECHNOLOGIES AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the provision of International Space Station-compatible docking adaptors and other relevant technologies to be made available to the commercial crew providers selected to service the International Space Station $50,000,000, to remain available until expended.

(e) CREW TRANSFER AND CREW RESCUE SERVICES CONTRACT.—If a commercial provider demonstrates the capability to provide International Space Station crew transfer and crew rescue services and to satisfy NASA ascent, entry, and International Space Station proximity operations safety requirements, NASA shall enter into an International Space Station crew transfer and crew rescue services contract with that commercial provider for a portion of NASA's anticipated International Space Station crew transfer and crew rescue requirements from the time the commercial provider commences operations under contract with NASA through calendar year 2016, with an option to extend the period of performance through calendar year 2020.

TITLE X—REVITALIZATION OF NASA INSTITUTIONAL CAPABILITIES

SEC. 1001. REVIEW OF INFORMATION SECURITY CONTROLS.

(a) REPORT ON CONTROLS.—Not later than one year after the date of enactment of this Act, the Comptroller General 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 review of information security controls that protect NASA's information technology resources and information from inadvertent or deliberate misuse, fraudulent use, disclosure, modification, or destruction. The review shall focus on networks servicing NASA's mission directorates. In assessing these controls, the review shall evaluate—

(1) the network's ability to limit, detect, and monitor access to resources and information, thereby safeguarding and protecting them from unauthorized access;

(2) the physical access to network resources; and

(3) the extent to which sensitive research and mission data is encrypted.

(b) RESTRICTED REPORT ON INTRUSIONS.—Not later than one year after the date of enactment of this Act, and in conjunction with the report described in subsection (a), the Comptroller General 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 restricted report detailing results of vulnerability assessments conducted by the Government Accountability Office on NASA's network resources. Intrusion attempts during such vulnerability assessments shall be divulged to NASA senior management prior to their application. The report shall put vulnerability assessment results in the context of unauthorized accesses or attempts during the prior two years and the corrective actions, recent or ongoing, that NASA has implemented in conjunction with other Federal authorities to prevent such intrusions.

SEC. 1002. MAINTENANCE AND UPGRADE OF CENTER FACILITIES.

(a) IN GENERAL.—In order to sustain healthy Centers that are capable of carrying out NASA's missions, the Administrator shall ensure that adequate maintenance and upgrading of those Center facilities is performed on a regular basis.

(b) REVIEW.—The Administrator shall determine and prioritize the maintenance and upgrade backlog at each of NASA's Centers and associated facilities, and shall develop a strategy and budget plan to reduce that maintenance and upgrade backlog by 50 percent over the next five years.

(c) REPORT.—The Administrator shall deliver a report to Congress on the results of the activities undertaken in subsection (b) concurrently with the delivery of the fiscal year 2011 budget request.

SEC. 1003. ASSESSMENT OF NASA LABORATORY CAPABILITIES.

(a) IN GENERAL.—NASA's laboratories are a critical component of NASA's research capabilities, and the Administrator shall ensure that those laboratories remain productive.

(b) REVIEW.—The Administrator shall enter into an arrangement for an independent external review of NASA's laboratories, includ-

ing laboratory equipment, facilities, and support services, to determine whether they are equipped and maintained at a level adequate to support NASA's research activities. The assessment shall also include an assessment of the relative quality of NASA's in-house laboratory equipment and facilities compared to comparable laboratories elsewhere.

TITLE XI—OTHER PROVISIONS

SEC. 1101. SPACE WEATHER.

(a) PLAN FOR REPLACEMENT OF ADVANCED COMPOSITION EXPLORER AT L-1 LAGRANGIAN POINT.—

(1) PLAN.—The Director of OSTP shall develop a plan for sustaining space-based measurements of solar wind from the L-1 Lagrangian point in space and for the dissemination of the data for operational purposes. OSTP shall consult with NASA, NOAA, and other Federal agencies, and with industry, in developing the plan.

(2) REPORT.—The Director shall transmit the plan to Congress not later than 1 year after the date of enactment of this Act.

(b) RESEARCH PROGRAM ON SPACE WEATHER AND AVIATION.—

(1) ESTABLISHMENT.—The Administrator shall, in coordination with the National Science Foundation, NOAA, and other relevant agencies, initiate a research program to—

(A) conduct or supervise research projects on impacts of space weather to aviation, including impacts on communication, navigation, avionic systems, and airline passengers and personnel; and

(B) facilitate the transfer of technology from space weather research programs to Federal agencies with operational responsibilities and to the private sector.

(2) USE OF GRANTS OR COOPERATIVE AGREEMENTS.—The Administrator may use grants or cooperative agreements in carrying out this subsection.

(c) ASSESSMENT OF THE IMPACT OF SPACE WEATHER ON AVIATION.—

(1) STUDY.—The Administrator shall enter into an arrangement with the National Research Council for a study of the impacts of space weather on the current and future United States aviation industry, and in particular to examine the risks for Over-The-Pole (OTP) and Ultra-Long-Range (ULR) operations. The study shall—

(A) examine space weather impacts on at least communications, navigation, avionics, and human health in flight;

(B) assess the benefits of space weather information and services to reduce aviation costs and maintain safety;

(C) provide recommendations on how NASA, NOAA, and the National Science Foundation can most effectively carry out research and monitoring activities related to space weather and aviation; and

(D) provide recommendations on how to integrate space weather information into the Next Generation Air Transportation System.

(2) REPORT.—A report containing the results of the study shall be provided to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

SEC. 1102. SPACE TRAFFIC MANAGEMENT.

(a) IN GENERAL.—As more nations acquire the capabilities for launching payloads into outer space, there is an increasing need for a framework under which information intended to promote safe access into outer space, operations in outer space, and return from outer space to Earth free from physical or radio-frequency interference can be shared among those nations.

(b) DISCUSSIONS.—The Administrator, in consultation with other appropriate agencies of the Federal Government, shall initiate discussions with the appropriate representatives of other spacefaring nations with the goal of determining an appropriate framework under which information intended to promote safe access into outer space, operations in outer space, and return from outer space to Earth free from physical or radio-frequency interference can be shared among those nations.

SEC. 1103. STUDY OF EXPORT CONTROL POLICIES RELATED TO CIVIL AND COMMERCIAL SPACE ACTIVITIES.

(a) REVIEW.—The Director of OSTP shall carry out a study of the impact of current export control policies and implementation directives on the United States aerospace industry and its competitiveness in global markets, and on the ability of United States Government agencies to carry out cooperative activities in science and technology and human space flight, including the impact on research carried out under the sponsorship of those agencies.

(b) CONSULTATION.—In carrying out the study, the Director shall seek input from industry, academia, representatives of the science community, all affected United States Government agencies, and any other appropriate organizations and individuals.

(c) REPORT.—The Director shall provide a report detailing the findings and recommendations of the study to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 9 months after the date of enactment of this Act.

SEC. 1104. ASTRONAUT HEALTH CARE.

(a) SURVEY.—The Administrator shall administer an anonymous survey of astronauts and flight surgeons to evaluate communication, relationships, and the effectiveness of policies. The survey questions and the analysis of results shall be evaluated by experts independent of NASA. The survey shall be administered on at least a biennial basis.

(b) REPORT.—The Administrator shall transmit a report of the results of the survey to Congress not later than 90 days following completion of the survey.

SEC. 1105. NATIONAL ACADEMIES DECADAL SURVEYS.

(a) IN GENERAL.—The Administrator shall enter into agreements on a periodic basis with the National Academies for independent assessments, also known as decadal surveys, to take stock of the status and opportunities for Earth and space science discipline

fields and Aeronautics research and to recommend priorities for research and programmatic areas over the next decade.

(b) INDEPENDENT COST ESTIMATES.—-The agreements described in subsection(a) shall include independent estimates of the life cycle costs and technical readiness of missions assessed in the decadal surveys whenever possible.

(c) REEXAMINATION.—- The Administrator shall request that each National Academies decadal survey committee identify any conditions or events, such as significant cost growth or scientific or technological advances, that would warrant NASA asking the National Academies to reexamine the priorities that the decadal survey had established.

SEC. 1106. INNOVATION PRIZES.

(a) IN GENERAL.—Prizes can play a useful role in encouraging innovation in the development of technologies and products that can assist NASA in its aeronautics and space activities, and the use of such prizes by NASA should be encouraged.

(b) AMENDMENTS.—Section 314 of the National Aeronautics and Space Act of 1958 is amended—

(1) by amending subsection (b) to read as follows:

"(b) TOPICS.—In selecting topics for prize competitions, the Administrator shall consult widely both within and outside the Federal Government, and may empanel advisory committees. The Administrator shall give consideration to prize goals such as the demonstration of the ability to provide energy to the lunar surface from space-based solar power systems, demonstration of innovative near-Earth object survey and deflection strategies, and innovative approaches to improving the safety and efficiency of aviation systems."; and

(2) in subsection (i)(4) by striking "$10,000,000" and inserting "$50,000,000".

[The information follows:]

Section By Section

Section-by-Section Analysis

H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008

Sec. 1. Short Title.

The "National Aeronautics and Space Administration Authorization Act of 2008".

Sec. 2. Findings.

Congress finds, on this the fiftieth anniversary of the establishment of NASA, that the agency is and should remain a balanced, multimission agency, and 12 other findings.

Sec. 3. Definitions.

(1) Administrator-The term "Administrator" means the Administrator of the National Aeronautics and Space Administration.
(2) NASA-The term "NASA" means the National Aeronautics and Space Administration.
(3) OSTP- The term "OSTP" means the Office of Science and Technology Policy.

TITLE I. – AUTHORIZATION OF APPROPRIATIONS FOR FISCAL YEAR 2009

Sec. 101. Fiscal Year 2009

Authorizes NASA at $20,210,000,000 for FY 09. This amount is approximately $2.59 billion above the President's FY 2009 request.

The baseline Authorization of $19.21 billion, includes the following breakdown:

Science: $4,932,200,000 of which
- $1,518,000,000 is for Earth Science
- $1,483,000,000 is for Planetary Science
- $1,290,400,000 is for Astrophysics
- $640,800,000 is for Heliophysics

Aeronautics: $853,400,000
Exploration: $3,886,000,000
Education: $128,300,000
Space Operations: $6,074,400,000
Cross-Agency Support Programs: $3,299,900,000
Inspector General: $35,500,000

In addition to the above amounts, the bill authorizes $1,000,000,000 to accelerate the initial operational capability of the Crew Exploration Vehicle and the Crew Launch Vehicle.

TITLE II. – EARTH SCIENCE

Sec. 201. Goal

Expresses the sense of the Congress that the goal of NASA's Earth Science program shall be to pursue a leadership role in providing Earth observations, research, and applications activities to better understand the Earth system

Sec. 202. Governance of U.S. Earth Observations Activities

Requires the Director of the OSTP to task the National Academies with conducting a study to determine the most appropriate governance structure for U.S. Earth Observation programs. Directs the study to be delivered to Congress within 18 months after the enactment of the Act, and for the OSTP to provide an implementation plan of the study's recommendations within 24 months of the enactment of the Act.

Sec. 203. Decadal Survey Missions.

Requires the Administrator to submit a plan describing how NASA intends to implement the recommended missions in the National Academies decadal survey "Earth Sciences and Applications from Space," within 270 days of the enactment of the Act.

Sec. 204. Transitioning Experimental Research Into Operational Services.

Encourages NASA to transition experimental sensors and missions that have the potential to benefit society into operational status whenever possible.

Directs the Director of the OSTP, in consultation with the Administrator of NASA and the Administrator of NOAA, to develop a process for federal agencies to transition NASA Earth science and space weather missions or sensors into operational status. Requires NASA and NOAA to submit a joint plan for each mission or sensor that is determined to be appropriate for transition to Congress within 60 days of the successful completion of the mission or sensor critical design review.

Sec. 205. Landsat Thermal Infrared Data Continuity

Requires the Administrator to prepare a plan for ensuring the continuity of Landsat thermal infrared data or its equivalent within 60 days of the enactment of the Act.

Sec. 206. Reauthorization of Glory Mission

Reauthorizes NASA to continue with development of the Glory mission and requires the Administrator to submit a report to Congress a new Baseline Report within 90 days of the enactment of the Act.

Sec. 207. Plan for Disposition of Deep Space Climate Observatory.

Requires NASA to develop a plan for the Deep Space Climate Observatory (DSCOVR), which shall examine options for the future disposition of the spacecraft and its instruments, and to submit this plan no later than 180 days after the enactment of the Act.

TITLE III. AERONAUTICS

Sec. 301. Environmentally Friendly Aircraft Research and Development Initiative.

Directs the Administrator to establish an initiative with the objective of enabling commercial aircraft performance characteristics such as significant noise reduction near airports and significant reductions in greenhouse gas emissions.

Sec. 302. Research Alignment.

Requires the Administrator, to the maximum extent possible, to align the fundamental aeronautics research program to address high priority technology challenges of the National Academies "Decadal Survey of Civil Aeronautics."

Sec. 303. Research Program to Determine Perceived Impact of Sonic Booms.

Requires the Administrator to establish a cooperative research program with industry to collect data on the impact of sonic booms that can be used to develop standards for overland commercial supersonic flight operations.

Sec. 304. External Review of NASA's Aviation Safety-Related Research Programs.

Requires the Administrator to arrange for the National Research Council to conduct an independent review of NASA's aviation safety-related research programs, and to submit to Congress a report on the results on this review within 14 months of the enactment of the Act.

Sec. 305. Interagency Research Initiative on the Impact of Aviation on the Climate.

Requires the Administrator, in coordination with the U.S. Climate Change Science Program and other appropriate agencies, to establish a research initiative to assess the impact of aviation on the climate, and if warranted, to evaluate approaches to mitigate that impact. Requires the participating entities to jointly develop a plan for the research program no later than 1 year after the enactment of the Act. Requires the Administrator to arrange for the National Research Council to conduct an independent review of the plan and to provide the results of this review no later than 2 years after the enactment of the Act.

Sec. 306. Research Program on Design for Certification.

Requires NASA, in consultation with other appropriate agencies, to establish a research program on methods to improve both the confidence in and the timeliness of certification of new technologies for their introduction into the national airspace system, and to provide a plan for this program no later than 1 year after the enactment of the Act. Requires the Administrator to arrange for the National Research Council to conduct an independent review of the plan and to provide the results of this review no later than 2 years after the enactment of the Act.

Sec. 307. Aviation Weather Research.

Requires the Administrator to establish a research program with NOAA on improving the reliability of 2-hour to 6-hour aviation weather forecasts.

Sec. 308. Joint Aeronautics Research and Development Advisory Committee.

Establishes and provides the guidelines for a joint Aeronautics Research and Development Advisory Committee which shall assess and make recommendations regarding the coordination of research and development activities of NASA and the FAA.

Sec. 309. Funding for R&D Activities in Support of other Mission Directorates.

Establishes that funding for research and development activities performed by the Aeronautics Research Mission Directorate for the flight projects of other Mission Directorates be funded by the Mission Directorate seeking assistance.

Sec. 310. University-Based Centers for Research on Aviation Training.

Changes "may" to "shall" in Section 427 (a) of P.L. 109-155.

TITLE IV. INTERNATIONAL EXPLORATION INITIATIVE

Sec. 401. Sense of Congress.

Expresses the sense of Congress that the President should invite America's friends and allies to participate in a long term exploration initiative under the leadership of the U.S.

Sec. 402. Stepping Stone Approach to Exploration.

Requires the Administrator to take all necessary steps to ensure that the lunar exploration program be designed and implemented in a manner that gives strong consideration to meeting requirements of future exploration and utilization activities beyond the Moon.

Sec. 403. Lunar Outpost.

Requires that NASA make no plans that would require a lunar outpost to be occupied to maintain its viability. Establishes that the U.S. portion of the first human-tended outpost on the Moon shall be designated the "Neil A. Armstrong Lunar Outpost." Expresses the intent of Congress that NASA shall make use of commercial services to the maximum extent practicable in support of its lunar outpost activities.

Sec. 404. Exploration Technology Development

Requires the Administrator to establish a program of long-term exploration-related technology research and development that is not tied to specific flight projects with a funding goal of at least ten percent of the budget of the Exploration Systems Mission Directorate, and of having at least fifty percent of the funding allocated to external research institutions.

Sec. 405. Exploration Risk Mitigation Plan

Requires the Administrator to provide a plan identifying the scientific and technical risks that need to be addressed in carrying out human exploration beyond low Earth orbit and the research and development activities required to address those risks, and to provide the plan no later than 1 year following the enactment of the Act.

Sec. 406. Exploration Crew Rescue.

Directs the Administrator to enter into discussions for the purpose of agreeing to a common docking system standard with other spacefaring nations who have or plan to have crew transportation systems.

Sec. 407. Participatory Exploration.

Requires the Administrator to develop a technology plan to enable dissemination of information to the public for the purpose of fully experiencing NASA's missions to the Moon, Mars and other bodies of our solar system, and to provide Congress with the plan no later than 270 days of the enactment of the Act.

Sec. 408. Science and Exploration.

Expresses the sense of Congress that NASA's scientific and human exploration activities are synergistic, and encourages the Administrator to coordinate NASA's science and exploration activities to maximize the success of the human exploration initiatives and to further our understanding of the universe.

TITLE V – SPACE SCIENCE

Sec. 501. Technology Development.

Directs the Administrator to establish a cross-Directorate long-term technology development program for space and Earth science within the Science Mission Directorate and sets a funding goal for the program of five percent of the total Science Mission Directorate annual budget, and directs that it be structured to include competitively awarded grants and contracts in the program.

Sec. 502. Provision for Future Servicing of Observatory-Class Scientific Spacecraft.

Directs the Administrator to ensure that provision is made for all future observatory-class scientific spacecraft intended to be deployed in Earth orbit or at Lagrangian points in space for robotic or human servicing and repair.

Sec. 503. Mars Exploration.

Reaffirms the Congress' support for a systematic and integrated program of robotic exploration of the Martian surface.

Sec. 504. Importance of a Balanced Science Programs.

Expresses the sense of Congress that a balanced and adequately funded set of activities all contribute to a robust and productive science program and are catalysts for innovation. Expresses the further sense of Congress that suborbital flight activities provide valuable training opportunities and that it is in the national interest to expand the size of NASA's suborbital research program.

Sec. 505. Restoration of RTG Material Production.

Requires the Director of the Office of Science and Technology Policy to develop a plan for restarting and sustaining the domestic production of Radioisotope Thermoelectric Generator (RTG) material for deep space and other space science missions and to deliver the plan to Congress within 270 days of the enactment of the Act. $5,000,000 is authorized for radioisotope material production.

Sec. 506. Assessment of Impediments to Interagency Cooperation on Space and Earth Science Missions.

Requires the Administrator to arrange for the National Research Council to assess impediments to interagency cooperation on space and Earth science missions and to provide the report to Congress within 15 months of the enactment of the Act.

Sec. 507. Assessment of Cost Growth.

Requires the Administrator to arrange for an independent external assessment to identify the primary causes of cost growth in large, medium, and small space and Earth science spacecraft mission classes and to identify recommendations and to provide the report within 15 months of the enactment of the Act.

TITLE VI – SPACE OPERATIONS

SUBTITLE A – International Space Station.

Sec. 601. Utilization.

Directs the Administrator to take all necessary steps to ensure that the International Space Station (ISS) remains a viable and productive facility of potential U.S. utilization through at least 2020 and to take no steps that would preclude its continued operation and utilization by the U.S. after 2016.

Sec. 602. Research Management Plan.

Requires the Administrator to develop a research management plan for the ISS. Directs the Administrator to establish a process to support ISS National Lab users in identifying requirements for transportation of research supplies to the ISS and to develop an estimate of transportation requirements needed to support users of the ISS National Lab. Directs the Administrator to identify existing research and support equipment that are manifested for flight and to provide a description of the status, budget and milestone of research equipment that were completed or in-development prior to being cancelled. Requires the Administrator to establish an advisory panel under the Federal Advisory Committee Act to monitor the activities and management of the ISS National Lab.

Sec. 603. Contingency Plan for Cargo Resupply.

Requires the Administrator to develop a contingency plan and arrangements to ensure the continued viability and productivity of the ISS in the event that U.S. commercial cargo resupply services are not available after the Space Shuttle is retired and to deliver the plan within one year of enactment of the Act.

SUBTITLE B – Space Shuttle.

Sec. 611. Flight Manifest.

Establishes that the Utilization flights ULF-4 and ULF-5 shall be considered part of the Space Shuttle baseline flight manifest and shall be flown prior to the retirement of the Space Shuttle. Requires the Administrator to take all necessary steps to fly one additional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer (AMS) to the ISS prior to the retirement of the Space Shuttle. Establishes that the Space Shuttle be retired following the completion of the baseline flight manifest and the additional flight carrying the AMS, events which are anticipated to occur in 2010.

Sec. 612. Disposition of Shuttle-Related Assets.

Requires the Administrator to provide a plan for the disposition of the remaining Space Shuttle orbiters and other Space Shuttle program-related hardware and facilities after the retirement of the Space Shuttle fleet and to not dispose of any Space Shuttle-related hardware prior to the completion of the plan, which shall be submitted to Congress within 90 days on the enactment of the Act.

Sec. 613. Space Shuttle Transition Liaison Office.

Directs the Administrator to establish an office within NASA's Office of Human Capital Management to assist local communities affected by the termination of the Space Shuttle program, which will be operated until 24 months after the last Space Shuttle flight.

SUBTITLE C – Launch Services.

Sec. 621. Launch Services Strategy.

Requires the Administrator to develop a strategy for providing launch services in support of NASA's small and medium science, space operations, and exploration missions as preparation for awards to follow up on the current NASA Launch Services contracts and to provide this report within 90 days of the enactment of the Act.

TITLE VII – EDUCATION

Sec. 701. Response to Review.

Requires the Administrator to develop a plan identifying actions taken or planned in response to the recommendations of the National Academies report, "NASA's Elementary and Secondary Education Program: Review and Critique," and to provide this report within one year of the enactment of the Act.

Sec. 702. External Review of Explorer School Program.

Requires the Administrator to arrange for an independent external review of the Explorer Schools program and provide the report within one year of the enactment of the Act.

TITLE VIII – NEAR EARTH OBJECTS

Sec. 801. In General.

Expresses Congress' support of the policy direction in P.L. 109-155 for NASA to detect, track, catalogue and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter.

Sec. 802. Findings.

Includes findings on the potential threat posed by near-Earth objects and the need to prepare the appropriate policies and procedures.

Sec. 803. Requests for Information.

Directs the Administrator to issue requests for information on a low cost space mission to rendezvous with the Apophis asteroid, and a medium-sized space mission with the purpose of detecting near-Earth objects equal to or greater than 140 meters in diameter.

Sec. 804. Establishment of Policy.

Requires the Director of the Office of Science and Technology Policy to develop a policy for notifying Federal agencies and relevant emergency response institutions of an impending NEO threat if near term public safety is at stake, to recommend a Federal agency or agencies to be responsible for protecting the Nation from a near-Earth object that is anticipated to collide with Earth and implementing a deflection campaign, in consultation with international bodies, should one be required.

Sec. 805. Planetary Radar Capability.

Requires the Administrator to maintain a planetary radar that is, at minimum, comparable to the capability provided through the NASA Deep Space Network Goldstone facility.

Sec. 806. Arecibo Observatory.

Expresses Congress' support for the use of the Arecibo Observatory for NASA-funded near-Earth object-related activities, and requires the Administrator to ensure the availability of the Arecibo Observatory's planetary radar to support these activities until the National Academies review of NASA's approach for the survey and deflection of near-Earth objects is completed.

TITLE IX – COMMERCIAL INITIATIVES

Sec. 901. Sense of Congress.

Expresses the sense of Congress that a healthy and robust commercial sector can make significant contributions to the successful conduct of NASA's space exploration program, and encourages NASA to look for such service opportunities and to the maximum extent practicable, make use of the commercial sector to provide those services.

Sec. 902. Commercial Crew Initiative.

Directs NASA to make use of U.S. commercially provided International Space Station (ISS) crew transfer and crew rescue services to the maximum extent practicable, limit the use, to the maximum extent practicable, of the Crew Exploration Vehicle to missions carrying astronauts beyond low Earth orbit once commercial crew transfer and crew rescue services that meet safety requirements become operational, facilitate the transfer of NASA-developed technologies to potential U.S. commercial crew transfer and rescue service providers, issue a notice of intent within 180 days of the enactment of the Act to enter into a funded Space Act Agreement with two or more commercial entities for a Phase 1 Commercial Orbital Transportation Services (COTS) crewed vehicle demonstration program with $50,000,000 to be authorized for FY 2009, and $50,000,000 to be authorized for the provision of ISS-compatible docking adaptors to be made available to the commercial crew providers selected to service the ISS. It also directs NASA to enter into a crew transportation services contract with a commercial provider if it demonstrates the ability to provide ISS crew transfer in accordance with safety requirements.

TITLE X – REVITALIZATION OF NASA INSTITUTIONAL CAPABILITIES

Sec. 1001. Review of Information Security Controls.

Requires the Comptroller General to complete a review of information security controls that protect NASA's information technology and to provide a report to Congress no later than one year after enactment of the Act. Requires the Comptroller General to provide a restricted report detailing results of vulnerability assessments conducted by GAO on NASA's network resources within one year of the enactment of the Act.

Sec. 1002. Maintenance and Upgrade of Center Facilities.

Requires the Administrator to ensure that adequate maintenance and upgrading of Center facilities is performed on a regular basis, to develop a budget plan to reduce maintenance

and upgrade backlog by 50 percent over the next five years, and to deliver a report to Congress on the results on these activities with the FY 2011 budget request.

Sec. 1003. Assessment of NASA Laboratory Capabilities.

Requires the Administrator to arrange for an independent external review of the overall quality of NASA's laboratories.

TITLE XI. OTHER PROVISIONS

Sec. 1101. Space Weather.

Directs the Office of Science and Technology Policy to develop a plan for sustaining space-based measurements of solar wind from the L1 Lagrangian point in space and to submit the plan within one year of the enactment of the Act.

Requires the Administrator, in coordination with the National Science Foundation, National Oceanic and Atmospheric Administration, and other relevant agencies, to initiate a research program to conduct or supervise research projects on impacts of space weather to aviation and to facilitate the transfer of technology from space weather research programs to Federal agencies with operational responsibilities and to the private sector.

Requires the Administrator to arrange for the National Research Council to conduct a study on the impacts of space weather on the current and future United States aviation industry, and to provide the results of the report no later than one year after the enactment of the Act.

Sec. 1102. Space Traffic Management.

Requires the Administrator, in consultation with other appropriate agencies of the Federal government, to initiate discussions with the appropriate representatives of other spacefaring nations to determine the appropriate framework under which information intended to promote safe overall operations in outer space can be shared.

Sec. 1103. Study of Export Control Policies Related to Civil and Commercial Space Activities.

Requires the Director of the Office of Science and Technology Policy to conduct a study of the impact of current export control policies and implementation directives on the U.S. aerospace industry and its competitiveness in global markets, as well as on the ability of

U.S. government agencies to carry out cooperative activities in science and technology, including the impact on research, and to provide the report to the Congress within 9 months of the enactment of the Act.

Sec. 1104. Astronaut Health Care.

Directs the Administrator to administer an anonymous survey of astronauts and flight surgeons to evaluate communication, relationships, and the effectiveness of policies on a biennial basis, and to report the results of the Survey to Congress no later than 90 days following completion of the Survey.

Sec. 1105. National Academies Decadal Surveys.

Directs the Administrator to enter into agreements on a periodic basis with the National Academies for independent assessments of the status and opportunities for Earth and space science discipline fields and Aeronautics research, to recommend priorities for research and programmatic areas over the next decade, to include whenever possible independent estimates of the costs and technical readiness of missions assessed, and to identify conditions that would warrant reexamination of the priorities established.

Sec. 1106. Innovation Prizes.

Amends Section 104 of P.L. 109-155 by replacing paragraph "(b) TOPICS" with language requiring the Administrator to consult widely in selecting topics for prize competitions and suggesting potential prize competition topics.

Amends section 104 of P.L. 109-155 by replacing "$10,000,000" in "(i)(4)" with "$50,000,000".

Mr. MELANCON. Are there any amendments? Hearing none, the vote is on the bill H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008. All those in favor will say aye. All those opposed will say no. Hearing no objections, we will go ahead and proceed then with motion to report the bill. Mr. Feeney, I would like to recognize you to offer a motion.

Mr. FEENEY. Mr. Chairman, I would move that the Subcommittee favorably report H.R. 6063 to the Full Committee. Furthermore, I move that the staff be instructed to prepare the Subcommittee legislative report and make necessary and technical changes and conforming changes to the bill as amended in accordance with the recommendations of the Subcommittee.

Mr. MELANCON. Therefore, the question is on the motion to report the bill favorably. Those in favor of the motion will signify by saying aye. Any nays? I am not hearing any.

Without objection, the motion to reconsider is laid upon the table. Subcommittee Members will have two subsequent calendar days in which to submit supplemental Minority or additional views on the measure, ending Friday, May 23 at 9 a.m.

If there is no other business, then I would like to thank the Members for their attendance, and this will conclude our Subcommittee markup.

[Whereupon, at 10:10 a.m., the Subcommittee was adjourned.]

XXII. PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 6063, THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT OF 2008

WEDNESDAY, JUNE 4, 2008

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

The Committee met, pursuant to call, at 10:02 a.m., in room 2318 of the Rayburn House Office Building, Hon. Bart Gordon (Chairman of the Committee) presiding.

Chairman GORDON. Come to order pursuant to notice. The Committee on Science and Technology meets to consider the following measure; H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008. We will now proceed with the markup.

H.R. 6063 was introduced by Space and Aeronautics Subcommittee Chairman Udall, and I was pleased to be an original cosponsor of the legislation. I was even more pleased that Mr. Hall and Mr. Feeney also joined as original cosponsors. This is a bipartisan bill in every sense of the word, and I want to thank them and their staff for their productive involvement in moving this legislation forward.

That constructive approach is reflected in their active participation in helping to craft the manager's amendment that will be considered in just a while. I am emphasizing the bipartisanship consensus we have on this bill, because I think it is important that we send a strong message to the next Administration, whether it turns out to be a Democratic or Republican one, that the Congress believes that NASA is important and worthy of the Nation's support.

H.R. 6063 makes it clear that NASA is relevant to the Nation's innovative—innovation agenda, that it has a key role to play in insuring the future health of our Nation's aviation system, and that it is critical to the Nation's efforts to better understand our climate and the changes facing the earth system.

In addition, H.R. 6063 demonstrates that a properly-structured human spaceflight and exploration program can provide dividends technologically, scientifically, and geopolitically and is worthy of the Nation's investment in it.

Yet, H.R. 6063 also demonstrates that a relevant space and aeronautics program is affordable. The baseline authorization for fiscal year 2009, represents simply an inflationary increase of 2.8 percent

over fiscal year 2008 authorization level that was enacted into law in the NASA Authorization Act of 2005.

It also increases funding for NASA relative to fiscal year 2008 appropriation for NASA at a rate consistent with that applied to R&D agencies in last year's America COMPETES Act. That is a reflection of the fact that NASA's activities have an important role to play in the Nation's innovation agenda.

It is also a reflection of fact that we need to ensure that NASA has sufficient resources for all of its important tasks and the Nation is asking it to carry out, and I believe that this bill does that—just that.

There are many important provisions in the NASA Authorization Act of 2008, including a special funding augmentation to help narrow the human spaceflight gap the Nation is facing after the retirement of the shuttle.

Since members have already familiarized themselves with the contents of the legislation, I will not take time now to restate those provisions. Instead, I will just close by saying that I think H.R. 6063 is a good bill that will help prepare NASA for a relevant, productive future, and I urge my colleagues to support it.

[The statement of Mr. Gordon follows:]

OPENING STATEMENT FOR MARKUP OF H.R. 6063

CHAIRMAN BART GORDON [D-TN]

June 4, 2008

- Good morning. Today the Committee is meeting to mark up H.R. 6063, the NASA Authorization Act of 2008.

- H.R. 6063 was introduced by Chairman Udall, and I was pleased to be an original cosponsor of the legislation.

- I was even more pleased that Mr. Hall and Mr. Feeney have joined as original cosponsors.

- This is a bipartisan bill in every sense of the word, and I want to thank them and their staff for their productive involvement in moving this legislation forward.

- That constructive approach is reflected in their active participation in helping to craft the manager's amendment that we will consider in a little while.

- I am emphasizing the bipartisan consensus we have on this bill because I think it is important that we send a strong message to the next Administration—whether it turns out to be a Democratic or a Republican one—that Congress believes that NASA is important and worthy of the nation's support.

- H.R. 6063 makes clear that NASA is relevant to the nation's innovation agenda, that it has a key role to play in ensuring the future health of our nation's aviation system, and that it is critical to the nation's efforts to better understand our climate and the changes facing the Earth system.

- In addition, H.R. 6063 demonstrates that a properly structured human space flight and exploration program can provide dividends technologically, scientifically, and geopolitically—and is worthy of the nation's investment in it.

- Yet H.R. 6063 also demonstrates that a relevant space and aeronautics program is affordable.

- The baseline authorization for Fiscal Year 2009 represents simply an inflationary increase of 2.8 percent over the FY 2008 authorization level that was enacted into law in the NASA Authorization Act of 2005.

- It also increases funding for NASA relative to the FY 2008 appropriation for NASA at a rate consistent with that applied to R&D agencies in last year's "America COMPETES Act".

- That is a reflection of the fact that NASA's activities have an important role to play in the nation's innovation agenda.

- It is also a reflection of the fact that we need to ensure that NASA has sufficient resources for all of the important tasks that the nation is asking it to carry out—and I believe that this bill does that.

- There are a great many important provisions in the NASA Authorization Act of 2008, including a special funding augmentation to help narrow the human space flight "gap" that the nation is facing after the retirement of the Shuttle.

- Since Members have already familiarized themselves with the contents of the legislation, I will not take time now to restate those provisions.

- Instead, I will just close by saying that I think that H.R. 6063 is a good bill that will help prepare NASA for a relevant, productive future, and I urge my colleagues to support it.

Chairman GORDON. I now recognize Mr. Hall to present his remarks.

Mr. HALL. Mr. Chairman, of course, I thank you for scheduling the markup, and I am, as you say, I am proud to be an original cosponsor of this bill, and I hope other members here today are going to consider adding their support to it.

H.R. 6063 is a 1-year bill that demonstrates Congress' commitment to maintain a strong and vital space program and will also serve as a signal to a new Administration that NASA has deep support within this Congress. And I think that is important. Passage of this bill is very important for another reason. I worry that if we allow NASA's authorization to lapse, the next presidential Administration may interpret our failure to act as a sign of weakness for NASA, and that, in turn, might tempt the new Administration to divert Agency resources. I don't want that to happen. I don't think any of us in this room want that to happen.

The bill before us today contains a number of important provisions. It authorizes $19.2 billion for NASA for fiscal year 2009, and provides an additional $1 billion to accelerate development of the new crew vehicle launch system. It emphasizes that NASA should maintain a strong and balanced array of science, aeronautics, and human spaceflight programs.

It also directs NASA to fly out its full manifest of Shuttle missions, including those dedicated to flying spare parts to the International Space Station, as well as adding a flight to take the Alpha Magnetic Spectrometer to the ISS, as we originally committed to do some years ago. The AMS was stricken from the Shuttle manifest following the Columbia tragedy, but I believe given the large investment in resources, we ought to make good on our original commitment to fly this expensive investment to the ISS.

H.R. 6063 directs NASA to continue the important task of developing the Constellation System, which will provide our country with a modern and more robust and safer manned spaceflight capability that will enable our astronauts to fly out of low earth orbit, an ability we haven't had since the retirement of Apollo over 30 years ago.

As most of you are aware, once the Shuttle is retired at the end of this decade, our country will have to buy seats from the Russians for as long as 5 years to assure a U.S. presence on International Space Station. Our payments for rides on their space craft have not yet been negotiated, but it will be expensive, and sadly, we will be making these purchases at a time when NASA will be laying off thousands of engineers and technicians from the Shuttle Program. In an effort to minimize our reliance on the Russians, as I mentioned a moment ago, this bill authorizes an additional $1 billion to speed up development of the new Constellation System. This additional investment is more than justified.

This bill also includes a number of provisions to encourage NASA, working with the private sector, to foster development of a domestic commercial cargo launch capability, primarily designed to take supplies to our space station. In addition, H.R. 6063 includes language directing NASA to solicit for commercial crew launch capability.

Turning to other parts of NASA, H.R. 6063 embraces a number of recommendations that were put forward by witnesses from government, industry, and academia who testified in hearings before this Committee and the Space and Aeronautics Subcommittee over the previous 18 months. These are sensible provisions designed to strengthen aeronautics, space science, and earth science research programs, encourage technology risk reduction policies and activities, and foster efficient technology transfer from NASA to other federal agencies and to the private sector, and detect and mitigate the threat of the Near-Earth Objects and research and monitor the effects of space weather on satellites. This list is not exhaustive, but I want to mention these few examples to—and take this time to emphasize to all members the breadth of this bill and how it improves upon many of NASA's activities and programs.

Before closing, I want to point out that during development of this bill the Democratic staff and leadership have been very open and forthright, sharing early ideas and drafts of this bill with our Republican staff. It has been a close and productive partnership. I want to especially recognize and praise the hard work of Dick Obermann and others.

And, Mr. Chairman, I thank you.

[The statement of Mr. Hall follows:]

Opening Statement of
The Honorable Ralph Hall
During Science and Technology Committee Consideration of
H.R. 6063, *The NASA Reauthorization Act of 2008*

Mr. Chairman, I want to thank you for scheduling this morning's markup of H.R. 6063, legislation authorizing NASA for Fiscal Year 2009. I am proud to be an original cosponsor of this bill and I hope other Members here today will consider adding their support as well.

H.R. 6063 is a one year bill that demonstrates Congress' commitment to maintain a strong and vital space program and will serve as a signal to a new Administration that NASA has deep support within Congress. Passage of this bill is important for another reason; I worry that if we allow NASA's authorization to lapse, the next Presidential administration may interpret our failure to act as a sign of weakness for NASA, and that in turn might tempt a new

Administration to divert agency resources. I don't think any of us in this room want that to happen.

The bill before us today contains a number of important provisions. It authorizes $19.2 billion for NASA for FY09, and provides an additional $1 billion to accelerate development of the new crew vehicle launch system. It emphasizes that NASA should maintain a strong and balanced array of science, aeronautics, and human spaceflight programs. It also directs NASA to fly out its full manifest of Shuttle missions, including those dedicated to flying spare parts to the International Space Station, as well as adding a flight to take the Alpha Magnetic Spectrometer to the ISS, as we originally committed to do some years ago. The AMS was stricken from the Shuttle manifest following the *Columbia* tragedy, but I believe given the huge investment in resources, we ought to make good on our original commitment to fly this expensive instrument to the ISS.

H.R. 6063 directs NASA to continue the important task of developing the *Constellation* system, which will provide our country with a modern, more robust, and safer manned spaceflight capability that will enable our astronauts fly out of Low Earth orbit, an ability we haven't had since the retirement of Apollo over 30 years ago.

As most of you are aware, once the Shuttle is retired at the end of this decade, our country will have to buy seats from the Russians – for as long as five years – to assure a U.S. presence on the International Space Station. Our payments for rides on their Soyuz spacecraft have not yet been negotiated, but it will be expensive, and sadly, we'll be making these purchases at a time when NASA will be laying off thousands of engineers and technicians from the Shuttle program. In an effort to minimize our reliance on the Russians, as I mentioned a moment ago, this bill authorizes an additional $1 billion to speed up development of the new

Constellation **system. This additional investment is more than justified.**

This bill also includes a number of provisions to encourage NASA, working with the private sector, to foster development of a domestic commercial cargo launch capability, primarily designed to take supplies to the space station. In addition, H.R. 6063 includes language directing NASA to solicit for commercial crew launch capability.

Turning to other parts of NASA, H.R. 6063 embraces a number of recommendations that were put forward by witnesses from government, industry, and academia who testified in hearings before this Committee, and the Space and Aeronautics Subcommittee, over the previous 18 months. These are sensible provisions designed to strengthen aeronautics, space science, and Earth science research programs; encourage technology risk reduction policies and activities; foster efficient technology transfer from NASA to other federal

agencies and to the private sector; detect and mitigate the threat of Near-Earth Objects; and research and monitor the effects of space weather on satellites. This list is not exhaustive, but I wanted to mention these few examples to emphasize to all Members the breadth of this bill and how it improves upon many of NASA's activities and programs.

Before closing, I want to point out that during development of this bill, the Democratic staff have been very open and forthright, sharing early ideas and drafts of the bill with our Republican staff. It has been a close and productive partnership, and I want to especially recognize and praise the hard work of Dick Obermann.

Thank you, Mr. Chairman.

Chairman GORDON. Thank you, Mr. Hall. I concur. Dick Obermann is a real asset to our Committee, as we just have excellent staff on both sides.

I also concur with your statement. This is a strong message of bipartisan unity to the next Administration.

Now I ask unanimous consent that the bill is considered as read.

Does anyone else wish to be recognized?

Oh, I am sorry. Yes. Mr. Udall, the Chairman of the subcommittee. Pardon me.

Mr. UDALL. Thank you, Mr. Chairman. I will be brief, but I think it is important to acknowledge that the bill came out of the subcommittee on May 20 without amendment with a voice vote.

Chairman Gordon noted that this is a strong bill that has bipartisan support, and I want to take a moment to thank Mr. Hall and Mr. Feeney in particular for their efforts on the legislation. Their support and thoughtful inputs made this a better bill, and they have excellent staff members I would like to acknowledge including Ed Fedeman, Ken Monroe, and Lee Arnold. And I want to emphasize and echo what the Chairman said about the subcommittee staff led by Dick Obermann. He is an amazing resource, and I have really enjoyed working with him over the last 2 years to put together a bill that will put NASA on track and keep it on track. So I want to thank Dick and Pam Whitney, Alan Li, and Devin Bryant for their participation. Of course, Wendy Adams and my congressional staff have been phenomenal as well.

We have received a lot of letters of endorsement, including ones from the Aerospace Industries Association, the General Aviation Manufacturers Association, the American Meteorological Society, the Planetary Society, the Universities Space Research Association, IEEE, the National Space Society AIAA, and ASME.

And the legislation is really a result of the testimony and that constructive input from many, many witnesses, outside experts, and origination, and I would like to thank all of them for their insights.

The guiding principle of the legislation is that NASA should be, and I believe is, an agency that can be a strong catalyst for dealing with important national concerns, and that is why we have focused on measures to insure that the Nation's human exploration efforts will be carried out in a manner that maximizes our return on our national investment in it, and that the International Space Station will be utilized as productively as possible.

And that is also why the bill focuses on building a strong earth sciences research and applications program, as well as strengthening NASA's aeronautics R&D program, which will be very critical to our Nation's future aviation system.

I could go on to some length about all the great features in the bill, but I know we would all like to proceed to the markup. So let me put the rest of my remarks in the record.

And in closing I will note as Chairman Gordon did that this year marks the 50th anniversary of the birth of the U.S. Space Program and the establishment of NASA, and I believe that H.R. 6063 will help insure that NASA's next 50 years will be as exciting and productive as its first 50. And I urge all the members here to support it at today's markup.

Thank you, Mr. Chairman.
[The statement of Mr. Udall follows:]

Opening Statement for the Markup of H.R. 6063

CHAIRMAN MARK UDALL [D-CO]
Statement for the Record
June 4, 2008

- Good morning. As Chairman of the Space and Aeronautics Subcommittee, I am pleased to report that the Subcommittee approved H.R. 6063 on a voice vote, without amendment, at its May 20th markup.

- As Chairman Gordon noted, H.R. 6063 is a bill that has strong bipartisan support, and I want to take a moment to thank Mr. Hall and Mr. Feeney in particular—as well as their staffs—for all their efforts on this legislation. Their support and thoughtful input has made this a better bill.

- I am also pleased to report to the Committee that since its introduction, we have received numerous letters of endorsement for H.R. 6063, including ones from the Aerospace Industries Association, the General Aviation Manufacturers Association, the American Meteorological Society, the Planetary Society, the Universities Space

Research Association, IEEE, the National Space Society, AIAA, and ASME.

- This legislation is in many respects the result of the testimony and constructive input of countless hearing witnesses, outside experts, and organizations, and I want to thank all of them for their insights.

- In particular, we have heard from witness after witness that NASA has not been given the funding it needs to successfully carry out all of the important tasks that the nation has asked of it.

- Well, we've listened, and the funding authorized in H.R. 6063 will help point NASA towards a more productive and sustainable future.

- In addition to the baseline authorization, H.R. 6063 contains a directed funding augmentation intended to help accelerate the date when the Orion Crew Exploration

Vehicle and Ares Crew Exploration Vehicle can attain full operational status.

- Providing the additional funding in FY 2009 can help narrow the post-Shuttle human space flight gap that we are facing.

- There are a number of other features of the legislation that I would like to highlight in these brief opening remarks.

- First, a guiding principle of this legislation is that NASA should be—and I believe *is*--an agency that can be a strong catalyst for dealing with important national concerns.

- That is why the bill focuses on building a strong, vital Earth sciences research and applications program

- And it's why we have taken significant steps in this legislation to strengthen and focus NASA's aeronautics

R&D program, which will be so critical to our nation's future aviation system.

- That's also why we have focused on measures to ensure that the International Space Station will be utilized as productively as possible, and that the nation's human exploration efforts will be carried out in a manner that maximizes our return on our national investment in it.

- Finally, H.R. 6063 recognizes that America's private sector has always been one of its great strengths.

- Thus this legislation includes substantive measures to help realize the synergies achievable between government and the private sector.

- Well, while there are many other features of H.R. 6063 that I could mention, I know we all would like to proceed with the markup, so I will just close by noting that this year marks the 50th anniversary of the birth of the U.S. space program and the establishment of NASA.

- I believe that H.R. 6063 will help ensure that NASA's next fifty years will be as exciting and productive as its first fifty, and I urge Members to support it at today's markup.

Chairman GORDON. Thank you, Mr. Udall. Job well done.

Mr. Feeney is recognized.

Mr. FEENEY. Well, thank you, Mr. Chairman. I could, but I won't, reread the statement of support that I gave at the beginning of our very expeditious subcommittee markup.

I want to join Chairman Udall and Chairman Gordon and Ranking Member Hall in thanking the majority party members on the subcommittee, but also the staff on both sides, as has been mentioned appropriately, have done a fantastic job. What we have done is to lay out a bipartisan blueprint for a sustained, healthy and vigorous NASA during the next Administration.

I think Chairman Gordon pointed out the importance of this bill. The next Administration is going to look for a starting place in terms of space and NASA policy. I think that we have laid out a great starting place, no matter who the next President may be. And I would note that apparently my colleague from Florida, Senator Nelson, has had complimentary things to say about the bill that came out of the subcommittee.

We provide good stewardship for all enterprises in NASA's portfolio, earth and space sciences, aeronautics, and human spaceflight.

Because I represent Kennedy Space Center and I saw Congresswoman Giffords there the other day, she was a little bit more nervous than I was for inexplicable reasons, I want to particularly note the unambiguous endorsement of America's human spaceflight program. We have come a very long way since the loss of the Shuttle Columbia over 5 years ago. This bill continues that progress by providing much-needed stability in our strategy and architecture for human spaceflight. Here is an example of bipartisan leadership during a time of difficult challenges for the program.

The manager's amendment includes a section directing the White House Office of Science and Technology Policy to establish an interagency committee and study the issues raised by locating a commercial space launch range in close proximity to a federal launch range.

In order to have viable commercial launch operations in the United States, effective coordination and cooperation must exist between potential commercial ranges and existing federal ranges. This issue is of constant concern to Florida's Space Coast, as it vies with international competitors as a site for launching commercial payloads.

I, again, thank the talented and accomplished staff on both sides of the aisle. The tone and tenor of discussion and negotiations continue this Committee's cooperative and inclusive approach to dealing with the areas within our jurisdiction.

And with that, I would yield back the balance of my time.

[The statement of Mr. Feeney follows:]

Supporting the National Aeronautics and Space Administration Authorization Act of 2008

By Tom Feeney (R-FL), Ranking Member, House Space and Aeronautics Subcommittee

I could – but won't – just reread the statement of support that I gave at the beginning of our expeditious subcommittee markup.

We have laid out a bipartisan blueprint for sustaining a healthy and vigorous NASA during the next administration. We provide good stewardship for all enterprises in NASA's portfolio – earth and space sciences, aeronautics, and human spaceflight.

Because I represent the Kennedy Space Center, I want to particularly note the unambiguous endorsement of America's human spaceflight program. We have come a very long way since the loss of the Shuttle Columbia over five years ago. This bill continues that progress by providing much needed stability in our strategy and architecture for human spaceflight. Here's an example of bipartisan leadership during a time of difficult challenges for this program.

The Manager's Amendment includes a section directing the White House Office of Science and Technology Policy to establish an interagency committee and study the issues raised by locating a commercial space launch range in close proximity to a Federal launch range.

In order to have viable commercial launch operations in the United States, effective coordination and cooperation must exist between potential commercial ranges and existing Federal ranges. This issue is of constant concern to Florida's Space Coast as it vies with international competitors as a site for launching commercial payloads.

I again thank the talented and accomplished staff on both sides of the aisle. The tone and tenor of discussions and negotiations continue this committee's cooperative and inclusive approach to dealing with the areas within our jurisdiction.

Congresswoman Laura Richardson
Statement at Full Committee Markup
H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008
Wednesday June 4, 2008
2318 Rayburn House Office Building 10AM – 12PM

Mr. Chairman I rise in strong support of H.R. 6063, the "National Aeronautics and Space Administration Authorization of 2008. As we celebrate the 50th anniversary of the creation of NASA, it is important to adhere to the commitment that we made as a nation to embrace innovation, and achieve the unachievable. This began on July 21, 1969 when Neil Armstrong set foot on the moon, and continues with the successful landing of NASA's Phoenix spacecraft on the planet Mars last week.

This legislation recognizes NASA's unique role as the foundation for American aeronautics research and development. Included in this bill is a commitment to the NEXTGEN program, a system that will make air travel safe and efficient, by implementing GPS satellite technology, an interoperable data bank called SWIM (System Wide Information Management), and a new system that provides accurate and timely weather reports. NEXTGEN will help ease the gridlock in the skies, now and in the future. It is estimated that by 2022 air gridlock willl cost the U.S. economy

$22 billion in lost economic activity, so the need to invest in this technology is crucial.

Likewise as we take our exploration of space to new and exciting levels, the need to close the "gap" is vital to maintain America's role as the leader in space exploration. When the current fleet of space shuttles are retired in 2010, it is imperative that we get the new fleet of space shuttles up and operating immediately. This legislation recognizes that need and authorizes $1 billion dollars in augmented funding to accelerate the development of the Orion Crew Exploration Vehicle, and Ares I Crew Launch Vehicle, technology that represents the next generation of American space travel. NASA has meant much to my home state of California. Many of the companies that provide component parts for the space shuttle call California home, and of course the facilities at Edwards Air Force Base have been used by NASA since the days of the Nixon administration.

I urge all of colleagues to support this legislation, Mr. Chairman I yield back my time.

Mr. HALL. Mr. Chairman, just one half a minute, if I might. Back when I was in the Texas Senate, we had all of those beautiful wives of the astronauts that would come to Austin from time to time, and they would always tell us when we were kind of courting them, you know, about their husbands. And one said, don't call me unless my husband is on television. That meant he is going around and around the world.

Now, we have got a lady on here that—whose husband is on television, and seriously, we need to pray for him and join her in the prayers for him and all the others to get down safely.

Thank you.

Chairman GORDON. As usual, Mr. Hall speaks well for all of us.

If there are no other statements to be made, then I ask unanimous consent that the bill is considered as read and open to amendment at any point and that the members proceed with amendments in the order of the roster.

Without objection, so ordered.

[H.R. 6063 follows:]

H.R. 6063

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

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 2008".

(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 FOR FISCAL YEAR 2009

Sec. 101. Fiscal year 2009.

TITLE II—EARTH SCIENCE

Sec. 201. Goal.
Sec. 202. Governance of United States Earth observations activities.
Sec. 203. Decadal survey missions.
Sec. 204. Transitioning experimental research into operational services.
Sec. 205. Landsat thermal infrared data continuity.
Sec. 206. Reauthorization of Glory Mission.
Sec. 207. Plan for disposition of Deep Space Climate Observatory.

TITLE III—AERONAUTICS

Sec. 301. Environmentally friendly aircraft research and development initiative.
Sec. 302. Research alignment.
Sec. 303. Research program to determine perceived impact of sonic booms.
Sec. 304. External review of NASA's aviation safety-related research programs.
Sec. 305. Interagency research initiative on the impact of aviation on the climate.
Sec. 306. Research program on design for certification.
Sec. 307. Aviation weather research.
Sec. 308. Joint Aeronautics Research and Development Advisory Committee.
Sec. 309. Funding for research and development activities in support of other mission directorates.
Sec. 310. University-based centers for research on aviation training.

TITLE IV—INTERNATIONAL EXPLORATION INITIATIVE

Sec. 401. Sense of Congress.
Sec. 402. Stepping stone approach to exploration.

Sec. 403. Lunar outpost.
Sec. 404. Exploration technology development.
Sec. 405. Exploration risk mitigation plan.
Sec. 406. Exploration crew rescue.
Sec. 407. Participatory exploration.
Sec. 408. Science and exploration.

TITLE V—SPACE SCIENCE

Sec. 501. Technology development.
Sec. 502. Provision for future servicing of observatory-class scientific spacecraft.
Sec. 503. Mars exploration.
Sec. 504. Importance of a balanced science program.
Sec. 505. Restoration of radioisotope thermoelectric generator material production.
Sec. 506. Assessment of impediments to interagency cooperation on space and Earth science missions.
Sec. 507. Assessment of cost growth.

TITLE VI—SPACE OPERATIONS

Subtitle A—International Space Station

Sec. 601. Utilization.
Sec. 602. Research management plan.
Sec. 603. Contingency plan for cargo resupply.

Subtitle B—Space Shuttle

Sec. 611. Flight manifest.
Sec. 612. Disposition of shuttle-related assets.
Sec. 613. Space Shuttle transition liaison office.

Subtitle C—Launch Services

Sec. 621. Launch services strategy.

TITLE VII—EDUCATION

Sec. 701. Response to review.
Sec. 702. External review of Explorer Schools program.

TITLE VIII—NEAR-EARTH OBJECTS

Sec. 801. In general.
Sec. 802. Findings.
Sec. 803. Requests for information.
Sec. 804. Establishment of policy.
Sec. 805. Planetary radar capability.
Sec. 806. Arecibo Observatory.

TITLE IX—COMMERCIAL INITIATIVES

Sec. 901. Sense of Congress.
Sec. 902. Commercial crew initiative.

TITLE X—REVITALIZATION OF NASA INSTITUTIONAL CAPABILITIES

Sec. 1001. Review of information security controls.
Sec. 1002. Maintenance and upgrade of Center facilities.
Sec. 1003. Assessment of NASA laboratory capabilities.

TITLE XI—OTHER PROVISIONS

Sec. 1101. Space weather.
Sec. 1102. Space traffic management.
Sec. 1103. Study of export control policies related to civil and commercial space activities.
Sec. 1104. Astronaut health care.
Sec. 1105. National Academies decadal surveys.
Sec. 1106. Innovation prizes.

SEC. 2. FINDINGS.

The Congress finds, on this, the 50th anniversary of the establishment of the National Aeronautics and Space Administration, 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) Investment in NASA's programs will promote innovation through research and development, and will improve the competitiveness of the United States.

(3) Investment in NASA's programs, like investments in other Federal science and technology activities, is an investment in our future.

(4) Properly structured, NASA's activities can contribute to an improved quality of life, economic vitality, United States leadership in peaceful cooperation with other nations on challenging undertakings in science and technology, national security, and the advancement of knowledge.

(5) NASA should assume a leadership role in a cooperative international Earth observations and research effort to address key research issues associated with climate change and its impacts on the Earth system.

(6) NASA should undertake a program of aeronautical research, development, and where appropriate demonstration activities with the overarching goals of—

(A) ensuring that the Nation's future air transportation system can handle up to 3 times the current travel demand and incorporate new vehicle types with no degradation in safety or adverse environmental impact on local communities;

(B) protecting the environment;

(C) promoting the security of the Nation; and

(D) retaining the leadership of the United States in global aviation.

(7) Human and robotic exploration of the solar system will be a significant long term 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.

(8) Developing United States human space flight capabilities to allow independent American access to the International Space Station, and to explore beyond low Earth orbit, is a strategically important national imperative, and all prudent steps should thus be taken to bring the Orion Crew Exploration Vehicle and Ares I Crew Launch Vehicle to full operational capability as soon as practicable.

(9) NASA's scientific research activities have contributed much to the advancement of knowledge, provided societal benefits, and helped train the next generation of scientists and engineers, and those activities should continue to be an important priority.

(10) NASA should make a sustained commitment to a robust long-term technology development activity. Such investments represent the critically important "seed corn" on which NASA's ability to carry out challenging and productive missions in the future will depend.

(11) NASA, through its pursuit of challenging and relevant activities, can provide an important stimulus to the next gen-

eration to pursue careers in science, technology, engineering, and mathematics.

(12) Commercial activities have substantially contributed to the strength of both the United States space program and the national economy, and the development of a healthy and robust United States commercial space sector should continue to be encouraged.

(13) 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 market place and the United States to undertake cooperative programs in science and human space flight in an effective and efficient manner.

SEC. 3. DEFINITIONS.

In this Act:

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

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

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

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

TITLE I—AUTHORIZATION OF APPROPRIATIONS FOR FISCAL YEAR 2009

SEC. 101. FISCAL YEAR 2009.

(a) BASELINE AUTHORIZATION.—There are authorized to be appropriated to NASA for fiscal year 2009 $19,210,000,000, as follows:

(1) For Science, $4,932,200,000, of which—

(A) $1,518,000,000 shall be for Earth Science, including $29,200,000 for Suborbital activities and $2,500,000 for carrying out section 313 of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155);

(B) $1,483,000,000 shall be for Planetary Science, including $486,500,000 for the Mars Exploration program, $2,000,000 to continue planetary radar operations at the Arecibo Observatory in support of the Near-Earth Object program, and $5,000,000 for radioisotope material production, to remain available until expended;

(C) $1,290,400,000 shall be for Astrophysics, including $27,300,000 for Suborbital activities;

(D) $640,800,000 shall be for Heliophysics, including $50,000,000 for Suborbital activities; and

(E) $75,000,000 shall be for Cross-Science Mission Directorate Technology Development, to be taken on a proportional basis from the funding subtotals under subparagraphs (A), (B), (C), and (D).

(2) For Aeronautics, $853,400,000, of which $406,900,000 shall be for system-level research, development, and demonstration activities related to—

(A) aviation safety;

(B) environmental impact mitigation, including noise, energy efficiency, and emissions;

(C) support of the Next Generation Air Transportation System initiative; and

(D) investigation of new vehicle concepts and flight regimes.

(3) For Exploration, $3,886,000,000, of which $100,000,000 shall be for the activities under sections 902(b) and 902(d); and $737,800,000 shall be for Advanced Capabilities, including $106,300,000 for the Lunar Precursor Robotic Program, $276,500,000 for International Space Station-related research and development activities, and $355,000,000 for research and development activities not related to the International Space Station.

(4) For Education, $128,300,000.

(5) For Space Operations, $6,074,700,000, of which—

(A) $150,000,000 shall be for an additional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer to the International Space Station;

(B) $100,000,000 shall be to augment funding for International Space Station Cargo Services to enhance research utilization of the International Space Station, to remain available until expended; and

(C) $50,000,000 shall be to augment funding for Space Operations Mission Directorate reserves and Shuttle Transition and Retirement activities.

(6) For Cross-Agency Support Programs, $3,299,900,000.

(7) For Inspector General, $35,500,000.

(b) ADDITIONAL AUTHORIZATION TO ADDRESS HUMAN SPACE FLIGHT GAP.—In addition to the sums authorized by subsection (a), there are authorized to be appropriated for the purposes described in subsection (a)(3) $1,000,000,000 for fiscal year 2009, to be used to accelerate the initial operational capability of the Orion Crew Exploration Vehicle and the Ares I Crew Launch Vehicle and associated ground support systems, to remain available until expended.

TITLE II—EARTH SCIENCE

SEC. 201. GOAL.

The goal for NASA's Earth Science program shall be to pursue a program of Earth observations, research, and applications activities to better understand the Earth, how it supports life, and how human activities affect its ability to do so in the future. In pursuit of this goal, NASA's Earth Science program shall ensure that securing practical benefits for society will be an important measure of its success in addition to securing new knowledge about the Earth system and climate change. In further pursuit of this goal, NASA shall assume a leadership role in developing and carrying out a cooperative international Earth observations-based research and applications program.

SEC. 202. GOVERNANCE OF UNITED STATES EARTH OBSERVATIONS ACTIVITIES.

(a) STUDY.—The Director of the OSTP shall enter into an arrangement with the National Academies for a study to determine

the most appropriate governance structure for United States Earth Observations programs in order to meet evolving United States Earth information needs and facilitate United States participation in global Earth Observations initiatives.

(b) REPORT.—The Director shall transmit the study to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 18 months after the date of enactment of this Act, and shall provide OSTP's plan for implementing the study's recommendations not later than 24 months after the date of enactment of this Act.

SEC. 203. DECADAL SURVEY MISSIONS.

(a) IN GENERAL.—The missions recommended in the National Academies' decadal survey "Earth Science and Applications from Space" provide the basis for a compelling and relevant program of research and applications, and the Administrator should work to establish an international cooperative effort to pursue those missions.

(b) PLAN.—The Administrator shall prepare a plan for submission to Congress not later than 270 days after the date of enactment of this Act that shall describe how NASA intends to implement the missions recommended as described in subsection (a), whether by means of dedicated NASA missions, multi-agency missions, international cooperative missions, data sharing, or commercial data buys, or by means of long-term technology development to determine whether specific missions would be executable at a reasonable cost and within a reasonable schedule.

SEC. 204. TRANSITIONING EXPERIMENTAL RESEARCH INTO OPERATIONAL SERVICES.

(a) SENSE OF CONGRESS.—It is the sense of the Congress that experimental NASA sensors and missions that have the potential to benefit society if transitioned into operational monitoring systems be transitioned into operational status whenever possible.

(b) INTERAGENCY PROCESS.—The Director of OSTP, in consultation with the Administrator and the Administrator of NOAA, shall develop a process for Federal agencies to transition, when appropriate, NASA Earth science and space weather missions or sensors into operational status. The process shall include coordination of annual agency budget requests as required to execute the transitions.

(c) RESPONSIBLE AGENCY OFFICIAL.—The Administrator and the Administrator of NOAA shall each designate an agency official who shall have the responsibility for and authority to lead NASA's and NOAA's transition activities and interagency coordination.

(d) PLAN.—For each mission or sensor that is determined to be appropriate for transition under subsection (b), NASA and NOAA shall transmit to Congress a joint plan for conducting the transition. The plan shall include the strategy, milestones, and budget required to execute the transition. The transition plan shall be transmitted to Congress not later than 60 days after the successful completion of the mission or sensor critical design review.

SEC. 205. LANDSAT THERMAL INFRARED DATA CONTINUITY.

(a) PLAN.—In view of the importance of Landsat thermal infrared data for both scientific research and water management applications, the Administrator shall prepare a plan for ensuring the continuity of Landsat thermal infrared data or its equivalent, including allocation of costs and responsibility for the collection and distribution of the data, and a budget plan. As part of the plan, the Administrator shall provide an option for developing a thermal infrared sensor at minimum cost to be flown on the Landsat Data Continuity Mission with minimum delay to the schedule of the Landsat Data Continuity Mission.

(b) DEADLINE.—The plan shall be provided to Congress not later than 60 days after the date of enactment of this Act.

SEC. 206. REAUTHORIZATION OF GLORY MISSION.

(a) REAUTHORIZATION.—Congress reauthorizes NASA to continue with development of the Glory Mission, which will examine how aerosols and solar energy affect the Earth's climate.

(b) BASELINE REPORT.—Pursuant to the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155), not later than 90 days after the date of enactment of this Act, the Administrator shall transmit a new baseline report consistent with section 103(b)(2) of such Act. The report shall include an analysis of the factors contributing to cost growth and the steps taken to address them.

SEC. 207. PLAN FOR DISPOSITION OF DEEP SPACE CLIMATE OBSERVATORY.

(a) PLAN.—NASA shall develop a plan for the Deep Space Climate Observatory (DSCOVR), including such options as using the parts of the spacecraft in the development and assembly of other science missions, transferring the spacecraft to another agency, reconfiguring the spacecraft for another Earth science mission, establishing a public-private partnership for the mission, and entering into an international cooperative partnership to use the spacecraft for its primary or other purposes. The plan shall include an estimate of budgetary resources and schedules required to implement each of the options.

(b) CONSULTATION.—NASA shall consult, as necessary, with other Federal agencies, industry, academic institutions, and international space agencies in developing the plan.

(c) REPORT.—The Administrator shall transmit the plan required under subsection (a) to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 180 days after the date of enactment of this Act.

TITLE III—AERONAUTICS

SEC. 301. ENVIRONMENTALLY FRIENDLY AIRCRAFT RESEARCH AND DEVELOPMENT INITIATIVE.

The Administrator shall establish an initiative of research, development, and demonstration, in a relevant environment, of technologies to enable the following commercial aircraft performance characteristics:

(1) Noise levels on takeoff and on airport approach and landing that do not exceed ambient noise levels in the absence of flight operations in the vicinity of airports from which such commercial aircraft would normally operate, without increasing energy consumption or nitrogen oxide emissions compared to aircraft in commercial service as of the date of enactment of this Act.

(2) Significant reductions in greenhouse gas emissions compared to aircraft in commercial services as of the date of enactment of this Act.

SEC. 302. RESEARCH ALIGNMENT.

In addition to pursuing the research and development initiative described in section 301, the Administrator shall, to the maximum extent practicable within available funding, align the fundamental aeronautics research program to address high priority technology challenges of the National Academies' Decadal Survey of Civil Aeronautics.

SEC. 303. RESEARCH PROGRAM TO DETERMINE PERCEIVED IMPACT OF SONIC BOOMS.

(a) IN GENERAL.—The ability to fly commercial aircraft over land at supersonic speeds without adverse impacts on the environment or on local communities would open new markets and enable new transportation capabilities. In order to have the basis for establishing an appropriate sonic boom standard for such flight operations, a research program is needed to assess the impact in a relevant environment of commercial supersonic flight operations.

(b) ESTABLISHMENT.—The Administrator shall establish a cooperative research program with industry, including the conduct of flight demonstrations in a relevant environment, to collect data on the perceived impact of sonic booms that would enable the promulgation of a standard that would have to be met for overland commercial supersonic flight operations.

SEC. 304. EXTERNAL REVIEW OF NASA'S AVIATION SAFETY-RELATED RESEARCH PROGRAMS.

(a) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for an independent review of NASA's aviation safety-related research programs. The review shall assess whether—

(1) the programs have well-defined, prioritized, and appropriate research objectives;

(2) the programs are properly coordinated with the safety research programs of the Federal Aviation Administration and other relevant Federal agencies;

(3) the programs have allocated appropriate resources to each of the research objectives; and

(4) suitable mechanisms exist for transitioning the research results from the programs into operational technologies and procedures and certification activities in a timely manner.

(b) REPORT.—Not later than 14 months after the date of enactment of this Act, the Administrator shall submit 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 on the results of the review.

SEC. 305. INTERAGENCY RESEARCH INITIATIVE ON THE IMPACT OF AVIATION ON THE CLIMATE.

(a) IN GENERAL.—The Administrator, in coordination with the United States Climate Change Science Program and other appropriate agencies, shall establish a research initiative to assess the impact of aviation on the climate and, if warranted, to evaluate approaches to mitigate that impact.

(b) RESEARCH PLAN.—Not later than 1 year after the date of enactment of this Act, the participating Federal entities shall jointly develop a plan for the research initiative that contains objectives, proposed tasks, milestones, and a 5-year budgetary profile.

(c) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for conducting an independent review of the interagency research program plan, and shall provide the results of that review to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 2 years after the date of enactment of this Act.

SEC. 306. RESEARCH PROGRAM ON DESIGN FOR CERTIFICATION.

(a) PROGRAM.—Not later than 6 months after the date of enactment of this Act, NASA, in consultation with other appropriate agencies, shall establish a research program on methods to improve both confidence in and the timeliness of certification of new technologies for their introduction into the national airspace system.

(b) RESEARCH PLAN.—Not later than 1 year after the date of enactment of this Act, as part of the activity described in subsection (a), NASA shall develop a plan for the research program that contains objectives, proposed tasks, milestones, and a 5-year budgetary profile.

(c) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council for conducting an independent review of the research program plan, and shall provide the results of that review to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 2 years after the date of enactment of this Act.

SEC. 307. AVIATION WEATHER RESEARCH.

The Administrator shall establish a program of collaborative research with NOAA on convective weather events, with the goal of significantly improving the reliability of 2-hour to 6-hour aviation weather forecasts.

SEC. 308. JOINT AERONAUTICS RESEARCH AND DEVELOPMENT ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—A joint Aeronautics Research and Development Advisory Committee (in this section referred to as the "Advisory Committee") shall be established.

(b) DUTIES.—The Advisory Committee shall—

(1) assess, and make recommendations regarding, the coordination of research and development activities of NASA and the Federal Aviation Administration;

(2) assess, and make recommendations regarding, the status of the activities of NASA and the Federal Aviation Administration's research and development programs as they relate to the

recommendations contained in the National Research Council's 2006 report entitled "Decadal Survey of Civil Aeronautics", and the recommendations contained in subsequent National Research Council reports of a similar nature; and

(3) not later than March 15 of each year, transmit a report to the Administrator, the Administrator of the Federal Aviation Administration, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate on the Advisory Committee's findings and recommendations under paragraphs (1) and (2).

(c) MEMBERSHIP.—The Advisory Committee shall consist of 10 members, none of whom shall be a Federal employee, including—

(1) 5 members selected by the Administrator; and

(2) 5 members selected by the Chair of the Federal Aviation Administration's Research, Engineering, and Development Advisory Committee (REDAC).

(d) SELECTION PROCESS.—Initial selections under subsection (c) shall be made within 3 months after the date of enactment of this Act. Vacancies shall be filled in the same manner as provided in subsection (c).

(e) CHAIRPERSON.—The Advisory Committee shall select a chairperson from among its members.

(f) COORDINATION.—The Advisory Committee shall coordinate with the advisory bodies of other Federal agencies, which may engage in related research activities.

(g) COMPENSATION.—The members of the Advisory Committee shall serve without compensation, but shall receive travel expenses, including per diem in lieu of subsistence, in accordance with sections 5702 and 5703 of title 5, United States Code.

(h) MEETINGS.—The Advisory Committee shall convene, in person or by electronic means, at least 4 times per year.

(i) QUORUM.—A majority of the members serving on the Advisory Committee shall constitute a quorum for purposes of conducting the business of the Advisory Committee.

(j) DURATION.—Section 14 of the Federal Advisory Committee Act shall not apply to the Advisory Committee.

SEC. 309. FUNDING FOR RESEARCH AND DEVELOPMENT ACTIVITIES IN SUPPORT OF OTHER MISSION DIRECTORATES.

Research and development activities performed by the Aeronautics Research Mission Directorate with the primary objective of assisting in the development of a flight project in another Mission Directorate shall be funded by the Mission Directorate seeking assistance.

SEC. 310. UNIVERSITY-BASED CENTERS FOR RESEARCH ON AVIATION TRAINING.

Section 427(a) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155) is amended by striking "may" and inserting "shall".

TITLE IV—INTERNATIONAL EXPLORATION INITIATIVE

SEC. 401. SENSE OF CONGRESS.

It is the sense of Congress that the President of the United States should invite America's friends and allies to participate in a long-term international initiative under the leadership of the United States to expand human and robotic presence into the solar system, including the exploration and utilization of the Moon, near Earth asteroids, Lagrangian points, and eventually Mars and its moons, among other exploration and utilization goals.

SEC. 402. STEPPING STONE APPROACH TO EXPLORATION.

In order to maximize the cost-effectiveness of the long-term exploration and utilization activities of the United States, the Administrator shall take all necessary steps to ensure that activities in its lunar exploration program shall be designed and implemented in a manner that gives strong consideration to how those activities might also help meet the requirements of future exploration and utilization activities beyond the Moon. The timetable of the lunar phase of the long-term international exploration initiative shall be determined by the availability of funding and agreement on an international cooperative framework for the conduct of the international exploration initiative. However, once an exploration-related project enters its development phase, the Administrator shall seek, to the maximum extent practicable, to complete that project without undue delays.

SEC. 403. LUNAR OUTPOST.

(a) ESTABLISHMENT.—As NASA works toward the establishment of a lunar outpost, NASA shall make no plans that would require a lunar outpost to be occupied to maintain its viability. Any such outpost shall be operable as a human-tended facility capable of remote or autonomous operation for extended periods.

(b) DESIGNATION.—The United States portion of the first human-tended outpost established on the surface of the Moon shall be designated the "Neil A. Armstrong Lunar Outpost".

(c) CONGRESSIONAL INTENT.—It is the intent of Congress that NASA shall make use of commercial services to the maximum extent practicable in support of its lunar outpost activities.

SEC. 404. EXPLORATION TECHNOLOGY DEVELOPMENT.

(a) IN GENERAL.—A robust program of long-term exploration-related technology research and development will be essential for the success and sustainability of any enduring initiative of human and robotic exploration of the solar system.

(b) ESTABLISHMENT.—The Administrator shall establish and maintain a program of long-term exploration-related technology research and development that is not tied to specific flight projects and that has a funding goal of at least 10 percent of the total budget of the Exploration Systems Mission Directorate.

(c) GOALS.—The long-term technology program shall have the goal of having at least 50 percent of the funding allocated to external grants and contracts with universities, research institutions, and industry.

SEC. 405. EXPLORATION RISK MITIGATION PLAN.

(a) PLAN.—The Administrator shall prepare a plan that identifies and prioritizes the scientific and technical risks that will need to be addressed in carrying out human exploration beyond low Earth orbit and the research and development activities required to address those risks. The plan shall address the role of the International Space Station in exploration risk mitigation and include a detailed description of the specific steps being taken to utilize the International Space Station for that purpose.

(b) REPORT.—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 the plan described in subsection (a) not later than one year after the date of enactment of this Act.

SEC. 406. EXPLORATION CREW RESCUE.

In order to maximize the ability to rescue astronauts whose space vehicles have become disabled, the Administrator shall enter into discussions with the appropriate representatives of spacefaring nations who have or plan to have crew transportation systems capable of orbital flight or flight beyond low Earth orbit for the purpose of agreeing on a common docking system standard.

SEC. 407. PARTICIPATORY EXPLORATION.

(a) IN GENERAL.—The Administrator shall develop a technology plan to enable dissemination of information to the public to allow the public to experience missions to the Moon, Mars, or other bodies within our solar system by leveraging advanced exploration technologies. The plan shall identify opportunities to leverage technologies in NASA's Constellation systems that deliver a rich, multimedia experience to the public, and that facilitate participation by the public, the private sector, and international partners. Technologies for collecting high-definition video, 3-dimensional images, and scientific data, along with the means to rapidly deliver this content through extended high bandwidth communications networks shall be considered as part of this plan. It shall include a review of high bandwidth radio and laser communications, high-definition video, stereo imagery, 3-dimensional scene cameras, and Internet routers in space, from orbit, and on the lunar surface. The plan shall also consider secondary cargo capability for technology validation and science mission opportunities. In addition, the plan shall identify opportunities to develop and demonstrate these technologies on the International Space Station and robotic missions to the Moon.

(b) REPORT.—Not later than 270 days after the date of enactment of this Act, the Administrator shall submit the plan to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

SEC. 408. SCIENCE AND EXPLORATION.

It is the sense of Congress that NASA's scientific and human exploration activities are synergistic, i.e. science enables exploration and human exploration enables science. The Congress encourages the Administrator to coordinate, where practical, NASA's science and exploration activities with the goal of maximizing the success

of human exploration initiatives and furthering our understanding of the Universe that we explore.

TITLE V—SPACE SCIENCE

SEC. 501. TECHNOLOGY DEVELOPMENT.

The Administrator shall establish a cross-Directorate long-term technology development program for space and Earth science within the Science Mission Directorate for the development of new technology. The program shall be independent of the flight projects under development. NASA shall have a goal of funding the cross-Directorate technology development program at a level of 5 percent of the total Science Mission Directorate annual budget. The program shall be structured to include competitively awarded grants and contracts.

SEC. 502. PROVISION FOR FUTURE SERVICING OF OBSERVATORY-CLASS SCIENTIFIC SPACECRAFT.

The Administrator shall take all necessary steps to ensure that provision is made in the design and construction of all future observatory-class scientific spacecraft intended to be deployed in Earth orbit or at a Lagrangian point in space for robotic or human servicing and repair.

SEC. 503. MARS EXPLORATION.

Congress reaffirms its support for a systematic, integrated program of exploration of the Martian surface to examine the planet whose surface is most like Earth's, to search for evidence of past or present life, and to examine Mars for future habitability and as a long-term goal for future human exploration.

SEC. 504. IMPORTANCE OF A BALANCED SCIENCE PROGRAM.

It is the sense of Congress that a balanced and adequately funded set of activities, consisting of NASA's research and analysis grants programs, technology development, small, medium-sized, and large space science missions, and suborbital research activities, contributes to a robust and productive science program and serves as a catalyst for innovation. It is further the sense of Congress that suborbital flight activities, including the use of sounding rockets, aircraft, and high-altitude balloons, offer valuable opportunities to advance science, train the next generation of scientists and engineers, and provide opportunities for participants in the programs to acquire skills in systems engineering and systems integration that are critical to maintaining the Nation's leadership in space programs. The Congress believes that it is in the national interest to expand the size of NASA's suborbital research program.

SEC. 505. RESTORATION OF RADIOISOTOPE THERMOELECTRIC GENERATOR MATERIAL PRODUCTION.

(a) PLAN.—The Director of OSTP shall develop a plan for restarting and sustaining the domestic production of radioisotope thermoelectric generator material for deep space and other space science missions.

(b) REPORT.—The plan developed under subsection (a) shall be transmitted to Congress not later than 270 days after the date of enactment of this Act.

SEC. 506. ASSESSMENT OF IMPEDIMENTS TO INTERAGENCY COOPERATION ON SPACE AND EARTH SCIENCE MISSIONS.

(a) ASSESSMENT.—The Administrator shall enter into an arrangement with the National Academies to assess impediments to the successful conduct of interagency cooperation on space and Earth science missions, to provide lessons learned and best practices, and to recommend steps to help facilitate successful interagency collaborations on space and Earth science missions.

(b) REPORT.—The report of the assessment carried out under subsection (a) shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 15 months after the date of enactment of this Act.

SEC. 507. ASSESSMENT OF COST GROWTH.

(a) STUDY.—The Administrator shall enter into an arrangement for an independent external assessment to identify the primary causes of cost growth in the large, medium-sized, and small space and Earth science spacecraft mission classes, and make recommendations as to what changes, if any, should be made to contain costs and ensure frequent mission opportunities in NASA's science spacecraft mission programs.

(b) REPORT.—The report of the assessment conducted under subsection (a) shall be submitted to Congress not later than 15 months after the date of enactment of this Act.

TITLE VI—SPACE OPERATIONS

Subtitle A—International Space Station

SEC. 601. UTILIZATION.

The Administrator shall take all necessary steps to ensure that the International Space Station remains a viable and productive facility capable of potential United States utilization through at least 2020 and shall take no steps that would preclude its continued operation and utilization by the United States after 2016.

SEC. 602. RESEARCH MANAGEMENT PLAN.

(a) RESEARCH MANAGEMENT PLAN.—The Administrator shall develop a research management plan for the International Space Station. The plan shall include a process for selecting and prioritizing research activities (including fundamental, applied, commercial, and other research) for flight on the International Space Station. This plan shall be used to prioritize resources such as crew time, racks and equipment, and United States access to international research facilities and equipment. The plan shall also identify the organization to be responsible for managing United States research on the International Space Station, including a description of the relationship of the management institution with NASA (e.g., internal NASA office, contract, cooperative agreement, or grant), the estimated length of time for the arrangement, and the budget required to support the management institution. The plan shall be developed in consultation with other Federal agencies, academia, industry, and other relevant stakeholders. The plan shall be transmitted to Congress not later than 12 months after the date of enactment of this Act.

(b) ACCESS TO NATIONAL LABORATORY.—The Administrator shall—

(1) establish a process by which to support International Space Station National Laboratory users in identifying their requirements for transportation of research supplies to and from the International Space Station, and for communicating those requirements to NASA and International Space Station transportation services providers; and

(2) develop an estimate of the transportation requirements needed to support users of the International Space Station National Laboratory and develop a plan for satisfying those requirements by dedicating a portion of volume on NASA supply missions to the International Space Station and missions returning from the International Space Station to Earth.

(c) ASSESSMENT.—The Administrator shall—

(1) identify existing research equipment and racks and support equipment that are manifested for flight; and

(2) provide a detailed description of the status of research equipment and facilities that were completed or in development prior to being cancelled, and provide the budget and milestones for completing and preparing the equipment for flight on the International Space Station.

(d) ADVISORY COMMITTEE.—Not later than 1 year after the date of enactment of this Act, the Administrator shall establish an advisory panel under the Federal Advisory Committee Act to monitor the activities and management of the International Space Station National Laboratory.

SEC. 603. CONTINGENCY PLAN FOR CARGO RESUPPLY.

(a) IN GENERAL.—The International Space Station represents a significant investment of national resources, and it is a facility that embodies a cooperative international approach to the exploration and utilization of space. As such, it is important that its continued viability and productivity be ensured, to the maximum extent possible, after the Space Shuttle is retired.

(b) CONTINGENCY PLAN.—The Administrator shall develop a contingency plan and arrangements, including use of International Space Station international partner cargo resupply capabilities, to ensure the continued viability and productivity of the International Space Station in the event that United States commercial cargo resupply services are not available during any extended period after the date that the Space Shuttle is retired. The plan shall be delivered to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than one year after the date of enactment of this Act.

Subtitle B—Space Shuttle

SEC. 611. FLIGHT MANIFEST.

(a) BASELINE MANIFEST.—In addition to the Space Shuttle flights listed as part of the baseline flight manifest as of January 1, 2008, the Utilization flights ULF–4 and ULF–5 shall be considered part of the Space Shuttle baseline flight manifest and shall be flown prior to the retirement of the Space Shuttle.

(b) ADDITIONAL FLIGHT TO DELIVER THE ALPHA MAGNETIC SPECTROMETER TO THE INTERNATIONAL SPACE STATION.—In addition to the flying of the baseline manifest as described in subsection (a), the Administrator shall take all necessary steps to fly one additional Space Shuttle flight to deliver the Alpha Magnetic Spectrometer to the International Space Station prior to the retirement of the Space Shuttle.

(c) SPACE SHUTTLE RETIREMENT DATE.—The Space Shuttle shall be retired following the completion of the baseline flight manifest and the flight of the additional flight specified in subsection (b), events that are anticipated to occur in 2010.

SEC. 612. DISPOSITION OF SHUTTLE-RELATED ASSETS.

Not later than 90 days after the date of enactment of this Act, the Administrator shall provide a plan to Congress for the disposition of the remaining Space Shuttle orbiters and other Space Shuttle program-related hardware and facilities after the retirement of the Space Shuttle fleet. The plan shall include a process by which educational institutions and science museums and other appropriate organizations may acquire, through loan or disposal by the Federal Government, Space Shuttle program-related hardware. The Administrator shall not dispose of any Space Shuttle-related hardware prior to the completion of the plan.

SEC. 613. SPACE SHUTTLE TRANSITION LIAISON OFFICE.

(a) ESTABLISHMENT.—The Administrator shall establish an office within NASA's Office of Human Capital Management that shall assist local communities affected by the termination of the Space Shuttle program. The office shall offer technical assistance and serve as a clearinghouse to assist communities in identifying services available from other Federal agencies.

(b) SUNSET.—The Office established under subsection (a) shall cease operations 24 months after the last Space Shuttle flight.

Subtitle C—Launch Services

SEC. 621. LAUNCH SERVICES STRATEGY.

(a) IN GENERAL.—In preparation for the award of contracts to follow up on the current NASA Launch Services (NLS) contracts, the Administrator shall develop a strategy for providing domestic commercial launch services in support of NASA's small and medium-sized Science, Space Operations, and Exploration missions, consistent with current law and policy.

(b) REPORT.—The Administrator shall transmit a report to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing the strategy developed under subsection (a) not later than 90 days after the date of enactment of this Act. The report shall provide, at a minimum—

(1) the results of the Request for Information on small to medium-sized launch services released on April 22, 2008;

(2) an analysis of possible alternatives to maintain small and medium-sized lift capabilities after June 30, 2010, including the use of the Department of Defense's Evolved Expendable Launch Vehicle (EELV);

(3) the recommended alternatives, and associated 5-year budget plans starting in October 2010 that would enable their implementation; and

(4) a contingency plan in the event the recommended alternatives described in paragraph (3) are not available when needed.

TITLE VII—EDUCATION

SEC. 701. RESPONSE TO REVIEW.

(a) PLAN.—The Administrator shall prepare a plan identifying actions taken or planned in response to the recommendations of the National Academies report, "NASA's Elementary and Secondary Education Program: Review and Critique". For those actions that have not been implemented, the plan shall include a schedule and budget required to support the actions.

(b) REPORT.—The plan prepared under subsection (a) shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

SEC. 702. EXTERNAL REVIEW OF EXPLORER SCHOOLS PROGRAM.

(a) REVIEW.—The Administrator shall make arrangements for an independent external review of the Explorer Schools program to evaluate its goals, status, plans, and accomplishments.

(b) REPORT.—The report of the independent external review shall be transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

TITLE VIII—NEAR-EARTH OBJECTS

SEC. 801. IN GENERAL.

The Congress reaffirms the policy direction established in the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155) for NASA to detect, track, catalogue, and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter. NASA's Near-Earth Object program activities will also provide benefits to NASA's scientific and exploration activities.

SEC. 802. FINDINGS.

Congress makes the following findings:

(1) Near-Earth objects pose a serious and credible threat to humankind, as many scientists believe that a major asteroid or comet was responsible for the mass extinction of the majority of the Earth's species, including the dinosaurs, nearly 65,000,000 years ago.

(2) Several such near-Earth objects have only been discovered within days of the objects' closest approach to Earth and recent discoveries of such large objects indicate that many large near-Earth objects remain undiscovered.

(3) Asteroid and comet collisions rank as one of the most costly natural disasters that can occur.

(4) The time needed to eliminate or mitigate the threat of a collision of a potentially hazardous near-Earth object with Earth is measured in decades.

(5) Unlike earthquakes and hurricanes, asteroids and comets can provide adequate collision information, enabling the United States to include both asteroid-collision and comet-collision disaster recovery and disaster avoidance in its public-safety structure.

(6) Basic information is needed for technical and policy decisionmaking for the United States to create a comprehensive program in order to be ready to eliminate and mitigate the serious and credible threats to humankind posed by potentially hazardous near-Earth asteroids and comets.

(7) As a first step to eliminate and to mitigate the risk of such collisions, situation and decision analysis processes, as well as procedures and system resources, must be in place well before a collision threat becomes known.

SEC. 803. REQUESTS FOR INFORMATION.

The Administrator shall issue requests for information on—

(1) a low-cost space mission with the purpose of rendezvousing with and characterizing the Apophis asteroid, which scientists estimate will in 2029 pass at a distance from Earth that is closer than geostationary satellites; and

(2) a medium-sized space mission with the purpose of detecting near-Earth objects equal to or greater than 140 meters in diameter.

SEC. 804. ESTABLISHMENT OF POLICY.

The Director of OSTP shall—

(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 stake; and

(2) recommend a Federal agency or agencies to be responsible for protecting the Nation from a near-Earth object that is anticipated to collide with Earth and implementing a deflection campaign, in consultation with international bodies, should one be required.

SEC. 805. PLANETARY RADAR CAPABILITY.

The Administrator shall maintain a planetary radar that is, at minimum, comparable to the capability provided through the NASA Deep Space Network Goldstone facility.

SEC. 806. ARECIBO OBSERVATORY.

Congress reiterates its support for the use of the Arecibo Observatory for NASA-funded near-Earth object-related activities. The Administrator shall ensure the availability of the Arecibo Observatory's planetary radar to support these activities until the National Academies' review of NASA's approach for the survey and deflection of near-Earth objects, including a determination of the role of Arecibo, that was directed to be undertaken by the Fiscal Year 2008 Omnibus Appropriations Act, is completed.

TITLE IX—COMMERCIAL INITIATIVES

SEC. 901. SENSE OF CONGRESS.

It is the sense of Congress that a healthy and robust commercial sector can make significant contributions to the successful conduct of NASA's space exploration program. While some activities are inherently governmental in nature, there are many other activities, such as routine supply of water, fuel, and other consumables to low Earth orbit or to destinations beyond low Earth orbit, and provision of power or communications services to lunar outposts, that potentially could be carried out effectively and efficiently by the commercial sector at some point in the future. Congress encourages NASA to look for such service opportunities and, to the maximum extent practicable, make use of the commercial sector to provide those services.

SEC. 902. COMMERCIAL CREW INITIATIVE.

(a) IN GENERAL.—In order to stimulate commercial use of space, help maximize the utility and productivity of the International Space Station, and enable a commercial means of providing crew transfer and crew rescue services for the International Space Station, NASA shall—

(1) make use of United States commercially provided International Space Station crew transfer and crew rescue services to the maximum extent practicable, if those commercial services have demonstrated the capability to meet NASA-specified ascent, entry, and International Space Station proximity operations safety requirements;

(2) limit, to the maximum extent practicable, the use of the Crew Exploration Vehicle to missions carrying astronauts beyond low Earth orbit once commercial crew transfer and crew rescue services that meet safety requirements become operational;

(3) facilitate, to the maximum extent practicable, the transfer of NASA-developed technologies to potential United States commercial crew transfer and rescue service providers, consistent with United States law; and

(4) issue a notice of intent, not later than 180 days after the date of enactment of this Act, to enter into a funded, competitively awarded Space Act Agreement with two or more commercial entities for a Phase 1 Commercial Orbital Transportation Services (COTS) crewed vehicle demonstration program.

(b) COTS AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the program described in subsection (a)(4) $50,000,000 for fiscal year 2009, to remain available until expended.

(c) CONGRESSIONAL INTENT.—It is the intent of Congress that funding for the program described in subsection (a)(4) shall not come at the expense of full funding for Orion Crew Exploration Vehicle development, Ares I Crew Launch Vehicle development, or International Space Station cargo delivery.

(d) ADDITIONAL TECHNOLOGIES AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the provision of International Space Station-compatible docking adaptors and other relevant technologies to be made available to the

commercial crew providers selected to service the International Space Station $50,000,000, to remain available until expended.

(e) CREW TRANSFER AND CREW RESCUE SERVICES CONTRACT.—If a commercial provider demonstrates the capability to provide International Space Station crew transfer and crew rescue services and to satisfy NASA ascent, entry, and International Space Station proximity operations safety requirements, NASA shall enter into an International Space Station crew transfer and crew rescue services contract with that commercial provider for a portion of NASA's anticipated International Space Station crew transfer and crew rescue requirements from the time the commercial provider commences operations under contract with NASA through calendar year 2016, with an option to extend the period of performance through calendar year 2020.

TITLE X—REVITALIZATION OF NASA INSTITUTIONAL CAPABILITIES

SEC. 1001. REVIEW OF INFORMATION SECURITY CONTROLS.

(a) REPORT ON CONTROLS.—Not later than one year after the date of enactment of this Act, the Comptroller General 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 review of information security controls that protect NASA's information technology resources and information from inadvertent or deliberate misuse, fraudulent use, disclosure, modification, or destruction. The review shall focus on networks servicing NASA's mission directorates. In assessing these controls, the review shall evaluate—

(1) the network's ability to limit, detect, and monitor access to resources and information, thereby safeguarding and protecting them from unauthorized access;

(2) the physical access to network resources; and

(3) the extent to which sensitive research and mission data is encrypted.

(b) RESTRICTED REPORT ON INTRUSIONS.—Not later than one year after the date of enactment of this Act, and in conjunction with the report described in subsection (a), the Comptroller General 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 restricted report detailing results of vulnerability assessments conducted by the Government Accountability Office on NASA's network resources. Intrusion attempts during such vulnerability assessments shall be divulged to NASA senior management prior to their application. The report shall put vulnerability assessment results in the context of unauthorized accesses or attempts during the prior two years and the corrective actions, recent or ongoing, that NASA has implemented in conjunction with other Federal authorities to prevent such intrusions.

SEC. 1002. MAINTENANCE AND UPGRADE OF CENTER FACILITIES.

(a) IN GENERAL.—In order to sustain healthy Centers that are capable of carrying out NASA's missions, the Administrator shall ensure that adequate maintenance and upgrading of those Center facilities is performed on a regular basis.

(b) REVIEW.—The Administrator shall determine and prioritize the maintenance and upgrade backlog at each of NASA's Centers and associated facilities, and shall develop a strategy and budget plan to reduce that maintenance and upgrade backlog by 50 percent over the next five years.

(c) REPORT.—The Administrator shall deliver a report to Congress on the results of the activities undertaken in subsection (b) concurrently with the delivery of the fiscal year 2011 budget request.

SEC. 1003. ASSESSMENT OF NASA LABORATORY CAPABILITIES.

(a) IN GENERAL.—NASA's laboratories are a critical component of NASA's research capabilities, and the Administrator shall ensure that those laboratories remain productive.

(b) REVIEW.—The Administrator shall enter into an arrangement for an independent external review of NASA's laboratories, including laboratory equipment, facilities, and support services, to determine whether they are equipped and maintained at a level adequate to support NASA's research activities. The assessment shall also include an assessment of the relative quality of NASA's in-house laboratory equipment and facilities compared to comparable laboratories elsewhere.

TITLE XI—OTHER PROVISIONS

SEC. 1101. SPACE WEATHER.

(a) PLAN FOR REPLACEMENT OF ADVANCED COMPOSITION EXPLORER AT L–1 LAGRANGIAN POINT.—

(1) PLAN.—The Director of OSTP shall develop a plan for sustaining space-based measurements of solar wind from the L–1 Lagrangian point in space and for the dissemination of the data for operational purposes. OSTP shall consult with NASA, NOAA, and other Federal agencies, and with industry, in developing the plan.

(2) REPORT.—The Director shall transmit the plan to Congress not later than 1 year after the date of enactment of this Act.

(b) RESEARCH PROGRAM ON SPACE WEATHER AND AVIATION.—

(1) ESTABLISHMENT.—The Administrator shall, in coordination with the National Science Foundation, NOAA, and other relevant agencies, initiate a research program to—

(A) conduct or supervise research projects on impacts of space weather to aviation, including impacts on communication, navigation, avionic systems, and airline passengers and personnel; and

(B) facilitate the transfer of technology from space weather research programs to Federal agencies with operational responsibilities and to the private sector.

(2) USE OF GRANTS OR COOPERATIVE AGREEMENTS.—The Administrator may use grants or cooperative agreements in carrying out this subsection.

(c) ASSESSMENT OF THE IMPACT OF SPACE WEATHER ON AVIATION.—

(1) STUDY.—The Administrator shall enter into an arrangement with the National Research Council for a study of the im-

pacts of space weather on the current and future United States aviation industry, and in particular to examine the risks for Over-The-Pole (OTP) and Ultra-Long-Range (ULR) operations. The study shall—

(A) examine space weather impacts on at least communications, navigation, avionics, and human health in flight;

(B) assess the benefits of space weather information and services to reduce aviation costs and maintain safety;

(C) provide recommendations on how NASA, NOAA, and the National Science Foundation can most effectively carry out research and monitoring activities related to space weather and aviation; and

(D) provide recommendations on how to integrate space weather information into the Next Generation Air Transportation System.

(2) REPORT.—A report containing the results of the study shall be provided to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

SEC. 1102. SPACE TRAFFIC MANAGEMENT.

(a) IN GENERAL.—As more nations acquire the capabilities for launching payloads into outer space, there is an increasing need for a framework under which information intended to promote safe access into outer space, operations in outer space, and return from outer space to Earth free from physical or radio-frequency interference can be shared among those nations.

(b) DISCUSSIONS.—The Administrator, in consultation with other appropriate agencies of the Federal Government, shall initiate discussions with the appropriate representatives of other spacefaring nations with the goal of determining an appropriate framework under which information intended to promote safe access into outer space, operations in outer space, and return from outer space to Earth free from physical or radio-frequency interference can be shared among those nations.

SEC. 1103. STUDY OF EXPORT CONTROL POLICIES RELATED TO CIVIL AND COMMERCIAL SPACE ACTIVITIES.

(a) REVIEW.—The Director of OSTP shall carry out a study of the impact of current export control policies and implementation directives on the United States aerospace industry and its competitiveness in global markets, and on the ability of United States Government agencies to carry out cooperative activities in science and technology and human space flight, including the impact on research carried out under the sponsorship of those agencies.

(b) CONSULTATION.—In carrying out the study, the Director shall seek input from industry, academia, representatives of the science community, all affected United States Government agencies, and any other appropriate organizations and individuals.

(c) REPORT.—The Director shall provide a report detailing the findings and recommendations of the study to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 9 months after the date of enactment of this Act.

SEC. 1104. ASTRONAUT HEALTH CARE.

(a) SURVEY.—The Administrator shall administer an anonymous survey of astronauts and flight surgeons to evaluate communication, relationships, and the effectiveness of policies. The survey questions and the analysis of results shall be evaluated by experts independent of NASA. The survey shall be administered on at least a biennial basis.

(b) REPORT.—The Administrator shall transmit a report of the results of the survey to Congress not later than 90 days following completion of the survey.

SEC. 1105. NATIONAL ACADEMIES DECADAL SURVEYS.

(a) IN GENERAL.—The Administrator shall enter into agreements on a periodic basis with the National Academies for independent assessments, also known as decadal surveys, to take stock of the status and opportunities for Earth and space science discipline fields and Aeronautics research and to recommend priorities for research and programmatic areas over the next decade.

(b) INDEPENDENT COST ESTIMATES.—The agreements described in subsection(a) shall include independent estimates of the life cycle costs and technical readiness of missions assessed in the decadal surveys whenever possible.

(c) REEXAMINATION.—The Administrator shall request that each National Academies decadal survey committee identify any conditions or events, such as significant cost growth or scientific or technological advances, that would warrant NASA asking the National Academies to reexamine the priorities that the decadal survey had established.

SEC. 1106. INNOVATION PRIZES.

(a) IN GENERAL.—Prizes can play a useful role in encouraging innovation in the development of technologies and products that can assist NASA in its aeronautics and space activities, and the use of such prizes by NASA should be encouraged.

(b) AMENDMENTS.—Section 314 of the National Aeronautics and Space Act of 1958 is amended—

(1) by amending subsection (b) to read as follows:

"(b) TOPICS.—In selecting topics for prize competitions, the Administrator shall consult widely both within and outside the Federal Government, and may empanel advisory committees. The Administrator shall give consideration to prize goals such as the demonstration of the ability to provide energy to the lunar surface from space-based solar power systems, demonstration of innovative near-Earth object survey and deflection strategies, and innovative approaches to improving the safety and efficiency of aviation systems."; and

(2) in subsection (i)(4) by striking "$10,000,000" and inserting "$50,000,000".

Chairman GORDON. The first amendment on the roster is the manager's amendment offered by myself. The clerk will report the amendment.

The CLERK. Amendment to H.R. 6063 offered by Mr. Gordon of Tennessee.

[The amendment follows:]

COMMITTEE ON SCIENCE AND TECHNOLOGY
FULL COMMITTEE MARKUP
June 4, 2008

AMENDMENT ROSTER

H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008

No.	Sponsor	Description	Results
1	Mr. Gordon	Manager's amendment makes technical and clarifying changes to the bill; includes a sense of Congress provision on the importance of the Outer Planets program; directs the OSTP Director to undertake a study of issues related to the establishment of commercial launch ranges; establishes an outreach and technology assistance program to help transfer NASA knowledge and technology to the nation's small businesses.	Agreed to by voice vote.
2	Mr. Gingrey 089	Adds a new section repealing section 526 of the Energy Independence and Security Act of 2007.	Ruled out of order as non-germane.
3	Mr. Gingrey 090	Adds a new section conferring authority to the Administrator (or his designee) to waive the prohibition contained in section 526 of the Energy Independence and Security Act of 2007 if such a waiver is deemed necessary by the Administrator to further the mission of NASA.	Ruled out of order as non-germane.

AMENDMENT TO H.R. 6063

OFFERED BY MR. GORDON OF TENNESSEE

Page 13, lines 9 through 11, strike "Administrator and the Administrator of NOAA, shall develop a process for Federal agencies" and insert "Administrator, the Administrator of NOAA, and other relevant stakeholders, shall develop a process".

Page 16, line 10, insert "involving NASA, universities, industry, and other research organizations as appropriate," after "establish an initiative".

Page 17, line 7, insert ", and shall work to increase the degree of involvement of external organizations, and especially of universities, in the fundamental aeronautics research program" after "Civil Aeronautics".

Page 21, lines 4 and 5, strike "assess, and make recommendations regarding," and insert "make recommendations regarding".

Page 21, after line 7, insert the following new paragraph:

> (2) make recommendations for and monitor development and implementation of processes for transitioning research and development from NASA and the Federal Aviation Administration to external entities for further development as appropriate;

Page 21, lines 8 and 17, redesignate paragraphs (2) and (3) as paragraphs (3) and (4), respectively.

Page 21, lines 8 and 9, strike "assess, and make recommendations regarding," and insert "make recommendations regarding".

Page 21, line 24, strike "paragraphs (1) and (2)" and insert "paragraphs (1), (2), and (3)".

Page 26, line 13, strike "scientific" and insert "human".

Page 27, line 20, insert "nongovernmental organizations," after "private sector,".

Page 28, line 9, insert ", Mars, and other solar system bodies" after "to the Moon".

Page 30, line 2, insert "To the extent affordable and practical, the program should pursue the goal of launches at every Mars launch opportunity, leading to an eventual robotic sample return." after "future human exploration.".

Page 32, after line 13, insert the following new section:

SEC. 508. OUTER PLANETS EXPLORATION.

It is the sense of Congress that the outer solar system planets and their satellites can offer important knowledge about the formation and evolution of the solar system, the nature and diversity of these solar system bodies, and the potential for conditions conducive to life beyond Earth. NASA should move forward with plans for an Outer Planets flagship mission to the Europa-Jupiter system or the Titan-Saturn system as soon as practicable within a balanced Planetary Science program.

Page 34, line 15, strike "and".

Page 34, line 21, strike the period and insert "; and".

Page 34, after line 21, insert the following new paragraph:

> (3) provide the results of the assessment to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of

the Senate not later than 18 months after the date of enactment of this Act.

Page 42, line 5, insert ", attaching a tracking device," after "rendezvousing with".

Page 42, line 13, strike "The Director" and insert "Not later than 2 years after the date of enactment of this Act, the Director".

Page 45, line 13, insert "CREWED VEHICLE DEMONSTRATION PROGRAM" after "COTS".

Page 45, line 19, insert "of the amounts authorized under section 101(a)(3), and for future fiscal years," after "full funding".

Page 49, line 17 insert "The results of the review shall be provided to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 18 months after the date of enactment of this Act." after "laboratories elsewhere.".

Page 56, after line 2, insert the following new sections (and amend the table of contents accordingly):

SEC. 1107. COMMERCIAL SPACE LAUNCH RANGE STUDY.

(a) STUDY BY INTERAGENCY COMMITTEE.—The Director of OSTP shall work with other appropriate Federal agencies to establish an interagency committee to conduct a study to—

(1) identify the issues and challenges associated with establishing a space launch range and facilities that are fully dedicated to commercial space missions in close proximity to Federal launch ranges or other Federal facilities; and

(2) develop a coordinating mechanism such that States seeking to establish such commercial space launch ranges will be able to effectively and efficiently interface with the Federal Government concerning issues related to the establishment of such commercial launch ranges in close proximity to Federal launch ranges or other Federal facilities.

(b) REPORT.—The Director shall, not later than May 31, 2010, submit 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 on the results of the study conducted under subsection (a).

SEC. 1108. NASA OUTREACH AND TECHNOLOGY ASSISTANCE PROGRAM.

(a) ESTABLISHMENT.—NASA shall contract with an organization that has demonstrated the ability to partner with NASA centers, aerospace contractors, and academic institutions to carry out a program to transfer the knowledge and technology of the space and aeronautics programs to small businesses in communities across the United States. The program shall support the mission of NASA's Innovative Partnerships Program to provide technical assistance through joint partnerships with industry, academia, government agencies, and national laboratories.

(b) PROGRAM STRUCTURE.—In carrying out the program described in subsection (a), the organization shall support the mission of NASA's Innovative Partnerships Program by undertaking the following activities:

(1) Facilitating technology transfer to the private sector to produce viable commercial products.

(2) Creating a network of academic institutions, aerospace contractors, and NASA centers that will commit to donating technical assistance to small businesses.

(3) Creating a network of economic development organizations to increase the awareness and enhance the effectiveness of the program nationwide.

(c) REPORT.—Not later than 1 year after the date of enactment of this Act, and annually thereafter, the Administrator shall submit a report to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing the efforts and accomplishments of the program established under subsection (a) in support of NASA's Innovative Partnerships Program. As part of the report, the Administrator shall provide—

(1) data on the number of small businesses receiving assistance, jobs created and retained, and volunteer hours donated by NASA, contractors, and academic institutions nationwide;

(2) an estimate of the total dollar value of the economic impact made by small businesses that received technical assistance through the program; and

(3) an accounting of the use of funds appropriated for the program.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA for the program established under subsection (a), $4,000,000 for fiscal year 2009 from the funding available for the Innovative Partnerships Program, to remain available until expended.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize myself for 5 minutes to explain the amendment.

I have what I believe is a straightforward amendment that makes a number of technical corrections to the bill, clarifies several of existing provisions of the bill, and adds some additional language. It clarifies that the bill intends for NASA to insure significant involvement by the universities and industry in NASA's Aeronautics R&D Program. It also clarifies that the responsibilities of the Joint Aeronautics R&D Advisory Committee established in the bill.

In the planetary science area the amendment adds additional language on support of the Robotic Mars Science Mission, as well as a sense of Congress provision on the importance of the Outer Planets Program.

And finally, the amendment includes two new provisions. First is a commercial launch range study to be carried out by OSTP to identify issues and challenges associated with establishing such launch ranges. And second, it is a provision to establish a new outreach in Technology Assistance Program to help transfer NASA's knowledge in technology to the Nation's small businesses.

We have worked closely with the minority in crafting this amendment, and I appreciate their assistance and input. I believe that this is a non-controversial amendment, and I would urge my colleagues to support it.

Is there further discussion on the amendment?

Mr. HALL. Mr. Chairman.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. Your amendment makes a number of clarifying changes and some good provisions were added in part through the advocacy of my friend and Texas colleague, Representative John Culberson, and you have mentioned the commercial launch range and Mr. Lampson's aid for the small business area.

And I support the manager's amendment and urge all members to lend their support to it as well.

And I yield back my time.

Chairman GORDON. If there is no further discussion on the amendment, if no, the vote occurs on the amendment. All in favor, say aye. Those opposed, no. The amendment has it—or the ayes have it, and the amendment is agreed to.

The second amendment on the roster is offered by the gentleman from Georgia, Mr. Gingrey. Dr. Gingrey. Are you ready to proceed with your amendment?

Mr. GINGREY. I am, Mr. Chairman.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 089, amendment to H.R. 6063 offered by Mr. Gingrey of Georgia.

[The amendment follows:]

AMENDMENT TO H.R. 6063

OFFERED BY MR. GINGREY OF GEORGIA

Page 56, after line 2, insert the following new section (and amend the table of contents accordingly):

SEC. 1107. REPEAL OF ALTERNATIVE FUEL PROCUREMENT REQUIREMENT FOR FEDERAL AGENCIES.

(a) FINDINGS.—Congress finds the following:

(1) Section 526 of the Energy Independence and Security Act of 2007, which restricts the purchase of fuels not derived from "conventional" petroleum, was included in the legislation "in response to proposals under consideration by the Air Force to develop coal-to-liquid fuels", according to the author of the section.

(2) Section 526 affects any Federal agency that purchases fuel, including NASA.

(3) Section 526, though aimed at coal-to-liquids, affects all "unconventional" fuels, including oil shale, tar sands, heavy oil, and possibly ethanol and other biofuels.

(4) Coal-to-liquids, oil shale, and tar sands are all abundant in the United States and Canada.

(5) Canada is currently the largest United States oil supplier. It sent 1,800,000 barrels per day of crude oil and 500,000 barrels per day of refined products to the United States in 2006, according to the Canadian Government. About half of Canadian crude is derived from oil sands, with sands production forecast to reach about 3,000,000 barrels per day in 2015.

(6) Section 526 could choke this flow of fuel from one of the Nation's most reliable allies and economic partners.

(b) REPEAL.—Section 526 of the Energy Independence and Security Act of 2007 (Public Law 110–140; 42 U.S.C. 17142) is hereby repealed.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

Mr. BAIRD. Mr. Chairman.

Chairman GORDON. The gentleman is recognized.

Mr. BAIRD. I reserve a point of order on the amendment.

Chairman GORDON. The gentleman is—Dr. Gingrey is recognized for 5 minutes to explain his amendment with a reservation held by Dr. Baird.

Mr. GINGREY. Mr. Chairman, thank you, and I certainly agree with you and your statements and the Ranking Member's statements, H.R. 6063 is definitely a strong and bipartisan piece of legislation, and I commend Mr. Udall and Mr. Feeney for working so closely together on this bill.

I think we can make it better, though, and I actually have two amendments, and let me describe the first one.

This—the first amendment would correct a misguided provision, and that provision is Section 526 of the Energy Independence and Security Act of 2007, that prevents the Federal Government, including NASA, from developing and implementing alternative fuels from our own domestic sources. This first amendment is very similar to a bipartisan amendment to the fiscal year 2009, National Defense Authorization Act that I submitted to the rules Committee, along with Mr. Hensarling of Texas, Mrs. Blackburn of Tennessee, and Mr. Abercrombie of Hawaii.

Unfortunately, the majority did not make that amendment in order, but it is my opinion that the Science Committee will engage in a full and an open debate on a clear difference of philosophies on energy policy that exists between the Republicans and our Democratic colleagues.

Over the past 5 years NASA has seen an increase of almost 400 percent in spending for jet fuel, from $4.5 million in fiscal year 2003, to $18.3 million in fiscal year 2007. Simply put, the growth NASA has experienced in fuel costs is simply out of control, and it has, therefore, been actively researching alternative fuels to help reduce fuel costs, not only for itself but also for other federal agencies. And in particular, for the Department of Defense.

It has estimated the Department of Defense, mainly through the Air Force, utilizes 480,000 gallons of refined petroleum products every day, 480,000 gallons a day, and because of the rising cost of fuel, it is estimated that in the fiscal year 2008, the additional cost to the Department of Defense and to the Federal Government will be $9 billion. Now, that is just the increased costs.

Mr. Chairman, NASA has historically been on the cutting edge of innovation, numerous contributions to technologies that we use on a daily basis in the United States. We all know about that. Currently, NASA is partnering with the Air Force and is already aggressively conducting research to convert domestic energy sources such as coal to liquid, natural gas, biomass, and oil shale. It is estimated that in the west, four or five states in the west, the amount of oil shale, which is—I am not that familiar with the product, but

it is not a liquid. It is kind of semi-solid, but if we utilize that and converted it into a petroleum product, it could produce something like three million additional—I am sorry—three trillion additional barrels of oil for use by the Federal Government. Three trillion. Now, put it in perspective when the first oil well was drilled in Pennsylvania back in the late 1800's. Since that time the whole world has used about one trillion barrels of petroleum, and this oil shale has the capacity, domestic, right here in River City, if you will, of producing three trillion additional barrels of petroleum.

And as I say, NASA is currently partnered with the Air Force. They are conducting the research to make these conversions into cleaner and more economical-alternative to traditional jet fuel. We are—the prices, of course, are rising, at a time where we could best utilize the research for emerging technologies for alternative fuels with Section 526, the Democratic majority has really effectively stymied innovation at NASA that could potentially help us reduce our dependence on foreign oil.

It basically says in Section 526 that the Federal Government cannot utilize any of these other sources if it results in any increased carbon footprint. Now, I am not talking about tonnage of CO_2. I am talking about maybe even an ounce more, and when we have to balance and consider the amount of money that we are spending and what we are going through and what the American public is going through in this time to not put aside that misguided policy so that our Federal Government doesn't literally go broke I think is a big mistake.

So, Mr. Chairman, that basically is my amendment. I would literally strike Section 526 and have that as part of this NASA bill, which, again, I think H.R. 6063 is a good, strong bipartisan bill, as you said, but I think we can make it much better with this amendment.

And I yield back.

Chairman GORDON. Thank you, Dr. Gingrey. Does the gentleman wish to be heard on his point of order?

Mr. BAIRD. Mr. Chair, I make a point of order that pursuant to Clause 7 of House Rule 16, the amendment is not germane to the underlying bill being amended.

Chairman GORDON. Dr. Gingrey, do you wish to be heard on the point of order?

Mr. GINGREY. Mr. Chairman, I do. I don't see how—I respect my colleague, of course, Dr. Baird, but I don't understand, maybe he could explain to us why this amendment would not be germane. As I just pointed out in my discussion, NASA is currently doing research on utilizing these alternative domestic sources and has a partnership with the Department of Defense so that they are not duplicating their research efforts and sharing that information and is just on the verge probably of being able to utilize that commercially.

So I can't understand. Maybe Dr. Baird can explain to us why he feels it is not germane.

Mr. BAIRD. I would be happy to. First of all, the most important thing is the parliamentarian has advised us that it qualifies as not germane, but my understanding is that federal procurement laws are part of the government reformat oversight and are not germane

to this particular committee, and on that basis is why I offered the resolution.

Mr. GINGREY. Mr. Chairman, if I could additionally comment on that, you know, I guess what Dr. Baird is saying is that it is not germane because this amendment would change the bill to the point that some other committee then would have some jurisdiction over it, and it would have to be referred to the other committee that Dr. Baird mentioned. But, I mean, why does that mean it is non-germane just because some other committee may have to look at it and have jurisdiction? We are not exactly killing ourselves, Mr. Chairman, up here getting things done. We are spending a lot of time on suspension bills and the one that is coming up tomorrow in regard to the Chesapeake Bay probably we are going to be spending time debating that, but it should be on suspension.

We are wasting a lot of time. This is important stuff. Even if it does mean sequential referral, so be it if we make it a much better bill and save our country from going down the tubes.

Mr. EHLERS. Mr. Chairman.

Chairman GORDON. Dr. Ehlers is recognized.

Mr. EHLERS. Thank you, Mr. Chairman. I speak against the point of order and in favor of the amendment for perhaps some different reasons, but as you know, I have fought very hard over the years to maintain this jurisdiction, the jurisdiction of this Committee over various areas. And this problem that we are trying to correct here is a good example of what happens when committees that don't understand the science and don't have jurisdiction over NASA, for example, pass regulations that just don't make sense.

And the reason this doesn't make sense in the case of either aviation or space travel is that the primary requirement for fuel to be used for space travel or for aviation is to have a high energy density fuel. In other words, a lot of energy compared to the weight, because with flying or space travel, weight means everything. You want to keep the weight as low as possible, but you need the maximum energy. So you want to buy fuels or find fuels or develop fuels that have the maximum energy density. In other words, the largest amount of energy available for the amount of weight of the fuel you are carrying.

And I see Section 526 basically saying, well, we don't care about that. We are just worried about the government foot print. Well, I am worried about government foot print, too. I want the smallest possible government foot print or tire tread or vapor trails through space, whatever you want to call it, but the point is simply let NASA and all the aviation and space researchers decide what is the best fuel, what is the highest energy density for the minimum government foot print.

In other words, you have to balance two things; energy density and foot print and not put everything on the foot print itself. So I think this Section 526, it is just pure nonsense. It should be left up to this Committee and to the scientific community to try to work out this particular problem. And by having another committee step in, which doesn't understand the science, we end up with this problem.

So I respect the parliamentarian and—but there is a problem here that has to be addressed. The problem arises because once

again a committee outside of the Science Committee tackled a scientific issue and messed up on it.

With that I will yield back.

Mr. SENSENBRENNER. Mr. Chairman.

Chairman GORDON. Ranking Member Hall has asked to be recognized.

Mr. HALL. And I will yield to Jim, but I would like 30 seconds first before I get you started, Jim. Okay?

I support, of course, the bill and speak in support of the amendment, and point of order has been raised, and that will be a legal question. But, you know, when I was in law school, I think they had a four corners of the page ruling that you look at anything from everything that is within those four corners of the page, and you had legal reasons and then you had equitable reasons. And sometimes equity outweighed the legal. And I think that is what the professor here is saying, that this amendment is simple, and yet it addresses a problem that is created by an earlier law that hamstrings our federal agencies. It is an equitable thing to undo those shackles that are put on them, American taxpayers, and I think we are aware of the Energy Bill that passed last year doesn't—does little to advance energy independence for Americans and actually takes options off the table for increasing the production of a number of domestic energy resources.

Section 526 is one of the many sections that reduces options for Americans. This section prohibits any federal agency from entering into contracts to purchase any new fuel sources such as coal to liquids and those derived from tar sands and oil shale to power their fleets. Instead, the way the section is written it could potentially also prohibit the purchase of ethanol and other biofuels. And some of us agree with that part, but we don't agree with the others.

But considering the fact that Americans are burdened with skyrocketing fuel costs, I think our Nation continues to rely on foreign sources of energy. We ought to be looking for all and using all unconventional sources of energy that we can produce domestically. I just think that when we look at the pages of—from the four corners of the pages and we see Section 526, it affects any federal agency that purchases fuels, and that includes NASA. NASA purchased $18.3 million of jet fuel just last year and countless more to power their automobile fleet and manufacturing capabilities.

And when we consider the fact that our Nation is on an energy crisis created in part by a lack of domestic production of resources, this amendment would allow the purchases of new domestic resources and simply makes sense. I think it is equitable if you take the equity position, and when you search and make a ruling on the legal, I urge all my colleagues to pass this commonsense amendment, if the Chair rules as correctly as I hope he is going to rule on this. And if he doesn't, I have a sneaking feeling we may be outvoted.

But I have to yield my last 5 minutes to Mr. Sensenbrenner.

Mr. SENSENBRENNER. Well, I thank the distinguished Ranking Member for yielding, and I am going to be much quicker than 5 minutes or even 5 seconds.

I would caution the Chair to—not to sustain the point of order that has been made by the gentleman from Washington State.

This bill deals with NASA authorization. NASA authorization largely is what NASA procures and how it procures it, and if we accept the argument that the gentleman from Washington State has raised, then this entire bill would probably be non-germane and in the jurisdiction of the Committee on Government Reform and Oversight. That would be a terrible mistake.

During my tenure as Chair of this Committee 10 years ago, we had some major tussles on jurisdictional issues, and it was largely with the Government Reform and Oversight Committee, and we were able to win most of those arguments. The way the House rules are written, the Waxman Committee can stick its nose into practically everything.

If we do not stand up and fight for our jurisdiction, the nose of the camel will be under our tent, and before we know it the entire camel will be there, and it will be our Committee that ends up being irrelevant. I would just as soon have that committee be made irrelevant, but that will require an overruling of the point of order that the gentleman from Washington State has entered.

Thank you.

Chairman GORDON. Thank you. The Chair is prepared to rule. The gentleman's point of order is sustained. The amendment in question amends the provision in an unrelated act, which has no relation to the subject matter of the underlying bill, which is NASA.

The Chair would also note that the amendment falls outside of the Committee's jurisdiction. Thus, the amendment is not germane, and the point of order is sustained pursuant to Clause 7 of House Rule 16.

Now, let me tell you in English what we mean here. The Government Reform has jurisdiction. The parliamentarians have made that very clear on this particular matter. And let me say that this is not a last, or Court of last resort, in that Dr. Gingrey can go to the Rules Committee, with which he is well familiar with, and ask this be made an order on the Floor.

And let me also remind, Mr. Sensenbrenner was giving us a little bit of a history lesson, for many, many, many years it has been the tradition and custom of this Committee that when the Chairman sends out a notice saying amendments are accepted, the Chairman also says that reserves the right not to accept any amendment that has not been presented within 24 hours. There is a reason for that. The reason is we have got a responsibility to put a good bill on the Floor, and it needs to be vetted. This is not the subcommittee. This is the full Committee. I haven't even—you know, we did not get this amendment until 9:30 last night, and if you were looking for a conspiracy, you might say it was waited late so that we couldn't get to the parliamentarians and ask about it. There was, you know, if this was so important it could have been brought at the subcommittee level, it could have brought more than 24 hours. I don't think that there—anyone thinks there hasn't been a lack of or there is a lack of cooperation and collaboration.

And so, you know, not even having read this bill it really does make me feel uncomfortable just in an honest situation to put something on the Floor that hasn't been vetted. It is not nec-

essarily the concept but is the way it is written. We just don't know.

So, again, I think there is a—certainly there is a significant parliamentary position here, and there is a substantive position, and I would say to Dr. Gingrey, I would suggest that he go to the subcommittee, I mean, rather to the Rules Committee, and I will not object when he does that.

So now there is a third——

Mr. FEENEY. Mr. Chairman.

Chairman GORDON. Yes.

Mr. FEENEY. If it is the appropriate time, I want to reluctantly appeal the ruling of the Chair, and it is not as much directed at the Chairman, who I have great respect for and a great friendship with, but it is as much——

Mr. BAIRD. Mr. Chairman, I would like to——

Mr. FEENEY [continuing]. A decision how the parliamentarian—and I think the parliamentarian has given the Committee and the Chairman bad advice, and therefore, I reluctantly but very firmly do appeal the ruling of the Chair on this.

Mr. BAIRD. Mr. Chairman, I call the roll. Ask for a record of the vote.

Chairman GORDON. I rule to table that motion. The question is on the gentleman's motion to lay the appeal on the ruling, of the ruling of the Chair on the table.

All in favor, say, aye. Opposed, no.

The ayes appear to have it.

Mr. FEENEY. Mr. Chairman, on that I would request a recorded vote, please.

Chairman GORDON. The clerk will call the roll.

The CLERK. Chairman Gordon.

Chairman GORDON. Aye.

The CLERK. Chairman Gordon votes aye. Mr. Costello.

Mr. COSTELLO. Aye.

The CLERK. Mr. Costello votes aye. Ms. Johnson.

[No response.]

The CLERK. Ms. Woolsey.

Ms. WOOLSEY. Aye.

The CLERK. Ms. Woolsey votes aye. Mr. Udall.

Mr. UDALL. Aye.

The CLERK. Mr. Udall votes aye. 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. Mr. Lampson.

Mr. LAMPSON. Aye.

The CLERK. Mr. Lampson votes aye. Ms. Giffords.

Ms. GIFFORDS. Aye.

The CLERK. Ms. Giffords votes aye. Mr. McNerney.

Mr. MCNERNEY. Aye.

The CLERK. Mr. McNerney votes aye. Ms. Richardson.

Ms. RICHARDSON. Aye.
The CLERK. Ms. Richardson votes aye. Mr. Kanjorski.
[No response.]
The CLERK. Ms. Hooley.
Ms. HOOLEY. Aye.
The CLERK. Ms. Hooley votes aye. Mr. Rothman.
[No response.]
The CLERK. Mr. Matheson.
Mr. MATHESON. Aye.
The CLERK. Mr. Matheson votes aye. Mr. Ross.
[No response.]
The CLERK. Mr. Chandler.
Mr. CHANDLER. Aye.
The CLERK. Mr. Chandler votes aye. Mr. Carnahan.
Mr. CARNAHAN. Aye.
The CLERK. Mr. Carnahan votes aye. Mr. Melancon.
Mr. MELANCON. Aye.
The CLERK. Mr. Melancon votes aye. Mr. Hill.
Mr. HILL. Aye.
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. Mr. Hall.
Mr. HALL. No.
The CLERK. Mr. Hall votes no. Mr. Sensenbrenner.
Mr. SENSENBRENNER. No.
The CLERK. Mr. Sensenbrenner votes no. Mr. Smith of Texas.
Mr. SMITH of Texas. No.
The CLERK. Mr. Smith of Texas votes no. Mr. Rohrabacher.
[No response.]
The CLERK. 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.
Ms. BIGGERT. No.
The CLERK. Mrs. Biggert votes no. Mr. Akin.
Mr. AKIN. No.
The CLERK. Mr. Akin votes no. Mr. Feeney.
Mr. FEENEY. No.
The CLERK. Mr. Feeney votes no. Mr. Neugebauer.
[No response.]
The CLERK. Mr. Inglis.
[No response.]
The CLERK. Mr. Reichert.
Mr. REICHERT. No.
The CLERK. Mr. Reichert votes no. Mr. McCaul.
Mr. MCCAUL. No.
The CLERK. Mr. McCaul votes no. Mr. Diaz-Balart.
Mr. DIAZ-BALART. No.
The CLERK. Mr. Diaz-Balart votes no. Mr. Gingrey.

Mr. GINGREY. No.

The CLERK. Mr. Gingrey votes no. Mr. Bilbray.

[No response.]

The CLERK. Mr. Smith.

Mr. SMITH OF NEBRASKA. No.

The CLERK. Mr. Smith of Nebraska votes no. Mr. Broun.

[No response.]

Chairman GORDON. Is there anyone present who hasn't had a chance to vote?

If not, the clerk will tally the votes.

The CLERK. Mr. Chairman, 20 members vote aye, and 14 members vote no.

Chairman GORDON. The third amendment on the roster is offered by the gentleman from Georgia, Dr. Gingrey. Are you ready to proceed with your amendment?

Mr. GINGREY. I am, Mr. Chairman.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 090, amendment to H.R. 6063 offered by Mr. Gingrey of Georgia.

[The amendment follows:]

COMMITTEE ON SCIENCE AND TECHNOLOGY

ROLL CALL #1 BILL H.R. 6063 DATE 6/4/2008
AMENDMENT NUMBER #2 DEFEATED 20-14
SPONSOR/AMENDMENT - Mr. Gingrey

MEMBER	AYE	NO	PRESENT	NOT VOTING
Mr. GORDON, Chairman	X			
Mr. COSTELLO	X			
Ms. JOHNSON				
Ms. WOOLSEY	X			
Mr. UDALL	X			
Mr. WU	X			
Mr. BAIRD	X			
Mr. MILLER	X			
Mr. LIPINSKI	X			
Mr. LAMPSON	X			
Ms. GIFFORDS	X			
Mr. McNERNEY	X			
Ms. RICHARDSON	X			
Mr. KANJORSKI				
Ms. HOOLEY	X			
Mr. ROTHMAN				
Mr. MATHESON	X			
Mr. ROSS				
Mr. CHANDLER	X			
Mr. CARNAHAN	X			
Mr. MELANCON	X			
Mr. HILL	X			
Mr. MITCHELL	X			
Mr. WILSON	X			
Mr. HALL		X		
Mr. SENSENBRENNER		X		
Mr. SMITH - TX		X		
Mr. ROHRABACHER				
Mr. BARTLETT		X		
Mr. EHLERS		X		
Mr. LUCAS		X		
Mrs. BIGGERT		X		
Mr. AKIN		X		
Mr. FEENEY		X		
Mr. NEUGEBAUER				
Mr. INGLIS				
Mr. REICHERT		X		
Mr. McCAUL		X		
Mr. DIAZ-BALART		X		
Mr. GINGREY		X		
Mr. BILBRAY				
Mr. SMITH - NE		X		
Mr. BROUN				
Vacancy				
TOTALS	20	14		

AMENDMENT TO H.R. 6063

OFFERED BY MR. GINGREY OF GEORGIA

Page 56, after line 2, insert the following new section (and amend the table of contents accordingly):

SEC. 1107. AUTHORITY TO WAIVE ALTERNATIVE FUEL PROCUREMENT REQUIREMENT.

The Administrator (or his designee) may waive the prohibition contained in section 526 of the Energy Independence and Security Act of 2007 (Public Law 110–140; 42 U.S.C. 17142) if such a waiver is deemed necessary by the Administrator, in his sole discretion, to further the mission of NASA.

Chairman GORDON. I ask unanimous consent to dispense with the reading, and without objection, so ordered.

Mr. BAIRD. Mr. Chairman, I would again reserve a point of order on the amendment.

Chairman GORDON. The gentleman is recognized for 5 minutes to explain his amendment.

Mr. GINGREY. Mr. Chairman, thank you. We are going to make a second attempt here for my colleagues, and this second amendment that I am offering does address the very same issue that the previous amendment did, but it attempts to correct it in a different way.

You have heard my explanation in regard to wanting to strike and repeal Section 526 of the Energy Independence and Security Act of 2007, and the reasons for that, because it is applicable to our entire Federal Government and the numbers that I gave you, I think, are just absolutely staggering. But in any regard, we have had that battle and I can count, and I heard that 20, 14 vote.

So now I want to try to approach this in a more limited manner, but I think one that hopefully our colleagues can accept, because I believe that this amendment provides a good compromise that would tremendously benefit NASA.

This amendment would allow the NASA administrator to use his discretion to provide a waiver to the agency to make it exempt from the harmful provisions of Section 526. Just like the other amendment that I offered to H.R. 6063, this amendment is very similar to one offered by Mr. Bishop of Utah in the fiscal year 2009 National Defense Authorization Act. Unfortunately, that amendment was also not made in order by the Rules Committee.

Again, I believe that this is also a commonsense amendment that will help us get on the path to correcting harmful energy policies by granting NASA a waiver, and we are not talking about the rest of the Federal Government, we are not even talking about the Department of Defense. We are just talking about this agency, allowing the administrator a waiver from Section 526 in his discretion. I believe that it would allow the agency to continue developing technologies that utilize the resources that we have here in the United States. And we have talked about those, oil shale, sand tar, coal to liquid. And we can do it, and NASA is proving that it can be done in an environmentally-safe fashion so that we could reduce our dependence on foreign sources of energy and at the same time

pay attention to our environment and make sure that we don't ignore that.

I hope all my colleagues on the Committee support this important amendment. It serves as a compromise, I think, a fair compromise to allow for continued alternative fuel innovation by NASA and NASA only.

And with that, Mr. Chairman, I will yield back my time.

Chairman GORDON. The gentleman is recognized for 5 minutes to explain—excuse me—does the gentleman wish to be heard on this point of order?

Mr. BAIRD. Mr. Chair, I do very briefly. I would just point out that the gentleman repeatedly talks about sand tars and oil shale and coal to liquid. I don't think to the best of my knowledge NASA is planning to launch a rocket fueled by any of the aforementioned, but if so, I will risk depriving them of that opportunity with this, and I do make the point of order that pursuant to Clause 7 of House Rule 16 the amendment is not germane to the underlying bill being amended.

Mr. HALL. Mr. Chairman.

Chairman GORDON. First I think, Mr. Hall, we need to recognize Dr. Gingrey to be heard on the point of order, and then he is welcome to yield to you.

Mr. GINGREY. Mr. Chairman, thank you, and I will take just a little time and then yield to the Ranking Member.

Again, the same argument that I made before, but this one in spades, I mean, we are talking about NASA now. We are not talking about the other agencies of the Federal Government. And it is NASA that is doing most of the research currently ongoing, sharing that research with Department of Defense as I stated in regard to how you can take these, this seed corn, if you will, the oil shale and coal to liquid, and turn them into fuel, and this is domestic fuel that we have right here in River City. And as I pointed out, up to three trillion gallons potentially of our own source of energy, that would be so much, much cheaper. Goodness gracious, $9 billion increased costs in 2008, because of what we have to pay to these foreign sources of petroleum. You just think about the savings and what we could do with that in regard to healthcare, and I could go on and on.

But I hope I made my point. I feel very strongly about this. I am surprised that point of order has been raised about germaneness, and I will yield to the distinguished Ranking Member the rest of my time.

Mr. HALL. Mr. Chairman, I certainly agree with Dr. Gingrey, and as I mentioned in discussion with Dr. Gingrey's excellent first amendment, the section from last year's Energy Bill that is in question takes energy options off the Floor, off the table for Americans at a time when we really ought to be expanding those resources.

The need to expand resources is certainly not a foreign concept to this Administration. It is not a Republican wish or a Democratic wish. It is an American wish and something we have to do. In fact, the very agency that we are discussing today, NASA, is currently engaged in ground-breaking research on many of the fuels that this ill-conceived section prohibits federal agencies from purchasing.

And as I look at the amendment, and once again, for the good it will do, it shouldn't surprise any of us that an agency that has led the way to the future by leading a man to the moon and returning him safely to earth and which has just last week softly landed a probe on Mars to explore the red planet, would be, again, be leading the way to energy independence. This is an energy thrust, and this amendment is simple. It simply says administrator may. It doesn't say shall. Shall is not in this amendment anywhere. He may waive the provision, and it goes on to be more definite in his sole discretion.

I just think it is a good amendment, and I hope that the Chairman will give us a good support in his wisdom and his great Tennessee background at the University School of Law down there to overrule, to support this motion.

Chairman GORDON. I will give the Ranking Member 3 years of law school and several years of practicing law the ruling here. The Chair is prepared to rule.

The gentleman's point of order is sustained. The amendment in question alters a government-wide procurement policy by examining one single agency affected by this procurement policy. Government-wide procurement policy is not within the jurisdiction of the Committee on Science and Technology, and the consequences of the amendment falls outside of the Committee's jurisdiction.

Thus, the amendment is not germane, and point of order is sustained pursuant to Clause 7 of Rule 16. And once again, let me point out that this amendment was not received until 9:33 last night when, like most of you, I had left the office, and I happened to be in bed with a sinus infection. Where you were is your own business.

And I would also, again, state that Dr. Gingrey has the right and privilege of being able to go to the Rules Committee and for this to be heard on the Floor in the appropriate manner.

Mr. GINGREY. Mr. Chairman.

Chairman GORDON. Dr. Gingrey is recognized.

Mr. GINGREY. I move to appeal the ruling of the Chair.

Mr. BAIRD. Mr. Chair, I would move to lay the appeal of the ruling of the Chair on the table.

Chairman GORDON. The question is on the gentleman's motion to lay the appeal of the ruling of the Chair on the table.

All in favor, say aye. Opposed, no.

The ayes appear to have it.

Mr. GINGREY. Mr. Chairman, on that I would ask for a recorded vote.

Chairman GORDON. The clerk will call the roll.

The CLERK. Chairman Gordon.

Chairman GORDON. Aye.

The CLERK. Chairman Gordon votes aye. Mr. Costello.

Mr. COSTELLO. Aye.

The CLERK. Mr. Costello votes aye. Ms. Johnson.

[No response.]

The CLERK. Ms. Woolsey.

Ms. WOOLSEY. Aye.

The CLERK. Ms. Woolsey votes aye. Mr. Udall.

Mr. UDALL. Aye.

The CLERK. Mr. Udall votes aye. 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. Mr. Lampson.
Mr. LAMPSON. Aye.
The CLERK. Mr. Lampson votes aye. Ms. Giffords.
Ms. GIFFORDS. Aye.
The CLERK. Ms. Giffords votes aye. Mr. McNerney.
Mr. MCNERNEY. Aye.
The CLERK. Mr. McNerney votes aye. Ms. Richardson.
Ms. RICHARDSON. Aye.
The CLERK. Ms. Richardson votes aye. Mr. Kanjorski.
Mr. KANJORSKI. Aye.
The CLERK. Mr. Kanjorski votes aye. Ms. Hooley.
Ms. HOOLEY. Aye.
The CLERK. Ms. Hooley votes aye. Mr. Rothman.
[No response.]
The CLERK. Mr. Matheson.
Mr. MATHESON. Aye.
The CLERK. Mr. Matheson votes aye. Mr. Ross.
Mr. ROSS. Aye.
The CLERK. Mr. Ross votes aye. Mr. Chandler.
Mr. CHANDLER. Aye.
The CLERK. Mr. Chandler votes aye. Mr. Carnahan.
Mr. CARNAHAN. Aye.
The CLERK. Mr. Carnahan votes aye. Mr. Melancon.
Mr. MELANCON. Aye.
The CLERK. Mr. Melancon votes aye. Mr. Hill.
Mr. HILL. Aye.
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. Mr. Hall.
Mr. HALL. No.
The CLERK. Mr. Hall votes no. Mr. Sensenbrenner.
Mr. SENSENBRENNER. No.
The CLERK. Mr. Sensenbrenner votes no. Mr. Smith of Texas.
Mr. SMITH OF TEXAS. No.
The CLERK. Mr. Smith of Texas votes no. Mr. Rohrabacher.
[No response.]
The CLERK. 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.
Ms. BIGGERT. No.

The CLERK. Mrs. Biggert votes no. Mr. Akin.
Mr. AKIN. No.
The CLERK. Mr. Akin votes no. Mr. Feeney.
Mr. FEENEY. No.
The CLERK. Mr. Feeney votes no. Mr. Neugebauer.
Mr. NEUGEBAUER. No.
The CLERK. Mr. Neugebauer votes no. Mr. Inglis.
[No response.]
The CLERK. Mr. Reichert.
Mr. REICHERT. No.
The CLERK. Mr. Reichert votes no. Mr. McCaul.
Mr. MCCAUL. No.
The CLERK. Mr. McCaul votes no. Mr. Diaz-Balart.
Mr. DIAZ-BALART. No.
The CLERK. Mr. Diaz-Balart votes no. Mr. Gingrey.
Mr. GINGREY. No.
The CLERK. Mr. Gingrey votes no. Mr. Bilbray.
[No response.]
The CLERK. Mr. Smith of Nebraska.
Mr. SMITH OF NEBRASKA. No.
The CLERK. Mr. Smith of Nebraska votes no. Mr. Broun.
[No response.]
Chairman GORDON. Are there any members whose vote was not recorded?
If not, the clerk will report the vote.
The CLERK. Mr. Chairman, 22 members vote aye, and 15 members vote no.
Chairman GORDON. The amendment—the motion is carried.
Are there other amendments?
If no, then the vote is on the bill H.R. 6063 as amended. All those in favor will say aye. All those opposed will say no.
In the opinion of the Chair the ayes have it.

COMMITTEE ON SCIENCE AND TECHNOLOGY

ROLL CALL #2 BILL H.R. 6030 DATE 6/4/2008
AMENDMENT NUMBER #3 Defeated 22-15
SPONSOR/AMENDMENT Mr. Gingrey

MEMBER	AYE	NO	PRESENT	NOT VOTING
Mr. GORDON, Chairman	X			
Mr. COSTELLO	X			
Ms. JOHNSON				
Ms. WOOLSEY	X			
Mr. UDALL	X			
Mr. WU	X			
Mr. BAIRD	X			
Mr. MILLER	X			
Mr. LIPINSKI	X			
Mr. LAMPSON	X			
Ms. GIFFORDS	X			
Mr. McNERNEY	X			
Ms. RICHARDSON	X			
Mr. KANJORSKI	X			
Ms. HOOLEY	X			
Mr. ROTHMAN	X			
Mr. MATHESON				
Mr. ROSS	X			
Mr. CHANDLER	X			
Mr. CARNAHAN	X			
Mr. MELANCON	X			
Mr. HILL	X			
Mr. MITCHELL	X			
Mr. WILSON	X			
Mr. HALL		X		
Mr. SENSENBRENNER		X		
Mr. SMITH - TX		X		
Mr. ROHRABACHER				
Mr. BARTLETT		X		
Mr. EHLERS		X		
Mr. LUCAS		X		
Mrs. BIGGERT		X		
Mr. AKIN		X		
Mr. FEENEY		X		
Mr. NEUGEBAUER		X		
Mr. INGLIS				
Mr. REICHERT		X		
Mr. McCAUL		X		
Mr. DIAZ-BALART		X		
Mr. GINGREY		X		
Mr. BILBRAY				
Mr. SMITH - NE		X		
Mr. BROUN				
Vacancy				
TOTALS	22	15		

I recognize Mr. Hall to offer a motion.

Mr. HALL. Mr. Chairman, I move the Committee favorably report H.R. 6063 as amended to the House for the recommendation that the bill as amended do pass. Furthermore, I move the 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. Opposed, no. The ayes have it. The bill is favorably reported.

Without objection, the motion to reconsider is laid upon the table. Members will have 2 subsequent calendar days in which to submit supplemental minority or additional views on the measure, ending Monday, June 9, at 9:00 a.m.

I move pursuant to Clause 1 of Rule 22 of the Rules of the House of Representatives that the Committee authorize the Chairman to offer such motions as may be necessary in the House to adopt and pass H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008, as amended.

Without objection, so ordered.

I thank everyone for their participation today, and the members, this now concludes the Committee markup.

[Whereupon, at 10:52 a.m., the Committee was adjourned.]

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