

Calendar No. 607

106th Congress }
2d Session }

SENATE

{ REPORT
{ 106-310

THE NEXT GENERATION INTERNET 2000

R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND
TRANSPORTATION

on

S. 2046



JUNE 16, 2000.—Ordered to be printed

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SIXTH CONGRESS

SECOND SESSION

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(II)

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THE NEXT GENERATION INTERNET

JUNE 16, 2000.—Ordered to be printed

Mr. MCCAIN, from the Committee on Commerce, Science, and
Transportation, submitted the following

REPORT

[To accompany S. 2046]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 2046) “A bill to reauthorize the Next Generation Internet Act, and for other purposes”, having considered the same, reports favorably thereon with an amendment in the nature of a substitute and recommends that the bill, as amended, do pass.

PURPOSE OF THE BILL

The purpose of the bill, as reported, is to authorize appropriations for the Large Scale Networking (LSN) programs, including the Next Generation Internet (NGI) programs, and to provide for the continuation of the Federal investment in civilian research and development (R&D) in a fiscally sustainable way.

BACKGROUND AND NEEDS

Technical innovation is a driving force behind the Nation’s long-term economic growth and rising standard of living. Federal investments in R&D have resulted in enormous financial and employment growth of the private and public sectors. Studies show that 50 percent of all post-World War II economic growth is a direct result of technological innovation.

Since the 1960’s, trends in R&D funding have paralleled those of overall discretionary spending. Thus, Federal investment in R&D has expanded by slow, steady growth. However, increasing mandatory spending levels have begun to constrain discretionary spending and to decrease fiscal flexibility for those programs. As the discretionary portion of the budget declines and spending caps con-

tinue to be imposed, R&D programs will compete increasingly with funding for public infrastructure, housing, social services, education, transportation, and military operations. While Federal R&D funding has increased in constant dollars from a peak in 1968, outlays have decreased from about 11 percent of the total budget in 1966, during the buildup for the space program, to less than 3 percent today. As a proportion of total discretionary spending, outlays for both Federal civilian and defense R&D have decreased from 16 percent in 1966 to about 13 percent today. Budget trends continue to demonstrate preferences for selective increases in the funding of the National Institutes of Health (NIH) and the National Science Foundation (NSF), with constant dollar decreases in many other areas.

The United States leads the world in developing and applying information and communications technologies. This leadership stems from its investments in Federal R&D. Without these investments, crucial technologies are at stake, which could determine our nation's ability to sustain its economic well-being, to compete successfully in the global marketplace, to maintain world leadership in basic and applied scientific research, and to preserve national security.

The use of computers and the Internet is rapidly becoming an important component of America's economic and social infrastructure. Within the next two decades, the Internet will have penetrated more deeply into our society than the telephone, radio, television, transportation, and electronic power distribution networks have today. As we come to rely on the Internet everyday, for uses such as conducting billions of electronic financial transactions and delivering of goods and services, this information infrastructure becomes even more critical to our national economy.

The NGI program was first proposed by President Clinton in his fiscal year (FY) 1998 budget request. The program was designed to advance the existing state of the Internet, improve university research capabilities, and assist Federal agencies in achieving their missions. NGI is a multi-agency R&D program designed to develop a coordinated set of technologies to create a network infrastructure supporting speed, robustness, and flexibility beyond what is available in the current implementation of the Internet. Six agencies participated in the original initiative including the Department of Defense (DOD), the Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), the National Institute of Standards and Technology (NIST), NIH through the National Library of Medicine (NLM), and NSF.

A follow-on component to NGI is the multi-agency LSN program. This program invests in research to develop tools and techniques to enable the Internet to grow in scale to increase the number of systems, devices, and people connected to it and to improve the quality and richness of services available to people. As a result, the Internet will become more reliable, faster, and secure, as well as supporting continuous access to information and services regardless of the individual's location. Federal LSN R&D also includes traditional research to support agency mission requirements and the NGI initiative.

NGI and LSN are only a part of the overall Federal investment in information technology research. The \$2.3 billion Administration

request for FY 2001 for this overall effort is 36 percent more than the FY 2000 level. The request also formally merges the FY 2000 Information Technology for the 21st Century (IT2) initiative and the 10 year old High Performance Computing and Communications initiative. Of the total investment for information technology, the Administration is requesting \$342.5 million to fund NGI and LSN in FY 2001.

PROGRAM ISSUES

Considerable concern has surfaced during the past five years regarding the balance of the Federal research portfolio. Because of the interdependent nature of the scientific and engineering disciplines, Congress should strive to ensure that the portfolio is well-balanced among the various fundamental disciplines, and geographically dispersed throughout the United States. The Committee believes that this integrated approach will lead to revolutionary advances in science, medicine, and technology.

In the review of the first two years of NGI, the President's Information Technology Advisory Committee recommended that the program should continue to focus on the utility of NGI's gigabit bandwidth to end-users, its increased security, and its expanded quality of service. More importantly, the committee stated that no Federal program specifically addresses the geographical penalty issue, the imposition of costs on users of the Internet in rural or other locations that are disproportionately greater than the costs imposed on users in locations closer to high populations. S. 2046 was drafted to address the geographical penalty dilemma. The reported bill would set aside 10 percent of the total amounts authorized to be made available to fund research grants for making high-speed connectivity more accessible to users in geographically-remote areas. In addition, the bill would set aside 5 percent of NGI funding for minority-serving institutions and small colleges and universities.

LEGISLATIVE HISTORY

In 1998, Senators Frist and Rockefeller introduced authorizing legislation to fund NGI for fiscal years 1998, 1999, and 2000. The NGI program was established in the Next Generation Internet Investment Act (Public Law 105-305), which was signed into law on October 28, 1998.

On February 8, 2000, Senators Frist and Rockefeller introduced S. 2046, the "Next Generation Internet 2000" Act. The bill is co-sponsored by Senators Roberts, Breaux, Abraham, Hollings, Lieberman, and Kerry.

On March 1, 2000, the Subcommittee on Science, Technology, and Space conducted a hearing on the Next Generation Internet. Witnesses included Dr. Rita R. Colwell, Director, National Science Foundation; Dr. Neal Lane, Assistant to the President for Science and Technology and Director, Office of Science and Technology Policy; Dr. Donald A.B. Lindberg, Director, National Library of Medicine; Dr. Thomas Carter Meredith, Chancellor, The University of Alabama System; Dr. Bill Stacy, Chancellor, University of Tennessee Chattanooga; and Mr. Stephen Tolbert, President and CEO, Global Systems & Strategies, Inc.

On April 13, 2000, the Commerce Committee in open session considered S. 2046 as introduced by Senator Frist and, without objection, ordered S. 2046, with an amendment in the nature of a substitute, to be reported.

The Federal Research Investment Act, Title II of the reported bill, is identical to legislation which was reported favorably by the Senate Commerce Committee on March 5, 1999 in open executive session. That legislation further passed the Senate by unanimous consent on July 26, 1999.

ESTIMATED COSTS

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

S. 2046—A bill to reauthorize the Next Generation Internet Act, and for other purposes

Summary: S. 2046 would authorize funds to be appropriated over a multiyear period for certain research and development (R&D) activities. The bill contains both specific and general authorizations. Title I would extend the authorization for research on large-scale computing, including the Next Generation Internet (NGI) program, through 2003. That authorization specifies a total of \$1.1 billion that may be appropriated to nine agencies for such purposes over the three-year period. Title II would establish an annual lump-sum authorization for nondefense R&D at 15 agencies, beginning with a total of \$39.8 billion in 2000 and increasing by 5.5 percent a year for the following 10 years. Instead of authorizing separate amounts for individual agencies or programs, title II would allow these aggregate amounts to be distributed according to guidelines in the bill. Finally, the bill includes directives regarding the evaluation of R&D programs and studies to be conducted by the National Academy of Sciences (NAS).

Assuming appropriation of the authorized amounts, CBO estimates that implementing the bill would cost a total of \$193.7 billion over the 2000–2005 period and an additional \$344.8 billion after 2005. The bill would not affect direct spending or receipt; therefore, pay-as-you-go procedures would not apply.

S. 2046 contains no intergovernmental mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments. S. 2046 would impose a private-sector mandate, as defined by UMRA, on the National Academy of Sciences. The direct costs of the mandate would be well below the threshold established by UMRA for private-sector mandates (\$109 million in 2000, adjusted annually for inflation).

Estimated cost to the Federal Government: The estimated budgetary impact of S. 2046 is shown in Table 1. The costs of this legislation fall within budget functions 050 (national defense), 250 (general science, space, and technology), 300 (natural resources and the environment), 350 (agriculture), 370 (commerce and housing credit), 400 (transportation), 500 (education, training, employment, and social services), 550 (health), and 700 (veterans benefits and services).

TABLE 1.—ESTIMATED BUDGETARY IMPACT OF S. 2046

	By fiscal year, in millions of dollars—					
	2000	2001	2002	2003	2004	2005
SPENDING SUBJECT TO APPROPRIATION						
R&D Spending Under Current Law:						
Budget Authority ¹	39,915	0	0	0	0	0
Estimated Outlays	38,811	22,286	5,750	2,299	738	83
Proposed Changes:						
Estimated Authorization Level	(?)	42,326	44,654	47,104	49,290	52,000
Budget Outlays	0	18,066	36,864	42,652	46,527	49,590
R&D Spending Under S. 2046:						
Estimated Authorization Level ¹	39,915	42,326	44,654	47,104	49,290	52,000
Estimated Outlays	38,811	40,352	42,614	44,951	47,265	49,673

¹The 2000 level is based on the Office of Management and Budget's estimate of the funding for R&D activities at the affected agencies for that year. The 2000 total includes \$325 million for R&D at the Department of Transportation that was provided as contract authority (a form of direct spending).

²The \$39,790 million authorized in title II for civilian R&D for fiscal year 2000 would be \$75 million less than the amount appropriated for R&D at the designated agencies for that year. For purposes of this estimate, CBO assumes that enacting this bill would have no effect on current-year appropriations.

Basis of estimate: CBO estimates that S. 2046 would authorize the appropriation of a total of \$235.4 billion over the 2001–2005 period, of which \$1.1 billion would be authorized specifically for NGI activities in title I and \$234.3 billion for R&D at the agencies specified in title II. In addition, the bill would authorize a total of \$306 billion for R&D for fiscal years 2006 through 2010. Based on information from the NAS, we estimate that the two studies required by the bill would cost about \$1 million.

CBO assumes that the authorized amounts will be appropriated for each year and allocated among agencies and programs according to the current distribution of funding for civilian R&D programs at the designated agencies. Table 2 shows the fiscal year 2000 funding levels for R&D activities at the 15 agencies covered by title II. These data suggest that the rate of spending for the bill's lump-sum authorization levels would largely be determined by the activities of the National Institutes of Health, the National Aeronautics and Space Administration, the Department of Energy, and the National Science Foundation. The authorization provided in title I would fund activities at eight of the agencies covered by title II as well as the Department of Defense, the National Security Agency, and the Agency for Healthcare Research and Quality.

Table 2.—Estimated fiscal year 2000 budget authority for R&D activities authorized by title II of S. 2046

[Millions of dollars]	
National Institutes of Health	17,141
National Aeronautics and Space Administration	9,753
Department of Energy (civilian R&D)	3,816
National Science Foundation	2,903
Department of Agriculture	1,773
Veterans Administration	655
Environmental Protection Agency	648
National Oceanic and Atmospheric Administration	591
Department of Transportation	585
Department of the Interior	584
Centers for Disease Control	477
National Institute of Standards and Technology	458
Department of Education	233
Food and Drug Administration	135
Smithsonian Institution	113
Total	39,865

Pay-as-you-go considerations: None.

Estimated impact on state, local, and tribal governments: S. 2046 contains no intergovernmental mandates as defined in UMRA and would impose no costs on state, local, or tribal governments. Currently, about \$15.5 billion of the research and development budgets of the agencies affected by this bill goes to academic institutions, including public universities.

Estimated impact on the private sector: S. 2046 would impose a private-sector mandate, as defined by UMRA, on the National Academy of Sciences.

The bill would require the National Academy of Sciences, a non-profit institution, to conduct a study to determine “the extent to which the Internet backbone and network infrastructure contribute to the uneven ability to access to Internet-related technologies and services by rural and low-income Americans.” According to the National Academy of Sciences, the cost of undertaking the study would be about \$400,000. Thus, the direct cost of the mandate would be well below the annual threshold established by UMRA for private-sector mandates (\$109 million in 2000, adjusted annually for inflation). S. 2046 would also authorize appropriations to cover the costs of preparing that study.

Estimate prepared by: Federal Costs: Kathleen Gramp; Impact on State, Local, and Tribal Governments: Victoria Heid Hall; and Impact on the Private Sector: Jean Wooster.

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

REGULATORY IMPACT STATEMENT

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation, as reported:

Because S. 2046, as reported, does not create any new programs, the legislation will have no additional regulatory impact. The legislation will have no further effect on the number or types of individuals and businesses regulated, the economic impact of such regulation, the personal privacy of affected individuals, or the paperwork required from such individuals and businesses.

NUMBER OF PERSONS COVERED

S. 2046, as reported, authorizes appropriations for the Next Generation Internet 2000 Act for FY 2001, 2002, and 2003, and authorizes appropriations to continue the Federal investment in civilian R&D for FY 2000 through 2010.

ECONOMIC IMPACT

This legislation will not have an adverse economic impact on the Nation. The Act authorizes funding to ensure sustained levels of federally-funded scientific, medical, and pre-competitive engineering research over an 11 year period. In addition, the bill requires the OMB Director to submit an annual report to Congress outlining federally-funded program activities which do not meet acceptable Government Performance Results Act (GPRA) criteria. This action will provide oversight of agency programs and promote more cost-effective use of Federal funds.

PRIVACY

This legislation would not have an adverse impact on personal privacy of individuals.

PAPERWORK

This legislation contains five Federal reporting requirements: (1) the National Academy of Sciences (NAS) is authorized to transmit to the Senate Committee on Commerce, Science, and Transportation and the House Committee on Science a study that examines the extent to which the Internet backbone and network infrastructure contribute to the uneven ability to access Internet-related technologies and services by rural and low-income Americans; (2) the President is authorized to include in his annual budget request to Congress a report detailing the total level of funding for R&D programs throughout all civilian agencies, outlining the Administration's strategy for meeting Congressional funding targets through 2010; (3) the Director of the Office of Science and Technology Policy, in consultation with the Director of the Office of Management and Budget (OMB), is authorized to contract with NAS for a comprehensive study to be submitted to OMB and to Congress on methods for evaluating federally-funded R&D programs; (4) the OMB Director is authorized to identify the civilian R&D program activities which do not meet the criteria defined in GPRA in an annual report to the President and to Congress; and (5) the head of an agency whose program activities do not meet the GPRA criteria for two years is authorized to submit to Congress a strategic plan for bringing the program into compliance or terminating it, including any necessary legislative changes.

SECTION-BY-SECTION ANALYSIS

TITLE I—THE NEXT GENERATION INTERNET

Section 101. Short title

This section cites the short title of Title I of the reported bill as the "Next Generation Internet 2000".

Sec. 102. Findings

This section of the reported bill outlines findings regarding Internet and networking technologies. The findings state that although the U.S. investment in science and technology has yielded unprecedented economic growth and international technological dominance, the Internet is at a pivotal point in its history. Promising applications in medicine, environmental science, and other disciplines are presently constrained by the Internet's capacity and capabilities. Thus, there is a critical need for increased network performance and management.

Sec. 103. Purposes

The purpose of Title I of the reported bill is to authorize funding for the LSN programs, including the NGI programs, which focus on R&D for advanced networking technologies and promote connectivity and interoperability among advanced computer networks of Federal agencies.

Sec. 104. Authorization of appropriations

This section would authorize appropriations for each Federal agency participating in the LSN programs, including the NGI programs, the following amounts:

Agency	FY 2001	FY 2002	FY 2003
Agency for Healthcare Research and Quality	\$7,400,000	\$7,800,000	\$8,200,000
DOD	\$70,300,000	\$74,200,000	\$78,300,000
DOE	\$32,000,000	\$33,800,000	\$35,700,000
NASA	\$19,500,000	\$20,600,000	\$21,700,000
NIH	\$96,000,000	\$101,300,000	\$106,300,000
NIST	\$4,200,000	\$4,400,000	\$4,600,000
National Oceanic and Atmospheric Administration	\$2,700,000	\$2,900,000	\$3,100,000
National Security Agency	\$1,900,000	\$2,000,000	\$2,100,000
NSF	\$111,200,000	\$117,300,000	\$123,800,000

Sec. 105. Rural infrastructure

As reported, this section would apportion no less than 10 percent of the total amounts authorized in this bill to be made available to fund research grants for making high-speed connectivity more accessible to users in geographically-remote areas. The administering agency would give priority to qualified, post-secondary educational institutions that participate in the Experimental Program to Stimulate Competitive Research.

Sec. 106. Minority and small colleges

This section would set aside no less than 5 percent of the total amounts authorized in the reported bill to be made available through merit-based and peer-reviewed research grants to institutions of higher education that are Hispanic-serving, Native American, Native Hawaiian, Native Alaskan, Historically Black, or small colleges and universities.

Sec. 107. Digital divide study

This section of the reported bill would authorize a study to be conducted by the National Academy of Sciences to determine the extent to which the Internet backbone and network infrastructure contribute to uneven access to Internet-related technologies and services by rural and low-income Americans. The study would be transmitted to the Senate Committee on Commerce, Science, and Transportation, and the House of Representatives Committee on Science within 1 year after the date of enactment of this legislation. Such sums as may be necessary to complete the study would be authorized to be appropriated to the National Academy of Sciences.

TITLE II—THE FEDERAL RESEARCH INVESTMENT ACT

Sec. 201. Short title

This section cites the short title of Title II of the reported bill as the “Federal Research Investment Act.”

Sec. 202. General findings regarding federal investment in research

This section of the reported bill outlines key findings regarding the value of R&D to the United States and the status of the Federal R&D investment. The findings state that current projections

for Federal research funding show a downward trend. This trend reflects the confluence of increased national dependency on technology, increased targets of opportunity, and decreased flexibility in apportioning dwindling discretionary funds. Indicators show that more funding for science, engineering, and technology is needed, but, even with increased funding, priorities must be established among different programs.

Sec. 203. Special findings regarding health-related research

This section of the reported bill emphasizes specific observations regarding the economic benefits of health-related research. It recognizes the current Congressional support for increased funding in the near-term and stresses potential difficulty in fully achieving this investment in health research if other fields of science and engineering are not properly preserved.

Sec. 204. Additional findings regarding the link between the research process and useful technology

This section of the reported bill highlights four major observations: (1) the current flow of science, engineering, and technology from early stages of research through pre-commercialization should be less discrete and better coordinated; (2) the relationship between Federal research and education should be expanded to include geographically-diverse states, primary and secondary educational institutions, and the community college system; (3) the United States should encourage research opportunities for interdisciplinary projects that foster collaboration among fields of research; and (4) partnerships among industry, universities, and Federal laboratories should be optimized.

Sec. 205. Maintenance of federal research effort; guiding principles

This section of the reported bill outlines four guiding principles for maintenance of Federal research efforts. First, Federal programs must be focused, peer-reviewed, merit-based, and not unnecessarily duplicative. They must address both knowledge-driven and mission-driven scientific requirements. The second principle guiding the maintenance of Federal research efforts requires programs to be fiscally accountable. Congress must exercise oversight to ensure that programs funded with scarce Federal dollars are properly managed. Third, government programs must have measurable results, and the effectiveness of these programs in achieving their goals must be evaluated. Fourth, selection of programs for Federal funding must balance the Nation's two traditional priorities: (1) basic scientific and technological research that represents an investment in the Nation's long-term scientific and technological capacity; and (2) mission-related research that derives from necessary public functions such as defense, health, education, and environmental protection. Because government investments should not compete nor displace short-term, market-driven private-sector funding, they should be restricted to pre-competitive activities rather than commercial technologies.

Sec. 206. Policy statement

Subsection (a) of this section of the reported bill states the overall goal of Title II is to assure a base level of Federal funding for

basic, scientific, biomedical, and precompetitive engineering research, with this base level defined as a doubling of Federal basic research funding over the 11-year period following the date of enactment of this Act.

Subsection (b) identifies the agencies and trust instrumentality covered by the authorizations in the bill as: NIH, NSF, NIST, NASA, the National Oceanic and Atmospheric Administration, Centers for Disease Control, DOE, Department of Transportation, the Smithsonian Institution, Environmental Protection Agency, Department of Agriculture, Department of Interior, Food and Drug Administration, and Department of Veterans Affairs. The Committee intends that the programs of these agencies and trust instrumentality be covered only to the extent that such programs involve activities that support basic scientific, medical, or pre-competitive engineering research.

Subsection (c) discusses historic investment trends and potential damage to the U.S. research infrastructure from continued inadequate funding levels.

Subsection (d) authorizes the following aggregate appropriation levels for civilian R&D for FY 2000 through FY 2010:

- (1) \$39.79 billion for FY 2000;
- (2) \$41.98 billion for FY 2001;
- (3) \$44.29 billion for FY 2002;
- (4) \$46.72 billion for FY 2003;
- (5) \$49.29 billion for FY 2004;
- (6) \$52.00 billion for FY 2005;
- (7) \$54.86 billion for FY 2006;
- (8) \$57.88 billion for FY 2007;
- (9) \$61.07 billion for FY 2008;
- (10) \$64.42 billion for FY 2009; and
- (11) \$67.97 billion for FY 2010.

Subsection (d) also creates an exclusionary clause whereby any agency in the reported bill included under subsection (b), which increases its R&D funding by more than 8 percent over the amount appropriated for its R&D in the preceding fiscal year, shall be removed from the total fiscal year authorization in subsection (d) until that agency's annualized appropriation meets or falls below the aggregate 5.5 percent target for increased funding under the Act.

Subsection (e) requires that no funds be made available under the bill in a manner that does not conform with the discretionary spending caps provided in the most recently adopted concurrent resolution on the budget.

Subsection (f) calls for the aggregate funding levels authorized by section 5 to be balanced among various scientific and engineering disciplines and geographically dispersed throughout the states.

Sec. 207. President's annual budget request

This section of the reported bill requires the President, as part of the annual budget request process, to submit a report on implementation of the commitment to support Federally-funded R&D. The report must provide: (1) a detailed summary of the total level of funding for R&D programs throughout civilian agencies; (2) a focused strategy reflecting annual funding projections for R&D through FY 2010; (3) an analysis of funding levels across Federal

agencies by methodology of funding, including grant agreements, procurement contracts, and cooperative agreements; and (4) specific proposals to improve R&D infrastructure and capacity in States with less concentrated R&D resources in order to create a nationwide R&D community.

Sec. 208. Comprehensive accountability study for federally-funded research

Subsection (a) of this section of the reported bill requires the Director of OSTP, in consultation with the Director of OMB, to contract with the NAS for a comprehensive study. The goal of the study is to develop methods for evaluating Federally-funded R&D programs by: (1) describing the research process in various scientific and engineering disciplines; (2) examining the measures and criteria employed by each discipline to evaluate the success or failure of a program both for exploratory long-range work and short-term goals; and (3) recommending how these measures may be adapted for use by federally-funded R&D programs.

This subsection also calls for the study to assess the extent to which agencies incorporate independent merit-based review into the formulation of strategic plans, as well as the quantity and quality of this type of input. The NAS would evaluate mechanisms for identifying poorly performing programs and the extent to which an independent merit-based review would contribute to addressing those problems. In addition, the Academy is required to report on the validity of using quantitative performance goals for administrative aspects of a program including: paperwork requirements for contractors, grant recipients and external reviewers; cost and schedule controls for any associated construction projects; the ratio of overhead costs relative to other program costs; and responsiveness to requests for funding, participation, or equipment use. Finally, the study would examine the extent to which Federal funding decisions support the Nation's historical R&D priorities.

Subsection (b) of this section provides for integration of the results of the NAS study into GPRA requirements. Within six months of study completion, the Director of OMB is required to promulgate one or more alternative forms for performance goals under GPRA (31 U.S.C. 1115(b)(10)(B)) based upon the study recommendations. In the development of such alternatives the OMB Director is required to provide for public notice and comment, obtain the approval of the Director of OSTP, and consult with the National Science and Technology Council. The goal of this subsection is to offer the head of each agency that conducts R&D activities alternative and more appropriate mechanisms to successfully comply with GPRA.

Subsection (c) of this section requires each agency that carries out R&D activities, upon updating or revising their strategic plan under subsection 306(b) of title 5, United States Code, to describe its current and future use of the alternative performance goals consistent with the Academy study. Subsection (d) provides definitions for several terms used in this section of the reported bill, including "Director," "program activity," and "independent merit-based evaluation." Finally, subsection (e) authorizes appropriations of 600,000 for carrying out the Academy study.

Sec. 209. Effective performance assessment program for federally-funded research

Subsection (a) of the reported bill amends GPRA to add a new section 1120 dealing with accountability for R&D programs. Subsection (a) of new section 1120 of GPRA would require the Director of OMB, based upon annual performance reports submitted by the President to Congress under GPRA, to identify civilian R&D program activities or components of such activities that do not meet an acceptable level of success as defined by alternative performance goals developed under section 8 of the reported bill. The OMB Director is required to submit a report to the President and Congress that lists program activities or components identified under this subsection within 30 days after each agency submits its annual GPRA report to the President.

Subsection (b) of new section 1120 of GPRA would establish a process for addressing programs that have failed to meet performance goals. When a program is identified as being below acceptable success levels in two consecutive OMB reports, the head of the responsible agency is required to submit a statement to the Congressional committees of jurisdiction outlining steps that will be taken to (1) bring the program into compliance with applicable performance goals; or (2) to terminate the program if compliance efforts have failed. A submission under this subsection also is required to identify any legislative changes needed for its implementation or termination. In establishing the process under this subsection, the Committee intends to improve accountability for R&D spending and to encourage cost-efficiencies in federally-funded R&D programs. However, this process should not be used to impose substantial new paperwork burdens on R&D programs that are not required of other Federal programs. Nor does the Committee intend that the process be used to target Federal R&D programs for which the funding reflects Congressional rather than Administration priorities.

Subsection 209(b) of the reported bill makes two technical and conforming amendments to GPRA.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, 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 material is printed in italic, existing law in which no change is proposed is shown in roman):

HIGH-PERFORMANCE COMPUTING ACT OF 1991

SEC. 103. NEXT GENERATION INTERNET. [15 U.S.C. 5513]

(a) ESTABLISHMENT.—The National Science Foundation, the Department of Energy, the National Institutes of Health, the National Aeronautics and Space Administration, and the National Institute of Standards and Technology may support the Next Generation Internet program. The objectives of the Next Generation Internet program shall be to—

- (1) support research, development, and demonstration of advanced networking technologies to increase the capabilities and improve the performance of the Internet;

(2) develop an advanced testbed network connecting a significant number of research sites, including universities, Federal research institutions, and other appropriate research partner institutions, to support networking research and to demonstrate new networking technologies; and

(3) develop and demonstrate advanced Internet applications that meet important national goals or agency mission needs, and that are supported by the activities described in paragraphs (1) and (2).

(b) DUTIES OF ADVISORY COMMITTEE.—The President's Information Technology Advisory Committee (established pursuant to section 101(b) by Executive Order No. 13035 of February 11, 1997 (62 F.R. 7131), as amended by Executive Order No. 13092 of July 24, 1998), in addition to its functions under section 101(b), shall—

(1) assess the extent to which the Next Generation Internet program—

(A) carries out the purposes of this Act; and

(B) addresses concerns relating to, among other matters—

(i) geographic penalties (as defined in section 7(1) of the Next Generation Internet Research Act of 1998);

(ii) the adequacy of access to the Internet by historically black colleges and universities, hispanic serving institutions, and small colleges and universities (whose enrollment is less than 5,000) and the degree of participation of those institutions in activities described in subsection (a); and

(iii) technology transfer to and from the private sector;

(2) review the extent to which the role of each Federal agency and department involved in implementing the Next Generation Internet program is clear and complementary to, and non-duplicative of, the roles of other participating agencies and departments;

(3) assess the extent to which Federal support of fundamental research in computing is sufficient to maintain the Nation's critical leadership in this field; and

(4) make recommendations relating to its findings under paragraphs (1), (2), and (3).

(c) REPORTS.—The Advisory Committee shall review implementation of the Next Generation Internet program and shall report, not less frequently than annually, to the President, the Committee on Commerce, Science, and Transportation, the Committee on Appropriations, and the Committee on Armed Services of the Senate, and the Committee on Science, the Committee on Appropriations, and the Committee on Armed Services of the House of Representatives on its findings and recommendations for the preceding fiscal year. The first such report shall be submitted 6 months after the date of the enactment of the Next Generation Internet Research Act of 1998 and the last report shall be submitted by September 30, 2000.

[(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated for the purposes of this section—

[(1) for the Department of Energy, \$22,000,000 for fiscal year 1999 and \$25,000,000 for fiscal year 2000;

[(2) for the National Science Foundation, \$25,000,000 for fiscal year 1999 and \$25,000,000 for fiscal year 2000, as authorized in the National Science Foundation Authorization Act of 1998;

[(3) for the National Institutes of Health, \$5,000,000 for fiscal year 1999 and \$7,500,000 for fiscal year 2000;

[(4) for the National Aeronautics and Space Administration, \$10,000,000 for fiscal year 1999 and \$10,000,000 for fiscal year 2000; and

[(5) for the National Institute of Standards and Technology, \$5,000,000 for fiscal year 1999 and \$7,500,000 for fiscal year 2000. Such funds may not be used for routine upgrades to existing federally funded communication networks.]

(d) *AUTHORIZATION OF APPROPRIATIONS.*—

(1) *IN GENERAL.*—*There are authorized to be appropriated for the purpose of carrying out the Large Scale Networking Programs, including the Next Generation Internet Programs, the following amounts:*

<i>AGENCY</i>	<i>FY 2001</i>	<i>FY 2002</i>	<i>FY 2003</i>
Department of Defense	70,300,000	74,200,000	78,300,000
Department of Energy	32,000,000	33,800,000	35,700,000
National Aeronautics and Space Administration	19,500,000	20,600,000	21,700,000
National Institutes of Health	96,000,000	101,300,000	106,300,000
National Institute of Standards and Technology	4,200,000	4,400,000	4,600,000
National Science Foundation	111,200,000	117,300,000	123,800,000
National Security Agency	1,900,000	2,000,000	2,100,000
Agency for Healthcare Research and Quality	7,400,000	7,800,000	8,200,000
National Oceanic and Atmosphere Administration	2,700,000	2,900,000	3,100,000

(2) *LIMITATIONS.*—*Funds authorized by paragraph (1) shall be used in a manner that contributes to achieving the goals of the Large Scale Networking Program, including the Next Generation Internet Programs. Research conducted under this program shall be merit-based and peer-reviewed.*

(e) *RURAL INFRASTRUCTURE.*—*Out of appropriated amounts authorized by subsection (d), not less than 10 percent of the total amounts shall be made available to fund research grants for making high-speed connectivity more accessible to users in geographically-remote areas. The research shall include investigations of wireless, hybrid, and satellite technologies. In awarding grants under this subsection, the administering agency shall give priority to qualified, post-secondary educational institutions that participate in the Experimental Program to Stimulate Competitive Research.*

(f) *MINORITY AND SMALL COLLEGE INTERNET ACCESS.*—*Not less than 5 percent of the amounts made available for research under subsection (d) shall be used for grants to institutions of higher education that are Hispanic-serving, Native American, Native Hawaiian, Native Alaskan, Historically Black, or small colleges and universities.*

TITLE 31. MONEY AND FINANCE

SUBTITLE II. THE BUDGET PROCESS

CHAPTER 11. THE BUDGET AND FISCAL, BUDGET, AND PROGRAM INFORMATION

§ 1115. PERFORMANCE PLANS.

(a) In carrying out the provisions of section 1105(a)(29), the Director of the Office of Management and Budget shall require each agency to prepare an annual performance plan covering each program activity set forth in the budget of such agency. Such plan shall—

- (1) establish performance goals to define the level of performance to be achieved by a program activity;
- (2) express such goals in an objective, quantifiable, and measurable form unless authorized to be in an alternative form under subsection (b);
- (3) briefly describe the operational processes, skills and technology, and the human, capital, information, or other resources required to meet the performance goals;
- (4) establish performance indicators to be used in measuring or assessing the relevant outputs, service levels, and outcomes of each program activity;
- (5) provide a basis for comparing actual program results with the established performance goals; and
- (6) describe the means to be used to verify and validate measured values.

(b) If an agency, in consultation with the Director of the Office of Management and Budget, determines that it is not feasible to express the performance goals for a particular program activity in an objective, quantifiable, and measurable form, the Director of the Office of Management and Budget may authorize an alternative form. Such alternative form shall—

- (1) include separate descriptive statements of—
 - (A)(i) a minimally effective program, and
 - (ii) a successful program, or
 - (B) such alternative as authorized by the Director of the Office of Management and Budget, with sufficient precision and in such terms that would allow for an accurate, independent determination of whether the program activity's performance meets the criteria of the description; or
- (2) state why it is infeasible or impractical to express a performance goal in any form for the program activity.

(c) For the purpose of complying with this section, an agency may aggregate, disaggregate, or consolidate program activities, except that any aggregation or consolidation may not omit or minimize the significance of any program activity constituting a major function or operation for the agency.

(d) An agency may submit with its annual performance plan an appendix covering any portion of the plan that—

(1) is specifically authorized under criteria established by an Executive order to be kept secret in the interest of national defense or foreign policy; and

(2) is properly classified pursuant to such Executive order.

(e) The functions and activities of this section shall be considered to be inherently Governmental functions. The drafting of performance plans under this section shall be performed only by Federal employees.

(f) For purposes of this [section and sections 1116 through 1119,] *section, sections 1116 through 1120*, and sections 9703 and 9704 the term—

(1) “agency” has the same meaning as such term is defined under section 306(f) of title 5;

(2) “outcome measure” means an assessment of the results of a program activity compared to its intended purpose;

(3) “output measure” means the tabulation, calculation, or recording of activity or effort and can be expressed in a quantitative or qualitative manner;

(4) “performance goal” means a target level of performance expressed as a tangible, measurable objective, against which actual achievement can be compared, including a goal expressed as a quantitative standard, value, or rate;

(5) “performance indicator” means a particular value or characteristic used to measure output or outcome;

(6) “program activity” means a specific activity or project as listed in the program and financing schedules of the annual budget of the United States Government; and

(7) “program evaluation” means an assessment, through objective measurement and systematic analysis, of the manner and extent to which Federal programs achieve intended objectives.

* * * * *

§ 1120. Accountability for research and development programs

(a) *IDENTIFICATION OF UNSUCCESSFUL PROGRAMS.—Based upon program performance reports for each fiscal year submitted to the President under section 1116, the Director of the Office of Management and Budget shall identify the civilian research and development program activities, or components thereof, which do not meet an acceptable level of success as defined in section 1115(b)(1)(B). Not later than 30 days after the submission of the reports under section 1116, the Director shall furnish a copy of a report listing the program activities or component identified under this subsection to the President and the Congress.*

(b) *ACCOUNTABILITY IF NO IMPROVEMENT SHOWN.—For each program activity or component that is identified by the Director under subsection (a) as being below the acceptable level of success for 2 fiscal years in a row, the head of the agency shall no later than 30 days after the Director submits the second report so identifying the program, submit to the appropriate congressional committees of jurisdiction—*

(1) *a concise statement of the steps necessary to—*

- (A) bring such program into compliance with performance goals; or*
- (B) terminate such program should compliance efforts fail; and*
- (2) any legislative changes needed to put the steps contained in such statement into effect.*

