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107TH CONGRESS, 2d Session } HOUSE OF REPRESENTATIVES { REPORT 107–511

NETWORKING AND INFORMATION TECHNOLOGY RESEARCH ADVANCEMENT ACT

JUNE 18, 2001.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. BOEHLERT, from the Committee on Science, submitted the following

R E P O R T

[To accompany H.R. 3400]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, to whom was referred the bill (H.R. 3400) to amend the High-Performance Computing Act of 1991 to authorize appropriations for fiscal years 2003 through 2007 for the coordinated Federal program on networking and information technology research and development, 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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99–006

I. AMENDMENT

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Networking and Information Technology Research Advancement Act".

SEC. 2. FINDINGS.

The Congress makes the following findings:

(1) Information technology is an enabling technology that contributes to other scientific disciplines. Advances in nanotechnology, bioinformatics, intelligent networks, wireless networking, robotics, artificial intelligence, and other fields depend on further advances in information technology research and development. In turn, advances in networking and information technology depend on research in a wide range of fields, such as computer science and engineering, mathematics, and many others, and in the development of electronic components such as semiconductors and fiber optics that are faster, denser, and cheaper. Research in fields such as materials sciences, physics, chemistry, and photonics lays the foundation for building these advanced components.

(2) Federal investment in information technology research and development over the past 50 years has led to technological innovations that have transformed our society and stimulated economic growth.

(3) A 1999 report from the President's Information Technology Advisory Committee entitled "Information Technology Research: Investing in Our Future" states that—

(A) Federal support for research in information technology is inadequate;

(B) Federal investment in information technology research and development should give a higher priority to long-term, basic research; and

(C) Federal information technology research management should develop a long-term and coherent strategy for sustained attention to national goals.

(4) Long-term, basic research is necessary to create technological breakthroughs in information technology. The Federal Government is uniquely positioned to support long-term fundamental research.

(5) Advances in networking and information technology have permeated and dramatically improved product design and development processes, production efficiency, and distribution systems of a wide range of manufacturing and other industries. From the aeronautical and automotive industries to farming, advances in networking and information technology have allowed United States industry to compete more effectively and better utilize limited resources through improved quality control and other means. Therefore, research in networking and information technology that advances the field also advances productivity and economic growth for the United States economy.

(6) Information technology encompasses ways to develop, store and retrieve, organize and use, make sense of, compute, and communicate information to further a number of societal goals, including increasing economic growth through product development and increased efficiency of services and manufacturing, advancing scientific research, and education.

SEC. 3. DEFINITIONS.

Section 4 of the High-Performance Computing Act of 1991 (15 U.S.C. 5503) is amended—

(1) in paragraph (3)—

(A) by striking "high-performance computing" and inserting "networking and information technology"; and

(B) by striking "(including vector supercomputers and large scale parallel systems)";

(2) in paragraph (4), by striking "packet switched";

(3) by striking paragraphs (5) and (6); and

(4) by adding at the end the following new paragraphs:

"(5) 'Program' means the Networking and Information Technology Research and Development Program described in section 101; and

"(6) 'Program Component Areas' means the major subject areas under which are grouped related individual projects and activities carried out under the Program and which are developed according to section 101(a)(3)(B) and identified in the annual report required under section 101(a)(3)(A).".

SEC. 4. NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM.

(a) AMENDMENTS.—Section 101 of the High-Performance Computing Act of 1991 (15 U.S.C. 5511) is amended—

(1) in the section heading, by striking "**NATIONAL HIGH-PERFORMANCE COMPUTING**" and inserting "**NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT**";

(2) by striking "high-performance computing" each place it appears other than in subsection (a)(2)(F) and inserting "networking and information technology";

(3) in the subsection heading of subsection (a), by striking "NATIONAL HIGH-PERFORMANCE COMPUTING" and inserting "NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT";

(4) in subsection (a)—

(A) by striking "National High-Performance Computing" and inserting "Networking and Information Technology Research and Development";

(B) in paragraph (1)—

(i) by striking "and" at the end of subparagraph (A);

(ii) by redesignating subparagraph (B) as subparagraph (C); and

(iii) by inserting after subparagraph (A) the following new subparagraph:

"(B) establish Program Component Areas that implement the goals established under subparagraph (A); and";

(C) by striking "and" at the end of paragraph (2)(H);

(D) by striking subparagraph (I) of paragraph (2) and inserting the following:

"(I) provide for improving the security of networked information systems, including research required to establish security standards and practices for computing systems and networks; and

"(J) provide for long-term basic research on networking and information technology, with priority given to research that helps address issues related to—

"(i) high end computing and software;

"(ii) network stability, fragility, reliability, security (including privacy), and scalability; and

"(iii) the social and economic consequences of information technology.";

(E) in subparagraph (B) of paragraph (3), by inserting ", including establishing the process by which Program Component Areas are defined" after "of the Program";

(F) by amending subparagraph (A) of paragraph (4) to read as follows:

"(A) provide a detailed description of the Program Component Areas, including—

"(i) a description of any changes in the Program Component Areas from the preceding report and the reasons for such changes; and

"(ii) a description of activities within each Program Component Area that contribute to the improvement of the security of networked information systems;";

(G) in paragraph (4)(C), by striking "specific activities" and all that follows through "the Network" and inserting "each Program Component Area";

(H) in paragraph (4)(D), by inserting "for each Program Component Area and for all activities that contribute to the improvement of the security of networked information systems" after "budget submission applies"; and

(I) in paragraph (4)(F), by inserting ", and the extent to which the Program incorporates the recommendations of the Advisory Committee established under subsection (b)" after "for the Program";

(5) in subsection (b)—

(A) by redesignating paragraphs (1) through (5) as subparagraphs (A) through (E), respectively;

(B) by inserting "(1)" after "ADVISORY COMMITTEE.—";

(C) in paragraph (1)(C), as so redesignated by this paragraph, by inserting ", including funding levels for the Program Component Areas" after "of the Program";

(D) in paragraph (1)(D), as so redesignated by this paragraph, by striking "computing" and inserting "networking and information"; and

(E) by adding at the end the following new paragraph:

"(2) In addition to the duties outlined in paragraph (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program, and shall report not less frequently than once every two fiscal years to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate

on its findings and recommendations. The first report shall be due within one year after the date of the enactment of this paragraph."; and

(6) in subsection (c)(1)(A), by striking "Program or" and inserting "Program Component Areas or".

(b) REPEALS.—Sections 102 and 103 of the High-Performance Computing Act of 1991 (15 U.S.C. 5512 and 5513) are repealed.

(c) CONFORMING AMENDMENT.—The heading of title I of the High-Performance Computing Act of 1991 is amended to read as follows:

"TITLE I—NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM".

SEC. 5. AGENCY ACTIVITIES.

(a) NATIONAL SCIENCE FOUNDATION ACTIVITIES.—Section 201 of the High-Performance Computing Act of 1991 (15 U.S.C. 5521) is amended to read as follows:

"SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

"(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Science Foundation shall—

"(1) generate fundamental scientific and technical knowledge with the potential of advancing networking and information technology and its applications; and

"(2) provide computing and networking infrastructure support for all science and engineering disciplines, and support basic research and human resource development in all aspects of networking and information technology and advanced high speed computer networking.

"(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of the Program $704,000,000 for fiscal year 2003; $774,000,000 for fiscal year 2004, $851,000,000 for fiscal year 2005, $937,000,000 for fiscal year 2006, and $1,030,000,000 for fiscal year 2007.".

(b) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.—Section 202 of the High-Performance Computing Act of 1991 (15 U.S.C. 5522) is amended to read as follows:

"SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.

"(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in networking and information technology, with emphasis on—

"(1) computational fluid, thermal, and aerodynamics;

"(2) scientific data dissemination and tools to enable data to be fully analyzed and combined from multiple sources and sensors;

"(3) remote exploration and experimentation; and

"(4) tools for collaboration in systems design, analysis, and testing.

"(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Aeronautics and Space Administration for the purposes of the Program $199,000,000 for fiscal year 2003, $219,000,000 for fiscal year 2004, $240,000,000 for fiscal year 2005, $265,000,000 for fiscal year 2006, and $292,000,000 for fiscal year 2007.".

(c) DEPARTMENT OF ENERGY ACTIVITIES.—Section 203 of the High-Performance Computing Act of 1991 (15 U.S.C. 5523) is amended—

(1) in subsection (a), by striking all after "the Secretary of Energy shall" and inserting "conduct basic and applied research in networking and information technology, with emphasis on—

"(1) supporting fundamental research in the physical sciences and engineering, and energy applications;

"(2) providing supercomputer access and advanced communication capabilities to scientific researchers; and

"(3) developing tools for distributed scientific collaboration."; and

(2) in subsection (e)—

(A) by striking "(1)";

(B) by striking "$93,000,000" and all that follows through "fiscal year 1996" and inserting "$193,000,000 for fiscal year 2003, $212,000,000 for fiscal year 2004, $234,000,000 for fiscal year 2005, $258,000,000 for fiscal year 2006, and $283,000,000 for fiscal year 2007"; and

(C) by striking paragraph (2).

(d) DEPARTMENT OF COMMERCE ACTIVITIES.—Section 204 of the High-Performance Computing Act of 1991 (15 U.S.C. 5524) is amended—

(1) by striking paragraphs (1) and (2) of subsection (a) and inserting the following:

"(1) the National Institute of Standards and Technology shall—

"(A) conduct basic and applied measurement research needed to support various computing systems and networks;

"(B) develop and propose voluntary standards and guidelines, and develop measurement techniques and test methods, for the interoperability of computing systems in networks and for common user interfaces to systems;

"(C) be responsible for developing benchmark tests and standards for computing systems and software; and

"(D) encourage the development, deployment, and implementation of voluntary guidelines and standards for—

"(i) robust security technology; and

"(ii) best practices and interoperability relating to the security of commercial and government computer networks; and

"(2) the National Oceanic and Atmospheric Administration shall conduct basic and applied research in networking and information technology, with emphasis on—

"(A) improving weather forecasting and climate prediction;

"(B) collection and dissemination of environmental information; and

"(C) development of more accurate models of the atmosphere-ocean system."; and

(2) by striking subsections (c) and (d) and inserting the following:

"(c) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated—

"(1) to the National Institute of Standards and Technology for the purposes of the Program $24,000,000 for fiscal year 2003, $27,000,000 for fiscal year 2004, $29,000,000 for fiscal year 2005, $32,000,000 for fiscal year 2006, and $35,000,000 for fiscal year 2007; and

"(2) to the National Oceanic and Atmospheric Administration for the purposes of the Program $22,000,000 for fiscal year 2003, $24,000,000 for fiscal year 2004, $26,000,000 for fiscal year 2005, $29,000,000 for fiscal year 2006, and $32,000,000 for fiscal year 2007.".

(e) ENVIRONMENTAL PROTECTION AGENCY ACTIVITIES—Section 205 of the High-Performance Computing Act of 1991 (15 U.S.C. 5525) is amended to read as follows:

"SEC. 205. ENVIRONMENTAL PROTECTION AGENCY ACTIVITIES.

"(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Environmental Protection Agency shall conduct basic and applied research directed toward the advancement and dissemination of computational techniques and software tools with an emphasis on modeling of—

"(1) ecosystems;

"(2) human effects

"(3) atmospheric dynamics and chemistry; and

"(4) pollutant transport.

"(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the Environmental Protection Agency for the purposes of the Program $4,000,000 for fiscal year 2003, $4,400,000 for fiscal year 2004, $4,800,000 for fiscal year 2005, $5,300,000 for fiscal year 2006, and $5,800,000 for fiscal year 2007.".

SEC. 6. REPORTS.

(a) INTERNATIONAL BENCHMARKING STUDIES.—

(1) STUDY.—Not later than 3 months after the date of the enactment of this Act, the Director of the National Science Foundation shall enter into an arrangement with the National Research Council of the National Academy of Sciences to conduct an assessment of the state of research on networking and information technology in the United States. The study shall use the methodology and approach developed by the Committee on Science, Engineering, and Public Policy of the National Academies and documented in its 2000 report entitled "Experiments in International Benchmarking of U.S. Research Fields".

(2) REPORT.—Not later than 2 years after the date of the enactment of this Act, the Director of the National Science Foundation shall transmit to the Committee on Science of the House of Representatives, the Committee on Commerce, Science, and Transportation of the Senate, the Director of the Office of Science and Technology Policy, and the advisory committee established under section 101(b) of the High-Performance Computing Act of 1991 (15 U.S.C. 5511(b)) (in this section referred to as the "advisory committee") a report setting forth the findings of the study conducted under paragraph (1).

(3) ADVISORY COMMITTEE RECOMMENDATIONS.—Not later than 3 months after receipt of the report transmitted under paragraph (2), the advisory committee shall provide recommendations to the Director of the Office of Science and Tech-

nology Policy on appropriate changes to the Program established by section 101(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5511(a)) to address issues raised by the study conducted under paragraph (1).

(4) ANNUAL REPORT.—The first annual report required by section 101(a)(3)(A) of the High-Performance Computing Act of 1991 (15 U.S.C. 5511(a)(3)(A)) that is due after the expiration of 9 months after receipt by the Director of the Office of Science and Technology Policy of the report transmitted under paragraph (2) shall include a description of activities under the Program established by section 101(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5511(a)) that address issues raised by the study conducted under paragraph (1), including strategies for—

(A) raising or maintaining the position of the United States relative to other nations in the research priority areas addressed by the report transmitted under paragraph (2); and

(B) promoting international research cooperation to leverage international niches of excellence identified by the report transmitted under paragraph (2).

(5) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation for carrying out the study under this subsection $850,000.

(b) INFORMATION TECHNOLOGY WORKFORCE STUDY.—

(1) DATA COLLECTION.—The Director of the National Science Foundation shall on a continuing basis collect data on the information technology workforce, including information on—

(A) the size and nature of the information technology workforce by occupation category, level of education and training, personnel demographics, and industry characteristics;

(B) the long-term employability of information technology professionals;

(C) various forms of employee compensation, including salaries, bonuses, and stock options;

(D) the role of foreign workers in the information technology workforce;

(E) the previous and subsequent immigration and employment status of workers who are aliens having the status of a nonimmigrant described in section 101(a)(15)(H)(i)(b) of the Immigration and Nationality Act (8 U.S.C. 1101(a)(15)(H)(i)(b)); and

(F) other relevant issues.

(2) ANALYSIS.—Not later than 3 months after the date of the enactment of this Act, the Director of the National Science Foundation shall enter into an arrangement with the National Research Council of the National Academy of Sciences to analyze the data collected under paragraph (1) and publish a biennial update to the "Building a Workforce in the Information Economy" report, issued in October of 2000.

(3) TRANSMITTAL TO CONGRESS.—Biennial updates required under paragraph (2) shall be transmitted to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, and to the National Coordination Office for Information Technology Research and Development, not later than 1 year after the date of the enactment of this Act and biennially thereafter.

SEC. 7. RESEARCH CENTER.

(a) IN GENERAL.—(1) As part of the Program described in section 101 of the High-Performance Computing Act of 1991 (15 U.S.C. 5511), the National Science Foundation, in consultation with the National Aeronautics and Space Administration, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and other Federal agencies as appropriate, shall establish a center for research on information technology questions related to crisis management.

(2) The award to support the establishment and operation of the center established under paragraph (1) shall be made to an eligible nonprofit organization or consortium thereof through a merit-reviewed, competitive process in accordance with requirements specified by the National Science Foundation.

(b) USE OF FUNDS.—The center established under subsection (a) shall carry out research to advance the role of information technology in crisis management. Such activities may include—

(1) research on—

(A) human-computer interface technologies suitable for meeting user needs and limitations;

(B) network-based collaboration tools, including virtual situation rooms;

(C) the interconnection, interoperation, and reliability of networks involving diverse information resources;

(D) rapidly deployable, self-configuring wireless networks;

(E) software to assist crisis managers in making decisions in the absence of complete information;

(F) means for improving the performance of distributed systems; and

(G) simulation of natural phenomena, such as severe storms or forest fires, that could provide guidance to crisis managers;

(2) establishment and use of experimental testbeds for crisis management-related research and development to allow for testing and validating technologies under realistic conditions; and

(3) analyses of the design and operation of existing national-scale infrastructures to identify features that enable such systems to be scalable and functionally flexible.

(c) SELECTION CRITERIA.—In evaluating applications submitted under this section, the Director of the National Science Foundation shall consider, at a minimum, the extent to which the applicant will work with individuals and organizations that would be users of the results of the research conducted by the center in establishing a research agenda and conducting activities under subsection (b)(2).

(d) DEFINITION.—In this section, the term "eligible nonprofit organization" means an institution of higher education as defined by section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001), or a nonprofit research institute or nonprofit association with experience related to applications of information technology in crisis management as determined by the National Science Foundation.

(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation for the purposes of this section $10,000,000 for each of the fiscal years 2003, 2004, 2005, 2006, and 2007.

II. PURPOSE OF THE BILL

The purpose of H.R. 3400 is to authorize appropriations for networking and information technology research and development.

III. BACKGROUND AND NEED FOR LEGISLATION

Information technology (IT) provides tools, systems, and capabilities that have changed our daily lives and have reshaped the way business is conducted. Its influence on economic growth and competitiveness has been enormous—the IT economy now generates more than $300 billion in revenue each year. The impact of information technology on education, environmental management, health care, law enforcement, productivity, scientific research, and transportation safety, has been equally dramatic. In fact many of our Nation's critical defense and civilian infrastructures are now reliant upon information technology. None of these advances would have been possible without a long-term, sustained focus on fundamental research—most of which has been supported by the Federal Government.

Innovations resulting from past investment in federally-sponsored research include:

- The Internet, which grew out of ARPANET, the network developed in the 1960s by researchers funded by the Defense Advanced Research Projects Agency (DARPA);
- The first graphical web "browser," developed by university-based researchers with National Science Foundation (NSF) support;
- Relational databases—the sophisticated software systems needed to store and manage large quantities of information, such as financial records, census data, and business inventories—pioneered by university researchers funded by NSF in the 1970s; and
- The first high-performance computers, placed in government installations, primarily for national defense purposes.

The Federal Government's role in funding IT research and development dates back at least as far as World War II, when the first digital electronic computer was developed and the Federal Government's overall investment in computing was less than $20 million ($185.2 million in FY 1999 dollars) per year. Until the mid-1970s, computers were tools available only to large corporations, research institutions, and the Federal Government, and the field of computer science was just emerging as a distinct academic discipline. However, the Federal Government's investment during this time in computing and such underlying disciplines as mathematics, engineering, and physics, was laying the groundwork for subsequent breakthroughs in software and technology.

Government support for high-performance computing expanded in the 1970s, and by the early 1980s many agencies had developed independent programs. In the late 1980s, ten of the programs were linked in the High-Performance Computing and Communications initiative. The High-Performance Computing Act of 1991 (HPC Act), P.L. 102–194, formalized the initiative and established a process by which the Federal Government could establish government-wide research priorities and ensure the coordination of individual agency contributions. This Act established a multi-agency program of research and authorized appropriations for fiscal years 1992 through 1996 at seven agencies: NSF, the National Aeronautics and Space Administration (NASA), the Department of Energy (DOE), the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), the Environmental Protection Agency (EPA), and the Department of Education.

The multi-agency program established by the HPC Act still exists today, and its activities are coordinated through the Networking and Information Technology Research and Development (NITRD) program. Within this program, an Interagency Working Group—made up of representatives from every agency involved in the NITRD program (see below) as well as the Office of Management and Budget, the Office of Science and Technology Policy (OSTP), the National Economic Council, and the National Coordination Office for IT Research and Development—coordinates the planning, budgeting, and assessment activities of the Federal IT research and development enterprise. The NITRD Interagency Working Group also serves as the internal deliberative organization for Federal IT research and development policy, program, and budget guidance within the Executive Branch.

The NITRD agencies include: Agency for Healthcare Research and Quality, DARPA, DOE National Nuclear Security Administration, DOE Office of Science, EPA, NASA, National Institutes of Health, NIST, NOAA, National Security Agency, NSF, and Office of the Deputy Under Secretary of Defense for Science and Technology.

The major research emphases of the NITRD effort are reflected in Program Component Areas (PCAs). PCAs are groupings of related IT activities that are defined by the Interagency Working Group through authority delegated by the President, and led by program managers from the NITRD participating agencies. These program managers confer regularly to coordinate the objectives and

activities of the multi-agency projects in their specialized research areas. The current PCAs are:

- High End Computing, which includes both research and development and Infrastructure & Applications;
- Human Computer Interaction & Information Management;
- Large Scale Networking;
- Software Design and Productivity;
- High Confidence Software and Systems; and
- Social, Economic, and Workplace Implications of IT and IT Workforce Development.

The President's Information Technology Advisory Committee (PITAC), which was established pursuant to the HPC Act, recently looked at a number of issues related to high-performance computing and communications research. In its 1999 report, "Information Technology Research: Investing in Our Future," PITAC concluded that while U.S. leadership in information technology provides an essential foundation for promoting economic growth, education and research, environmental stewardship, public health, and national security, there has been an erosion of support for long-term fundamental research in information technology. Describing the current Federal funding levels as being "seriously inadequate," the Committee also concluded that current research is too focused on near-term problems linked to agency missions. PITAC recommended that the Federal Government create a strategic initiative for long-term research and development, fund projects for longer time periods, establish an effective structure for managing and coordinating research and development, and increase spending significantly.

In addition, a National Research Council (NRC) panel concluded in its 1999 report, "Funding a Revolution," that the Federal Government's focus on funding long-range, fundamental research—something that industry has little incentive to pursue—was a primary stimulus for the current information technology boom. The panel also cited the diversity of Federal IT research programs—a natural by-product of the multi-agency effort—as an additional factor in this success.

The recommendations of the PITAC report and the NRC panel are reflected in H.R. 3400, the Networking and Information Technology Research Advancement Act (NITRAA). The Act, which extends and updates the HPC Act, authorizes a Federal investment in future IT research and development that is aimed at ensuring the continued success of the United States IT enterprise.

IV. Summary of Hearings

On Tuesday, June 26, 2001, the House Science Committee's Research Subcommittee held a hearing to set the stage, and provide recommendations for the development of broad authorization legislation for the Federal information technology research program. The witnesses addressed the need for Federal investments in fundamental IT research and development, the role that those investments play in innovation and economic productivity, and the coordination of the activities of the agencies involved in the overall Federal IT R&D program. The witnesses all recommended increased Federal funding for basic research in IT and stressed the

benefits of IT research and development to the public, economy, and national security.

On Tuesday, July 31, 2001, the House Science Committee's Research Subcommittee held a hearing on NSF's participation in the NITRD program and on the positive impact NSF-supported IT advances have had on science, education, manufacturing, and human services. Witnesses highlighted the importance of solutions-focused interdisciplinary IT research efforts that focus on applications that serve the end user. The witnesses agreed that future spending should concentrate on IT infrastructure, networks and high end computing.

V. Committee Actions

On December 4, 2001, Research Subcommittee Chairman Nick Smith, Research Subcommittee Ranking Minority Member Eddie Bernice Johnson, Science Committee Chairman Sherwood L. Boehlert, and Ranking Minority Member Ralph M. Hall introduced H.R. 3400, the Networking and Information Technology Research Advancement Act, a bill to authorize appropriations for networking and information technology research and development for fiscal years 2003 through 2007.

The House Committee on Science met on December 6, 2001, to consider the bill. Mr. Matheson (UT) offered an amendment to authorize $10 million per year for fiscal years 2003 through 2007 to establish a center for research on IT questions related to crisis management. The amendment was adopted by voice vote. With a quorum present, Mr. Hall moved that the Committee favorably report the bill, as amended, to the House with the recommendation that it pass, and that the staff be instructed to make technical and conforming changes to the bill and prepare the legislative report, and that the Chairman take all necessary steps to bring the bill before the House for consideration. The motion was agreed to by a voice vote.

VI. Summary of Major Provisions of the Bill

- Increases funding for, and improves coordination of, information technology research and development at NSF, NASA, DOE, NIST, NOAA, and EPA.
- Authorizes a total of $7.045 billion over five years for research and development programs (from amounts already authorized for research and development) as follows:
    - $4.346 billion for NSF;
    - $1.18 billion for DOE's Office of Science;
    - $1.215 billion for NASA;
    - $147 million for NIST;
    - $133 million for NOAA; and
    - $24.3 million for EPA.
- Authorizes the agencies' ongoing participation in the NITRD program, which is led by OSTP. This inter-agency research effort focuses the Federal Government's spending in the area of networking and information technology among a number of research areas including:
    - High-End Computing Infrastructure and Applications;
    - High-End Computing Research and Development;

- Human/Computer Interaction and Information Management;
- Large Scale Networking;
- Software Design and Productivity;
- High Confidence Software and Systems; and
- Social, Economic and Workforce.

- Updates terminology and certain provisions in the HPC Act.
- Adds research on the security of networked information systems to the list of required functions for the NITRD program.
- Directs PITAC to carry out periodic evaluations of the funding, management, coordination, and implementation of the NITRD program and to report its findings to Congress biennially.
- Authorizes $50 million over five years for the establishment of a center for research on IT questions related to crisis management.
- Directs the National Research Council to perform two studies aimed at strengthening networking and information technology research and development. The first of these studies will compare the state of research in computer and information science and engineering in the United States with that of other countries. The second will analyze data on the IT workforce.

VII. Section-by-Section Analysis

SEC. 1. SHORT TITLE

"Networking and Information Technology Research Advancement Act."

SEC. 2. FINDINGS

Discusses the key roles information technology research and development play in enabling scientific research in a diverse array of scientific and engineering disciplines and, in turn, highlights the dependence of information technology research and development on other scientific fields and technologies; the critical role Federal support of long-term, basic IT research has played in stimulating the economy and transforming society, and the importance of maintaining that role; the current inadequacies in Federal support for research and the unique role the Federal Government has in supporting long-term basic research; the overall importance of information technology research and development to specific industries; and the variety of uses of IT.

SEC. 3. DEFINITIONS

Amends section 4 of the HPC Act by replacing the term "high-performance computing" with "networking and information technology," and redefines the Federal interagency program focused on information technology research and development as the "Networking and Information Technology Research and Development Program." Adds a definition for "Program Component Areas," which are the major subject areas under which projects and activities carried out by the interagency research program are grouped.

SEC. 4. NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM

Amends section 101 of the HPC Act, which describes the organization and responsibilities of the interagency research program originally referred to as the National High-Performance Computing Program (and re-named the Networking and Information Technology Research and Development Program in this Act), to include among the Program's research priorities the security of networked information systems, research on high-end computers (so-called "supercomputers"), software, networks, and the social and economic impacts of IT. Also amends the HPC Act to include the requirement that the Program establish Program Component Areas in line with the overall goals of the program.

Leaves substantively unchanged provisions of the HPC Act requiring: (1) OSTP to provide an annual report to Congress, along with the annual budget request, describing the implementation of the program; (2) the OSTP Director to consult with academic, state, industry, and other appropriate groups; (3) Federal agencies to report on their information technology research and development activities as part of the yearly budget submission; and (4) the establishment of a presidential advisory committee for information technology.

Requires OSTP to include, in its report to Congress, detailed information about Program Component Areas and requires the presidential advisory committee (currently named PITAC) to report to Congress not less than every two years on its findings and recommendations relating to the Program.

Repeals section 102 of the HPC Act, the "National Research and Education Network," which called for the development of a network to link research and educational institutions, government, and industry (this network has since been supplanted by the Internet). Also repeals section 103 of the HPC Act, "Next Generation Internet," as this program is no longer in existence.

Replaces the term "high-performance computing" with "networking and information technology" throughout the section. Renames title I of the HPC Act "Networking and Information Technology Research and Development Program."

SEC. 5. AGENCY ACTIVITIES

Amends the HPC Act to authorize funds for, and define the specific activities of, certain agencies within the Program. All authorizations are from sums otherwise authorized to be appropriated.

- NSF—a total of $4.346 billion over fiscal years 2003 through 2007;
- DOE's Office of Science—a total of $1.18 billion over fiscal years 2003 through 2007;
- NASA—a total of $1.215 billion over fiscal years 2003 through 2007;
- NIST—a total of $147 million over fiscal years 2003 through 2007;
- NOAA—a total of $133 million over fiscal years 2003 through 2007; and
- EPA—$24.3 million over fiscal years 2003 through 2007.

SEC. 6. REPORTS

Directs NSF to enter into an arrangement with the National Research Council to conduct an assessment of the state of research in computer and information science and engineering in the United States, and to report to Congress and OSTP on the assessment's findings. In addition, the legislation tasks the presidential advisory committee for information technology with reviewing the NRC's findings and making recommendations to the OSTP Director regarding their implementation. Finally, the bill requires the Director of OSTP, in his annual report to Congress on the state of the program, to describe how the program is working to address the concerns and recommendations outlined in the NRC study.

The bill also directs the NSF to collect data on the information technology workforce and tasks the NRC with analyzing this data and publishing a biennial update to the NRC's "Building a Workforce in the Information Economy" report.

SEC. 7. RESEARCH CENTER

Authorizes NSF, in consultation with NASA, EPA and NOAA, to establish a center for research on IT questions related to crisis management.

Authorizes $10 million to the NSF for each of the fiscal years 2003 through 2007.

VIII. Committee Views

The Federal Government has a critical role to play in supporting the long-term, fundamental research that underlies private sector development in IT and fuels our National economy. The Committee takes seriously the warning issued by PITAC in its 1999 report, "Information Technology Research: Investing in Our Future," that the emphasis of Federal IT research programs in recent years has shifted from long-term, high-risk research to short-term, mission-orientated research. In addition, the overall level of Federal support for fundamental research in IT is, as PITAC concluded, inadequate to maintain the Nation's global leadership in this area. The Committee believes that maintaining the Nation's global leadership in information technology will require a sustained Federal commitment to fundamental research in the scientific and engineering disciplines that underlie IT.

The Committee believes that the lack of sufficient Federal support for long-term IT research has also had a negative impact on the development of a highly skilled, technically trained U.S. workforce. While industry is projecting significant increases in the demand for computer scientists, engineers and other technically-trained workers, U.S. colleges and universities are having a great deal of difficulty attracting and retaining students—especially U.S. citizens, nationals, and permanent resident aliens—to undergraduate and graduate programs in mathematics, engineering, computer science and the physical sciences. Increased funding of basic IT research will have an indirect, but beneficial impact on academic programs that will train the next generation of technical workers, researchers, and industry leaders.

NITRAA, by amending the HPC Act, provides long-term funding in support of a comprehensive research agenda for six of the agencies participating in the multi-agency NITRD program.

Networking and Information Technology Research and Development Program

The Committee believes that the coordination and management framework for the NITRD program has been effective. The Interagency Working Group that comprises the principal mechanism for coordination and collaboration among the NITRD agencies has been successful is guiding the Federal IT research and development effort. The Committee wishes to stress that interagency coordination is vital to the success of any Federal IT research program. In particular, the Committee believes that agencies must coordinate to reduce areas of unnecessary overlap and develop complementary approaches to solving difficult research questions.

In recognizing that the national IT research and development priorities will continue to evolve over time, the Committee worked to ensure that this Act provides flexibility in defining the research and development priorities—defined as Program Component Areas—of the Interagency Working Group and its member agencies. In this way, the Act continues to support the original intent of the HPC Act while allowing for the Federal effort to reflect the current state of the IT field. The Committee expects that the annual reports for the NITRD program will document how the contents of the PCAs change over time and the rationale for the changes.

While the Act leaves intact the central thrust of the HPC Act, it updates some of the terminology and definitions used in the earlier Act. In particular, the current Act refers to "networking and information technology", rather than "high performance computing". The Committee notes that the nature of the term "high performance computing" has changed since the passage of the HPC Act in 1991. While the term was defined quite broadly in HPC Act, today it is normally used to describe sophisticated computational work, such as complex modeling, that requires extremely fast and powerful computers—so called high performance or "high end" computers—capable of performing immense numbers of mathematical calculations. As the Federal investment in IT research and development has broadened significantly to include research into other areas, such as software engineering and component technologies, networking, and applied technologies such as bioinformatics, and socioeconomic issues, the Committee believes the term "networking and information technology" better describes the range of activities covered by the current Federal program. The Committee wishes to stress that the definition of "high performance computing" has been changed in name only (with the exception to references to vector supercomputers and large scale parallel systems that were removed from the definition). Thus, the definition of "networking and information technology" still refers to advanced computing, communications and information technologies, including scientific workstations, supercomputer systems, high-capacity and high-speed networks, special purpose and experimental systems, and applications and systems software.

NITRAA enlarges the role of PITAC in oversight of the NITRD program by directing PITAC to periodically evaluate and report to Congress on the funding, management, coordination, implementation, and contents of the program.

NITRAA repeals provisions of the HPC Act related to the National Research and Education Network and the Next Generation Internet, as those programs were never fully implemented or have expired.

The September 11, 2001 attacks on the United States raised many concerns about the security and preparedness of the United States, not least of which is the security of the Nation's computer network infrastructure and all the critical information and control systems connected to it. The Committee believes that research on ways to improve the security of networked information systems is critical. The Act revises the original HPC Act to clearly place this area of research under the NITRD program. The Committee strongly encourages the program to make security research a high priority within the Federal IT research and development portfolio.

The Committee believes that, with these and other updates, the HPC Act can continue to guide the Federal information technology research effort into the future.

Agency activities

The Committee expects that each agency, through its independent contributions to each interagency focus area, will support the overall goals of the NITRD program while still advancing its unique mission. Because of NSF's statutory role in supporting basic research, the Committee believes that NSF should play a major role in the Interagency NITRD effort and, therefore, authorizes significant funding increases for research programs at NSF. In addition, the Committee expects all NITRD agencies to maximize cooperation to ensure that available resources and experience are used as efficiently as possible.

The Committee recognizes that many academic disciplines both benefit from, and contribute to, IT research and development. In addition to the discipline of computer science itself, many other fields, including mathematics, engineering, physics, computational science and engineering, materials science, physics, chemistry, the social and behavioral sciences and many others, have made and will continue to make contributions to IT research and development that are critical to the field's continued advancement.

The Committee believes that certain IT applications warrant additional attention through Federal investment and interagency coordination. For example, bioinformatics, which is aimed at harnessing the computational power of IT to solve difficult problems related to biology and medicine, is a rapidly growing field that is helping to manage the huge explosion of information about DNA and protein sequences, molecular structures, and complex inter- and intra-cellular relationships and activities. Bioinformatics has become an essential tool to the biomedical research community in that it provides new opportunities to collect, store, distribute and analyze data, to model biological processes, and even to identify potent new pharmaceutical products. Another example, medical informatics, utilizes computer modeling and simulation to analyze large clinical databases, enhance diagnostics, facilitate computer-

assisted surgical procedures, and better understand disease prevention and treatment. Because bioinformatics and medical informatics require special expertise on the part of researchers and users, both of these critical technologies are deserving of additional funding for research and development. In addition, full attention must be given to the education of future informatics researchers and professionals.

The Committee is aware that advances in high-speed, scalable, adaptive networking depend on high performance testbed networks to enable the research, development, and demonstration of advanced networking technologies and applications. The NITRD program, as outlined in the original HPC Act and left unchanged by this Act, is responsible for providing high performance testbed networks. The Committee encourages the program to consider investment in new testbeds that take advantage of advances in areas such as optical networking.

Impediments to research

The Committee understands that the delicate balance between intellectual property protections and the need to further IT research has become increasingly problematic. On October 10, 2001, Dr. Gene Spafford, Director of Purdue University's Center for Education and Research in Information Assurance and Security, testified before the Committee on Science that:

> Unfortunately, the evolution of law has led to unintended consequences for those of us working in security. I have had several reported instances where research into new and novel forms of information security have had to be curtailed or stopped because the researchers had been threatened by the patent holders. University researchers do not have the resources to fight such threats whether they are justified or not. Therefore, those avenues of research have been abandoned.

A growing number of researchers have become hesitant to study encryption and other copyright protection technologies because of legal concerns and vague understandings of the type of research that is allowable under the law. The Committee encourages PITAC to review these concerns, identify impediments to critical research, and make recommendations to OSTP on ways to better educate the IT research community regarding the limits on research resulting from intellectual property law.

International benchmarking survey

Section 6(a) directs NSF to enter into an arrangement with the National Research Council to conduct an international benchmarking survey on networking and information technology research. The Committee believes a review of how U.S. efforts in networking and information technology research compare with similar programs in key competitor countries can inform continued and future research efforts in the U.S. For that reason, the Act requires PITAC to make recommendations as to whether changes to the NITRD program are warranted, and, if so, the nature of those changes, on the basis of the NRC report's findings.

The Committee understands that the length of time within which PITAC is to perform this analysis and make recommendations is relatively short (three months). The Committee believes that this expedited schedule is necessary if the findings of the NRC report are to inform the needs of the NITRD program in a timely way.

Information technology workforce study

The Committee recognizes the important contribution made by the National Research Council in its study report, "Building a Workforce for the Information Economy," which clearly characterizes the IT workforce—including size, capacity, education, training, and demographics of the current IT workforce—and describes long-term strategies for expanding the highly-trained employee pool. However, the workforce needs of the IT field evolve as rapidly as the technologies and applications on which the industry is based. These changing needs must be evaluated and reported on an ongoing basis so that educational institutions, and the Federal agencies that support them, can respond quickly to these changing needs through expeditious programmatic shifts. The Committee, therefore, finds it imperative that the NSF continue to collect data on the IT workforce—including the size and nature of the workforce, long-term employability, employee compensation, and the role of foreign workers in the IT industry—which can be analyzed by the National Research Council and published as a biennial update to the original "Building a Workforce for the Information Economy Study." This biennial update shall be transmitted to Congress no later than one year after the data of the enactment of this Act and biennially thereafter.

Crisis Management Research Center

Section 7 of the Act authorizes NSF, in consultation with other appropriate agencies, to establish a research center focused on issues associated with the use of IT to support the needs and requirements of crisis management. The National Science and Technology Council's report, "Networking and Information Technology Research and Development: Supplement to the President's Budget for FY 2002," points out that, in a major natural or human-caused disaster, there is a great need for an instantaneous common communication system and a common capability for real-time distribution of information, disaster guidance and directives, situational updates and analyses, and instructions for disaster workers. The report goes on to point out the lack of such a capability today and the opportunity that exists from advances in information technology to provide tools that could address this need. Likewise, the 1996 report of the NRC, "Computing and Communications in the Extreme: Research for Crisis Management and Other Applications," describes IT research areas that would lead to benefits for crisis management.

The research center authorized by the bill is modeled on the Enabling Technology Centers (ETCs) described in the February 1999 PITAC report, "Information Technology Research: Investing in Our Future." The report describes the ETCs as long-term centers of excellence in computer science and engineering research that would involve academia, industry and government and that would explore particular applications of information and communications tech-

nology of national importance. Crisis management is cited in the report as a national problem area in which an ETC could make an important contribution.

The Committee expects that the research center authorized by section 7 of the bill will function in a manner similar to that recommended by PITAC for ETCs. In particular, the center should carry out research on information technology targeted toward the demands of crisis management; support experimental test beds for testing and validating relevant technologies under realistic conditions; and identify barriers to more widespread adoption of information technology in crisis management. In addition, the Committee expects the center to help forge linkages among researchers, companies, and users of the technologies that will result from the research undertaken by the center.

IX. Cost Estimate

Rule XIII, clause 3(d)(2) of the House of Representatives requires each committee report accompanying each bill or joint resolution of a public character to contain: (1) an estimate, made by such committee, of the costs which would be incurred in carrying out such bill or joint resolution in the fiscal year in which it is reported, and in each of the five fiscal years following such fiscal year (or for the authorized duration of any program authorized by such bill or joint resolution, if less than five years); (2) a comparison of the estimate of costs described in subparagraph (1) of this paragraph made by such committee with an estimate of such costs made by any Government agency and submitted to such committee; and (3) when practicable, a comparison of the total estimated funding level for the relevant program (or programs) with the appropriate levels under current law. However, House Rule XIII, clause 3(d)(3)(B) provides that this requirement does not apply when 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 prior to the filing of the report and included in the report pursuant to House Rule XIII, clause 3(c)(3). 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 prior to the filing of this report and is included in Section IX of this report pursuant to House Rule XIII, clause 3(c)(3).

Rule XIII, clause 3(c)(2) of the House of Representatives requires each committee report that accompanies a measure providing new budget authority (other than continuing appropriations), new spending authority, or new credit authority, or charges in revenues or tax expenditures to contain a cost estimate, as required by section 308(a)(1) of the Congressional Budget Act of 1974 and, when practicable with respect to estimates of new budget authority, a comparison of the total estimated funding level for the relevant program (or programs) to the appropriate levels under current law. H.R. 3394 does not contain any new budget authority, credit authority, or changes in revenues or tax expenditures. Assuming that the sums authorized under the bill are appropriated, H.R. 3394 does authorize additional discretionary spending, as described in

the Congressional Budget Office report on the bill, which is contained in Section IX of this report.

X. Congressional Budget Office Cost Estimate

U.S. Congress,
Congressional Budget Office,
Washington, DC, January 24, 2002.

Hon. Sherwood L. Boehlert,
Chairman, Committee on Science,
House of Representatives, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 3400, the Networking and Information Technology Research Advancement Act.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Kathleen Gramp.

Sincerely,

Barry B. Anderson
(For Dan L. Crippen, Director).

Enclosure.

H.R. 3400—Networking and Information Technology Research Advancement Act

Summary: H.R. 3400 would authorize the appropriation of about $7 billion over the 2003–2007 period for civilian research and development (R&D) on computer networking and information technology (IT) at five agencies. The bill would authorize funding for both new and ongoing activities of the National Science Foundation (NSF), Department of Energy, National Aeronautics and Space Administration, Department of Commerce, and Environmental Protection Agency. In addition, the bill would direct NSF to examine trends in the IT workforce and fund a study by the National Academy of Sciences on the nation's IT research capabilities in relation to other countries.

Assuming appropriation of the specified amounts, CBO estimates that implementing this bill would cost $5.4 billion over the 2003–2007 period. The bill would not affect direct spending or receipts; therefore, pay-as-you-go procedures would not apply.

H.R. 3400 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. 3400 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 the environment), and 376 (commerce and housing credit). For this estimate, CBO assumes that funds will be appropriated near the beginning of each fiscal year and that outlays will occur at rates similar to those for other research programs at these agencies. We also assume that the amounts authorized for NSF include funding for the study on the IT workforce.

	By fiscal year, in millions of dollars—					
	2002	2003	2004	2005	2006	2007
SPENDING SUBJECT TO APPROPRIATION						
R&D spending for IT under current law:						
Budget authority[1]	1,068	0	0	0	0	0
Estimated outlays	958	634	150	42	14	0
Proposed changes:						
Authorization level	0	1,157	1,270	1,395	1,536	1,688
Estimated outlays	0	401	985	1,203	1,354	1,504
R&D spending for IT under H.R. 3400:						
Authorization level	1,068	1,157	1,270	1,395	1,536	1,688
Estimated outlays	958	1,035	1,135	1,245	1,368	1,504

[1] The amount appropriated for these activities in 2002 is based on information from the Office of Management and Budget.

Pay-as-you-go considerations: None.

Estimated impact on state, local, and tribal governments: H.R. 3400 contains no intergovernmental mandates as defined in UMRA and would impose no costs on state, local, or tribal governments. The bill would benefit state governments by authorizing $50 million, from 2003 through 2007, to eligible nonprofit organizations (including public universities) to carry out research to advance the role of information technology in crisis management. Based on historical spending patterns of the agencies identified in H.R. 3400, CBO estimates the public universities also would receive, in the form of grants, a significant portion of the approximately $7 billion authorized in the bill.

Estimated impact on the private sector: This bill contains no new private-sector mandates as defined in UMRA.

Estimate prepared by: Federal costs: Kathleen Gramp, Ken Johnson, and Susanne Mehlman; impact on state, local, and tribal governments: Elyse Goldman; impact on the private sector: Jean Talarico.

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

XI. Compliance With Public Law 104–4 (Unfunded Mandates)

H.R. 3400 contains no unfunded mandates.

XII. Committee Oversight Findings and Recommendations

Rule XIII, clause 3(c)(1) of the House of Representatives requires each committee report to include oversight findings and recommendations required pursuant to clause 2(b)(1) of Rule X. The Committee on Science's oversight findings and recommendations are reflected in the body of this report.

XIII. Constitutional Authority Statement

Rule XIII, clause 3(d)(1) of the House of Representatives requires each report of a committee on a bill or joint resolution of a public character to include a statement citing the specific powers granted to the Congress in the Constitution to enact the law proposed by the bill or joint resolution. Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 3400.

XIV. Federal Advisory Committee Statement

H.R. 3400 does not establish nor authorize the establishment of any advisory committee.

XV. Congressional Accountability Act

The Committee finds that H.R. 3400 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).

XVI. Statement on Preemption of State, Local, or Tribal Law

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

XVII. 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 italics, existing law in which no change is proposed is shown in roman):

HIGH-PERFORMANCE COMPUTING ACT OF 1991

* * * * * * *

SEC. 4. DEFINITIONS.

As used in this Act, the term—

(1) * * *

* * * * * * *

(3) "[high-performance computing] *networking and information technology*" means advanced computing, communications, and information technologies, including scientific workstations, supercomputer systems [(including vector supercomputers and large scale parallel systems)], high-capacity and high-speed networks, special purpose and experimental systems, and applications and systems software;

(4) "Internet" means the international computer network of both Federal and non-Federal interoperable [packet switched] data networks;

[(5) "Network" means a computer network referred to as the National Research and Education Network established under section 102; and

[(6) "Program" means the National High-Performance Computing Program described in section 101.]

(5) "Program" means the Networking and Information Technology Research and Development Program described in section 101; and

(6) "Program Component Areas" means the major subject areas under which are grouped related individual projects and activities carried out under the Program and which are developed according to section 101(a)(3)(B) and identified in the annual report required under section 101(a)(3)(A).

[TITLE I—HIGH-PERFORMANCE COMPUTING AND THE NATIONAL RESEARCH AND EDUCATION NETWORK]

TITLE I—NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM

SEC. 101. [NATIONAL HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT* PROGRAM.

(a) [NATIONAL HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT* PROGRAM.—(1) The President shall implement a [National High-Performance Computing] *Networking and Information Technology Research and Development* Program, which shall—

(A) establish the goals and priorities for Federal [high-performance computing] *networking and information technology* research, development, networking, and other activities; [and]

(B) establish Program Component Areas that implement the goals established under subparagraph (A); and

[(B)] *(C)* provide for interagency coordination of Federal [high-performance computing] *networking and information technology* research, development, networking, and other activities undertaken pursuant to the Program.

(2) The Program shall—

(A) * * *

* * * * * * *

(F) provide for acceleration of the development of high-performance computing systems, subsystems, and associated software;

(G) provide for the technical support and research and development of [high-performance computing] *networking and information technology* software and hardware needed to address Grand Challenges;

(H) provide for educating and training additional undergraduate and graduate students in software engineering, computer science, library and information science, and computational science; [and]

[(I) provide—

[(i) for the security requirements, policies, and standards necessary to protect Federal research computer networks and information resources accessible through Federal research computer networks, including research required to establish security standards for high-performance computing systems and networks; and

[(ii) that agencies and departments identified in the annual report submitted under paragraph (3)(A) shall define and implement a security plan consistent with the Program and with applicable law.]

(I) provide for improving the security of networked information systems, including research required to establish security standards and practices for computing systems and networks; and

(J) provide for long-term basic research on networking and information technology, with priority given to research that helps address issues related to—

(i) high end computing and software;

(ii) network stability, fragility, reliability, security (including privacy), and scalability; and

(iii) the social and economic consequences of information technology.

(3) The Director shall—

(A) * * *

(B) provide for interagency coordination of the Program*, including establishing the process by which Program Component Areas are defined*; and

(C) consult with academic, State, industry, and other appropriate groups conducting research on and using [high-performance computing] *networking and information technology*.

(4) The annual report submitted under paragraph (3)(A) shall—

[(A) include a detailed description of the goals and priorities established by the President for the Program;]

(A) provide a detailed description of the Program Component Areas, including—

(i) a description of any changes in the Program Component Areas from the preceding report and the reasons for such changes; and

(ii) a description of activities within each Program Component Area that contribute to the improvement of the security of networked information systems;

* * * * * * *

(C) describe the levels of Federal funding for the fiscal year during which such report is submitted, and the levels proposed for the fiscal year with respect to which the budget submission applies, for [specific activities, including education, research, hardware and software development, and support for the establishment of the Network] *each Program Component Area*;

(D) describe the levels of Federal funding for each agency and department participating in the Program for the fiscal year during which such report is submitted, and the levels proposed for the fiscal year with respect to which the budget submission applies *for each Program Component Area and for all activities that contribute to the improvement of the security of networked information systems*;

(E) include the report of the Secretary of Energy required by section 203(d); and

(F) include an analysis of the progress made toward achieving the goals and priorities established for the Program*, and the extent to which the Program incorporates the recommendations of the Advisory Committee established under subsection (b)*.

(b) ADVISORY COMMITTEE.—*(1)* The President shall establish an advisory committee on [high-performance computing] *networking and information technology* consisting of non-Federal members, including representatives of the research, education, and library communities, network providers, and industry, who are specially qualified to provide the Director with advice and information on [high-performance computing] *networking and information technology*. The recommendations of the advisory committee shall be considered in reviewing and revising the Program. The advisory com-

mittee shall provide the Director with an independent assessment of—

[(1)] *(A)* progress made in implementing the Program;

[(2)] *(B)* the need to revise the Program;

[(3)] *(C)* the balance between the components of the Program*, including funding levels for the Program Component Areas*;

[(4)] *(D)* whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in [computing] *networking and information* technology; and

[(5)] *(E)* other issues identified by the Director.

(2) In addition to the duties outlined in paragraph (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program, and shall report not less frequently than once every two fiscal years to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on its findings and recommendations. The first report shall be due within one year after the date of the enactment of this paragraph.

(c) OFFICE OF MANAGEMENT AND BUDGET.—(1) Each Federal agency and department participating in the Program shall, as part of its annual request for appropriations to the Office of Management and Budget, submit a report to the Office of Management and Budget which—

(A) identifies each element of its [high-performance computing] *networking and information technology* activities which contributes directly to the [Program or] *Program Component Areas or* benefits from the Program; and

* * * * * * *

[SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK.

[(a) ESTABLISHMENT.—As part of the Program, the National Science Foundation, the Department of Defense, the Department of Energy, the Department of Commerce, the National Aeronautics and Space Administration, and other agencies participating in the Program shall support the establishment of the National Research and Education Network, portions of which shall, to the extent technically feasible, be capable of transmitting data at one gigabit per second or greater by 1996. The Network shall provide for the linkage of research institutions and educational institutions, government, and industry in every State.

[(b) ACCESS.—Federal agencies and departments shall work with private network service providers, State and local agencies, libraries, educational institutions and organizations, and others, as appropriate, in order to ensure that the researchers, educators, and students have access, as appropriate, to the Network. The Network is to provide users with appropriate access to high-performance computing systems, electronic information resources, other research facilities, and libraries. The Network shall provide access, to the extent practicable, to electronic information resources maintained by libraries, research facilities, publishers, and affiliated organizations.

[(c) NETWORK CHARACTERISTICS.—The Network shall—

[(1) be developed and deployed with the computer, telecommunications, and information industries;

[(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

[(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment in high-speed data networking within the telecommunications industry;

[(4) be designed, developed, and operated in a manner which promotes research and development leading to development of commercial data communications and telecommunications standards, whose development will encourage the establishment of privately operated high-speed commercial networks;

[(5) be designed and operated so as to ensure the continued application of laws that provide network and information resources security measures, including those that protect copyright and other intellectual property rights, and those that control access to data bases and protect national security;

[(6) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the Network and, where appropriate and technically feasible, for their usage of the Network;

[(7) ensure the interoperability of Federal and non-Federal computer networks, to the extent appropriate, in a way that allows autonomy for each component network;

[(8) be developed by purchasing standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when not feasible, in order to minimize Federal investment in network hardware;

[(9) support research and development of networking software and hardware; and

[(10) serve as a test bed for further research and development of high-capacity and high-speed computing networks and demonstrate how advanced computers, high-capacity and high-speed computing networks, and data bases can improve the national information infrastructure.

[(d) DEFENSE ADVANCED RESEARCH PROJECTS AGENCY RESPONSIBILITY.—As part of the Program, the Department of Defense, through the Defense Advanced Research Projects Agency, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network.

[(e) INFORMATION SERVICES.—The Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Network. These services may include the provision of directories of the users and services on computer networks, data bases of unclassified Federal scientific data, training of users of data bases and computer networks, access to commercial information services for users of the Network, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

[(f) USE OF GRANT FUNDS.—All Federal agencies and departments are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

[(g) REPORT TO CONGRESS.—Within one year after the date of enactment of this Act, the Director shall report to the Congress on—

[(1) effective mechanisms for providing operating funds for the maintenance and use of the Network, including user fees, industry support, and continued Federal investment;

[(2) the future operation and evolution of the Network;

[(3) how commercial information service providers could be charged for access to the Network, and how Network users could be charged for such commercial information services;

[(4) the technological feasibility of allowing commercial information service providers to use the Network and other federally funded research networks;

[(5) how to protect the copyrights of material distributed over the Network; and

[(6) appropriate policies to ensure the security of resources available on the Network and to protect the privacy of users of networks.

[SEC. 103. NEXT GENERATION INTERNET.

[(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.]

* * * * * * *

TITLE II—AGENCY ACTIVITIES

[SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

[(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I—

[(1) the National Science Foundation shall provide computing and networking infrastructure support for all science and engineering disciplines, and support basic research and human resource development in all aspects of high-perform-

ance computing and advanced high-speed computer networking;

[(2) to the extent that colleges, universities, and libraries cannot connect to the Network with the assistance of the private sector, the National Science Foundation shall have primary responsibility for assisting colleges, universities, and libraries to connect to the Network;

[(3) the National Science Foundation shall serve as the primary source of information on access to and use of the Network; and

[(4) the National Science Foundation shall upgrade the National Science Foundation funded network, assist regional networks to upgrade their capabilities, and provide other Federal departments and agencies the opportunity to connect to the National Science Foundation funded network.

[(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of the Program $213,000,000 for fiscal year 1992; $262,000,000 for fiscal year 1993; $305,000,000 for fiscal year 1994; $354,000,000 for fiscal year 1995; and $413,000,000 for fiscal year 1996.

[SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.

[(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in high-performance computing, particularly in the field of computational science, with emphasis on aerospace sciences, earth and space sciences, and remote exploration and experimentation.

[(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Aeronautics and Space Administration for the purposes of the Program $72,000,000 for fiscal year 1992; $107,000,000 for fiscal year 1993; $134,000,000 for fiscal year 1994; $151,000,000 for fiscal year 1995; and $145,000,000 for fiscal year 1996.]

SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Science Foundation shall—

(1) generate fundamental scientific and technical knowledge with the potential of advancing networking and information technology and its applications; and

(2) provide computing and networking infrastructure support for all science and engineering disciplines, and support basic research and human resource development in all aspects of networking and information technology and advanced high speed computer networking.

(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of the Program $704,000,000 for fiscal year 2003; $774,000,000 for fiscal year 2004, $851,000,000 for fiscal year 2005, $937,000,000 for fiscal year 2006, and $1,030,000,000 for fiscal year 2007.

SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in networking and information technology, with emphasis on—

(1) computational fluid, thermal, and aerodynamics;

(2) scientific data dissemination and tools to enable data to be fully analyzed and combined from multiple sources and sensors;

(3) remote exploration and experimentation; and

(4) tools for collaboration in systems design, analysis, and testing.

(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Aeronautics and Space Administration for the purposes of the Program $199,000,000 for fiscal year 2003, $219,000,000 for fiscal year 2004, $240,000,000 for fiscal year 2005, $265,000,000 for fiscal year 2006, and $292,000,000 for fiscal year 2007.

SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Energy shall**[**—

[(1) perform research and development on, and systems evaluations of, high-performance computing and communications systems;

[(2) conduct computational research with emphasis on energy applications;

[(3) support basic research, education, and human resources in computational science; and

[(4) provide for networking infrastructure support for energy-related mission activities.**]**

conduct basic and applied research in networking and information technology, with emphasis on—

(1) supporting fundamental research in the physical sciences and engineering, and energy applications;

(2) providing supercomputer access and advanced communication capabilities to scientific researchers; and

(3) developing tools for distributed scientific collaboration.

* * * * * * *

(e) AUTHORIZATION OF APPROPRIATIONS.—**[**(1)**]** There are authorized to be appropriated to the Secretary of Energy for the purposes of the Program **[**$93,000,000 for fiscal year 1992; $110,000,000 for fiscal year 1993; $138,000,000 for fiscal year 1994: $157,000,000 for fiscal year 1995; and $169,000,000 for fiscal year 1996**]** *$193,000,000 for fiscal year 2003, $212,000,000 for fiscal year 2004, $234,000,000 for fiscal year 2005, $258,000,000 for fiscal year 2006, and $283,000,000 for fiscal year 2007.*

[(2) There are authorized to be appropriated to the Secretary of Energy for fiscal years 1992, 1993, 1994, 1995, and 1996, such funds as may be necessary to carry out the activities that are not part of the Program but are authorized by this section.**]**

SEC. 204. DEPARTMENT OF COMMERCE ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I—

[(1) the National Institute of Standards and Technology shall—

[(A) conduct basic and applied measurement research needed to support various high-performance computing systems and networks;

[(B) develop and propose standards and guidelines, and develop measurement techniques and test methods, for the interoperability of high-performance computing systems in networks and for common user interfaces to systems; and

[(C) be responsible for developing benchmark tests and standards for high-performance computing systems and software; and

[(2) the National Oceanic and Atmospheric Administration shall conduct basic and applied research in weather prediction and ocean sciences, particularly in development of new forecast models, in computational fluid dynamics, and in the incorporation of evolving computer architectures and networks into the systems that carry out agency missions.]

(1) the National Institute of Standards and Technology shall—

(A) conduct basic and applied measurement research needed to support various computing systems and networks;

(B) develop and propose voluntary standards and guidelines, and develop measurement techniques and test methods, for the interoperability of computing systems in networks and for common user interfaces to systems;

(C) be responsible for developing benchmark tests and standards for computing systems and software; and

(D) encourage the development, deployment, and implementation of voluntary guidelines and standards for—

(i) robust security technology; and

(ii) best practices and interoperability relating to the security of commercial and government computer networks; and

(2) the National Oceanic and Atmospheric Administration shall conduct basic and applied research in networking and information technology, with emphasis on—

(A) improving weather forecasting and climate prediction;

(B) collection and dissemination of environmental information; and

(C) development of more accurate models of the atmosphere-ocean system.

* * * * * * *

[(c) STUDY OF IMPACT OF FEDERAL PROCUREMENT REGULATIONS.—(1) The Secretary of Commerce shall conduct a study to—

[(A) evaluate the impact of Federal procurement regulations that require that contractors providing software to the Federal Government share the rights to proprietary software development tools that the contractors use to develop the software; and

[(B) determine whether such regulations discourage development of improved software development tools and techniques.

[(2) The Secretary of Commerce shall, within one year after the date of enactment of this Act, report to the Congress regarding the results of the study conducted under paragraph (1).

[(d) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated—

[(1) to the National Institute of Standards and Technology for the purposes of the Program $3,000,000 for fiscal year 1992; $4,000,000 for fiscal year 1993; $5,000,000 for fiscal year 1994; $6,000,000 for fiscal year 1995; and $7,000,000 for fiscal year 1996; and

[(2) to the National Oceanic and Atmospheric Administration for the purposes of the Program $2,500,000 for fiscal year 1992; $3,000,000 for fiscal year 1993; $3,500,000 for fiscal year 1994; $4,000,000 for fiscal year 1995; and $4,500,000 for fiscal year 1996.]

(c) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated—

(1) to the National Institute of Standards and Technology for the purposes of the Program $24,000,000 for fiscal year 2003, $27,000,000 for fiscal year 2004, $29,000,000 for fiscal year 2005, $32,000,000 for fiscal year 2006, and $35,000,000 for fiscal year 2007; and

(2) to the National Oceanic and Atmospheric Administration for the purposes of the Program $22,000,000 for fiscal year 2003, $24,000,000 for fiscal year 2004, $26,000,000 for fiscal year 2005, $29,000,000 for fiscal year 2006, and $32,000,000 for fiscal year 2007.

[SEC. 205. ENVIRONMENTAL PROTECTION AGENCY ACTIVITIES.

[(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Environmental Protection Agency shall conduct basic and applied research directed toward the advancement and dissemination of computational techniques and software tools which form the core of ecosystem, atmospheric chemistry, and atmospheric dynamics models.

[(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the Environmental Protection Agency for the purposes of the Program $5,000,000 for fiscal year 1992; $5,500,000 for fiscal year 1993; $6,000,000 for fiscal year 1994; $6,500,000 for fiscal year 1995; and $7,000,000 for fiscal year 1996.]

SEC. 205. ENVIRONMENTAL PROTECTION AGENCY ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Environmental Protection Agency shall conduct basic and applied research directed toward the advancement and dissemination of computational techniques and software tools with an emphasis on modeling of—

(1) ecosystems;

(2) human effects

(3) atmospheric dynamics and chemistry; and

(4) pollutant transport.

(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the Environmental Protection Agency for the purposes of the Program $4,000,000 for fiscal year 2003, $4,400,000 for fiscal year 2004, $4,800,000 for fiscal year 2005, $5,300,000 for fiscal year 2006, and $5,800,000 for fiscal year 2007.

* * * * * * *

XVIII. COMMITTEE RECOMMENDATION

On December 6, 2001, a quorum being present, the Committee on Science favorably reported the Networking and Information Technology Research Advancement Act, as amended, by a voice vote, and recommends its enactment.

XIX. STATEMENT OF GENERAL PERFORMANCE GOALS AND OBJECTIVES

Pursuant to Clause (3)(c) of House Rule XIII, the goal of H.R. 3400 is to maintain and improve federally funded information technology research and development. The bill authorizes funding for IT research and development at NSF, DOE, NIST, NOAA, and EPA. It also amends the HPC Act in order to maintain and improve the function of the NITRD program.

The objective of the Act is to increase the amount of high quality IT research and development performed by the agencies listed above. Each agency is expecged to focus its research effort in areas that correspond to that agency's mission. NSF, for example, is expected to fund external researchers who receive research grants under a system of merit-based, competitive peer review in order to generate fundamental knowledge in information technology. Other agencies are expected to conduct basic and applied information technology research that focuses on the areas that will support the mission of the agency and which are outlined specifically in the Act.

XX. PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 3400, NETWORKING AND INFORMATION TECHNOLOGY RESEARCH ADVANCEMENT ACT

The Committee met, pursuant to call, at 11:21 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Sherwood L. Boehlert (chairman of the committee) presiding.

Chairman BOEHLERT. We will now consider H.R. 3400, the Networking and Information Technology Research Advancement Act. And I will yield five minutes to the Chairman of the Research Committee, Mr. Smith of Michigan.

Mr. SMITH OF MICHIGAN. Thank you, Mr. Chairman, and thank you for helping develop and move this bill. And I also would recognize Ranking Member Hall, Ranking Member of our Subcommittee, Eddie Bernice Johnson. H.R. 3400, the Networking and Information Technology Research and Advancement Act, is the result of a truly bipartisan effort by the Committee to update and reauthorize federally funded basic research in information technology.

Now, specifically, H.R. 3400 amends the High-Performance Computing Act of 1991, and it coordinates the research efforts of six

agencies under the Science Committee jurisdiction that are engaged in the networking and information technology. The bill authorizes approximately $7 billion over five years between those six agencies. And, at this time, I would request that my full statement be entered into the record. And I will skip some of it and conclude, if that is permissible, Mr. Chairman.

Chairman BOEHLERT. Without objection, so ordered.

[The prepared statement of Mr. Hall of Texas follows:]

PREPARED STATEMENT OF THE HONORABLE RALPH M. HALL

Mr. Chairman, I am pleased to join you in supporting the information technology research bills that are before the Committee today.

I want to congratulate you and Subcommittee Chairman Smith, along with Congresswoman Eddie Bernice Johnson and Congressman Baird on this side of the aisle, for all of your hard work in developing these important bills. We have worked together in a remarkable spirit of cooperation and bipartisanship, for which the Chairman has my thanks.

Over the past ten years the Science Committee has been active in developing legislation and conducting oversight of information technology research and development. In particular, the Committee has supported the development and growth of a closely coordinated, multiple agency research effort that has helped fuel enormous advances in computing and networking performance.

H.R. 3400, the Networking and Information Technology Research Advancement Act, will help ensure the continuation of the progress we have seen in information technology, which is transforming the way people live, learn, work, and play.

The new resources provided by H.R. 3400 will allow this ongoing information technology initiative to focus greater attention on long-term research. This long-term view is needed to generate the new ideas that will underpin future technology products and services. These added resources will also support the education and training of the new scientists and engineers this field will require.

In short, the bill will re-energize a key program for supplying the seed corn for sustaining the nation's leadership in information technology.

I would like to yield now to the co-author of the bill, Congresswoman Eddie Bernice Johnson, the Ranking Democratic Member on the Research Subcommittee, for her comments.

[The prepared statement of Mr. Smith of Michigan follows:]

PREPARED STATEMENT OF CONGRESSMAN NICK SMITH

Description of Legislation

Thank you, Mr. Chairman, and thank you for helping develop and move this bill. I also want to recognize the work of Ranking Member Hall and Congresswoman Eddie Bernice Johnson for their work in crafting this legislation.

H.R. 3400, the Networking and Information Technology Research and Advancement Act (NITRA), is the result of a truly bipartisan effort by the Committee to update and re-authorize federally funded basic research in information technology.

Specifically, H.R. 3400 amends the High-Performance Computing Act of 1991 to update and coordinate the research efforts of the six agencies under the Science Committee jurisdiction that are engaged in the Networking and Information Technology Research and Development (NITERD) Program. The bill authorizes $7 billion over 5 years for this effort.

Specifically, the bill calls for:

- $4.296 billion for the National Science Foundation
- $1.215 billion for NASA
- $1.18 billion for the Department of Energy Office of Science
- $147 million for the National Institute of Standards and Technology (NIST)
- $133 million for the National Oceanic and Atmospheric Administration (NOAA)
- $24.3 million for the Environmental Protection Agency

This represents approximately a 10 percent per year funding increase for those agencies.

We're also authorizing two important studies by the National Academy of Sciences: One that will help us get a clear understanding of how Federal support for basic IT research stacks up against other countries, and another study that will

provide us with a detailed assessment of the evolving IT workforce in the United States. We feel that these studies will help to guide us as we eventually move beyond this legislation and look to continue directing Federal IT research.

As we all know, the high-tech industry has seen unprecedented growth and transformation in the last decade, and the degree to which it is now part of our everyday lives, including business, would have been unimaginable 10 years ago. As the presence and scope of the technology industry has expanded, so has the need to coordinate fundamental IT research.

This bill and the cyber security bill emerged from a series of hearings that we held this summer on the Research Subcommittee, which I chair with Congresswoman Johnson. In those hearings we heard from top industry, government, and academic experts on the Federal Government's role in promoting innovation and continued developments in information technology. We learned of the need to continue building upon the knowledge base that helped create the current boom in information technology and our overall economy, and I am confident that the bill we have before the Committee will allow us to meet the ongoing research needs.

Some examples of what basic Federal R&D funding has given us today are the Internet, the ethernet, web browsers, supercomputers, and high-speed optical networks.

The potential for future advancements is unlimited. The R&D funding of today will bring us advanced technologies such as nanotechnology; carbon nanotubes on silicon for "instant-on" PCs; Extreme Ultraviolet Lithography (EUV) to allow computer chips to operate 40 times faster than today. We are looking at computers that will make up to a quadrillion calculations per second, and Telemedicine that will help get needed care to citizens immediately wherever they are located. Other great technologies on the horizon include advanced and distance learning systems, ubiquitous communications, cyber security, self-managing computer systems, and high-tech combat simulation.

The world is getting much tougher in terms of our ability to compete, to develop the kinds of products people want to buy and to develop them at high quality and low cost. That's what happens with research, particularly this networking and information technology research.

Mr. Chairman, these Federal investments will foster innovation and set the foundation to deal with two of our most important priorities: security and the economy. The two bills we have before us today compliment each other well in that respect. I thank you again for bringing forth action on this bill and I encourage members on both sides of the aisle to lend their support.

Mr. SMITH OF MICHIGAN. This effort represents a 10 percent per year increasing in funding for networking and information technology. We are also authorizing two important studies by the National Academy of Sciences; one that will help us get a clear understanding how Federal support for basic IT research stacks up against other countries. And we are in competition. Make no doubt in terms of the contribution to the economy that information technology's research contributes. We feel these studies will help to guide us as we eventually move beyond this legislation and look to continue directing Federal IT research.

As we all know, high-tech industry has seen unprecedented growth and transformation in our lives in the last decade. And the degree to which it is now part of our everyday lives, including business, would have been unimaginable 10 or 15 years ago. As the presence and scope of the technology industry has expanded, so has the need to coordinate fundamental IT research. That is what we do. We do coordination and we increase the Federal effort in this basic research effort.

This bill has—and the Cyber Security bill—are merged from a series of hearings that we held this summer on the Research Subcommittee, which I chair and with Congresswoman Johnson. In those hearings, we heard from top industry government and academic experts on the Federal Government's role in promoting innovation and continued developments in information technology. We learned of the need to continue building on the knowledge base

that helped create the current boom in information technology and our overall economy. I am confident that the bill we have before the Committee will allow us to meet the ongoing research needs.

And I just think it is good to mention a few of the results of what we have done. The funding has given us the silicon chip to start with. It has given us the Internet, the Ethernet, the browsers, the supercomputers, the high-speed optical networks that we now have. The evolution of basic research has taken between 20 and 30 years to culminate into the kind of applied research that has allowed this Nation to be ahead of every other nation in—economically and our business because of its contribution to new products, because of its contribution to increased efficiency and production.

And where do we go from here? The potential for future advancements is unlimited. The R&D funding of today will bring us advanced technologies, such as greater use of the nanotechnology, the carbon nanotubes on silicone for instant-on PCs, for example; the Extreme Ultraviolet Lithography to allow computer chips to operate 40 times faster than today; the new computers that will compute up to a quadrillion calculations per second. This kind of technology, Mr. Chairman, Nembers, is what is going to keep us ahead in terms of our competitive position in the world.

And with that, Mr. Chairman, again, I thank all of the agencies that have worked with us in the development of this bill, and move that we adopt this bill and move it to the Floor as quickly as possible.

Chairman BOEHLERT. Thank you very much. I really appreciate the hard work and leadership you have provided in this area. I think we can wrap this up in a timely manner. The Chair now recognizes Ms. Johnson.

Ms. JOHNSON. Thank you very much, Mr. Chairman. Let me express my appreciation to you and Mr. Hall and especially Mr. Smith. I ask unanimous consent to just file my statement and simply say that——

Chairman BOEHLERT. Without objection.

Ms. JOHNSON [continuing]. I think that the implementation of the President's Commission certainly has been followed in this bill, because they indicated that the long-term research was short at least by a billion dollars, and we go a long ways in the right direction. And I appreciate the support of you and your leadership, Mr. Hall, and, Mr. Smith. Thank you.

[The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF EDDIE BERNICE JOHNSON

Mr. Chairman, I am pleased. you have brought H.R. 3400 before the Committee for its consideration. This is a bipartisan bill that was developed in a spirit of cooperation in the best traditions of this Committee. It authorizes a major new research investment in information technology, which is directly tied to the nation's economic growth and national security. This is a very important research initiative, and it is appropriate that the Committee is moving expeditiously to authorize it.

H.R. 3400 will reinvigorate the current multi-agency information technology research program by putting in place the principal recommendations of a recent report from the President's Information Technology Advisory Committee. The report, entitled "Information Technology Research: Investing in Our Future," documents the results of a comprehensive assessment of federally funded information technology research conducted by the Advisory Committee.

The President's Advisory Committee found that Federal funding for information technology research has tilted too much toward support for near-term, mission-focused objectives. They discovered a growing gap between the power of high-perform-

ance computers available to support agency mission requirements versus support for the general academic research community. They identified the need for socio-economic research on the impact on society of the rapid evolution of information technology. And, they judged that the annual Federal research investment is inadequate by more than $1 billion.

I am confident that H.R. 3400 will effectively implement the Advisory Committee's recommendations. In addition to support for research, the bill will also contribute to providing the highly trained workers needed by the information industries in the future.

The Science Committee has a long history of support for information technology research. We have seen ample evidence of the value of past research programs. The example of the Internet alone makes the case for the unexpected, and often spectacular, outcomes from Federal long-term research investments in information technologies. H.R. 3400 will provide for the basic research needed to underpin the technological advances of the future.

Mr. Chairman, I want to thank you for your leadership on this bill, and I look forward to assisting you in moving the bill forward.

[The prepared statement of J. Randy Forbes follows:]

PREPARED STATEMENT OF CONGRESSMAN J. RANDY FORBES

Mr. Chairman, I would like to express my strong support both for the Networking and Information Technology Research Advancement Act, as well as the Cyber Security Research and Development Act. As a co-sponsor of both pieces of legislation, I appreciate my colleagues' efforts to coordinate our national response to the very serious threat of cyber terrorism.

Though it won't bring the death and destruction of biological or chemical weapons, cyber terrorism holds the power to disrupt our way of life, harm people's personal interests, and cause tremendous losses for businesses. Both bills before us are necessary for updating our national ability to thwart terrorist plots to disrupt our economy and do harm to our way of life using our own computer networks. As we heard from various witnesses who have come before this Committee over the past several months, cyber terrorism is a very real threat that we are not currently prepared to fully meet. We have bright and innovative minds in this nation, but they need direction and coordination to maximize their efforts to find ways to prevent cyber terrorist attacks and ameliorate their consequences.

The bills before us today will coordinate the various research and development efforts that currently exist and increase the overall federal contribution for them. In addition, they will revise the rules under which federal dollars operate to give our science and technology experts the ability to think outside the box. Our enemies use their evil cunning as a weapon. We should not be restricted in our thinking to defeat their efforts.

Mr. Chairman, I appreciate your bringing these bills to our Committee so quickly. I am hopeful that they will get such prompt treatment by the Congress as a whole so that we can begin to implement this coordinated policy. Thank you.

Chairman BOEHLERT. Thank you very much. I ask unanimous consent that the bill be considered as read and open to amendment at any point. I ask the Members to proceed with the amendments in the order on the roster. The first amendment on the roster is the amendment offered by Mr. Matheson.

Mr. MATHESON. Thank you, Mr. Chairman. I will try to be—I will try to be brief in presenting the amendment.

Chairman BOEHLERT. I ask unanimous consent that we dispense with the reading of the amendment, and, without objection, so ordered. And I recognize you for five minutes, and I hope you will contract into about two.

Mr. MATHESON. I will contract and give you a written statement for the record if that is okay, Mr. Chairman.

Chairman BOEHLERT. Thank you.

Mr. MATHESON. I just want to thank you for this hearing. My amendment is not designed to detract from the substance of this important legislation. It just makes one addition, which I think focuses on a particular subsection of issues, which is crisis manage-

ment. It establishes a research center to develop and demonstrate applications of information technology for crisis management.

And, as we have seen recently, unexpected crises can immediately require the ability to quickly and accurately relay large amounts of information to make crucial decisions. And crisis response is characterized by the generation and distribution of large quantities of unstructured data and information that must be acquired, processed, integrated, and disseminated in real time.

And I think that the potential for information technology to assist in crisis management was recently identified in the 1996 reports from the National Academy of Sciences and the President's Information Technology Advisory Committee's 1999 report, which was called Information Technology Research: Investing in Our Future.

This amendment seeks to implement their recommendation to establish centers of excellence in computer science and engineering research applied to specific applications areas of importance, including crisis management.

I hope that this Committee will accept this amendment as a means to further research that can improve crisis management and an appropriate addition to this legislation on networking information technology. I yield back the balance of my time.

[The prepared statement of Mr. Matheson follows:]

PREPARED STATEMENT OF THE HONORABLE JIM MATHESON

Mr. Chairman, Members of the Committee, I want to applaud your efforts to bring two very crucial pieces of legislation before the committee today. As our world becomes more digitally connected, it is imperative that our security and research concerns take into consideration the role of information technology and improved networking.

H.R. 3400, which Mr. Smith and Ms. Johnson have introduced, goes a long way to making this happen by furthering the participation of many government agencies in the Networking and Information Technology Research Program and by funding grants for basic and applied research in the computer sciences. My amendment is not designed to detract from the substance of this legislation. Instead, it makes one addition, which helps focus on a particular sub-section of issues: crisis management.

The amendment establishes a research center to develop and demonstrate applications of information technology for crisis management. The focus of the center will be to explore ways to marshal the capabilities of high-performance networks and computing for immediate response to, recovery from, and mitigation of the effects of man-made and natural disasters.

As we have recently seen, unexpected crises can immediately require the ability to quickly and accurately relay large amounts of information and make crucial decisions. The generation and distribution of large quantities of unstructured data and information that must be acquired, processed, integrated and disseminated in real time crisis characterize this response. Severe demands are placed on communications systems needed to provide accurate situational updates and analyses for crisis managers, instructions to emergency responders and relief workers, and guidance and directives to the public. Advances in information technologies can provide crisis coordination and management systems with the needed characteristics.

The potential for information technology to assist in crisis management was recently identified in a 1996 report from the National Academy of Sciences and the President's Information Technology Advisory Committee's 1999 report, "Information Technology Research: Investing in Our Future." This amendment seeks to implement their recommendation to establish of centers of excellence in computer science and engineering research applied to specific application areas of importance, including crisis management.

It authorizes $10 million per year over 5 years for the National Science Foundation to establish a crisis management research center. This will be a multidisciplinary center and include participation by organizations that have expertise and experience in applications of information technology and ties to the emergency response community. Research will include areas such as: self-configuring wireless networks and computer-based tools to assist crisis managers in making decisions in

the absence of complete information, the creation of tested networks for validating new technologies under realistic conditions, computational simulation of natural and large-scale phenomenon that can help predict the behavior of disasters which cannot be tested or performed experimentally.

Finally, the center must develop its research plan through consultation with representatives from the emergency services community that would be the users of the technologies developed by the center. I hope the Committee will accept this amendment as an means to further research that can improve crisis management and an appropriate addition to this legislation on networking and information technology.

[The Amendment to H.R. 3400 offered by Mr. Matheson follows:]

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AMENDMENT TO H.R. 3400

OFFERED BY MR. MATHESON

At the end of the bill, insert the following new section:

1 **SEC. 7. RESEARCH CENTER.**

2 (a) IN GENERAL.—(1) As part of the Program de-
3 scribed in section 101 of the High-Performance Com-
4 puting Act of 1991 (15 U.S.C. 5511), the National
5 Science Foundation, in consultation with the National
6 Aeronautics and Space Administration, the Environmental
7 Protection Agency, ~~and~~ the National Oceanic and Atmos-
8 pheric Administration, and other Federal agencies as appropriate, shall establish a center for research
9 on information technology questions related to crisis man-
10 agement.

11 (2) The award to support the establishment and oper-
12 ation of the center established under paragraph (1) shall
13 be made to an eligible nonprofit organization or consor-
14 tium thereof through a merit-reviewed, competitive proc-
15 ess in accordance with requirements specified by the Na-
16 tional Science Foundation.

17 (b) USE OF FUNDS.—The center established under
18 subsection (a) shall carry out research to advance the role
19 of information technology in crisis management. Such ac-
20 tivities may include—

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1 (1) research on—

2 (A) human-computer interface technologies
3 suitable for meeting user needs and limitations;

4 (B) network-based collaboration tools, in-
5 cluding virtual situation rooms;

6 (C) the interconnection, interoperation,
7 and reliability of networks involving diverse in-
8 formation resources;

9 (D) rapidly deployable, self-configuring
10 wireless networks;

11 (E) software to assist crisis managers in
12 making decisions in the absence of complete in-
13 formation;

14 (F) means for improving the performance
15 of distributed systems; and

16 (G) simulation of natural phenomena, such
17 as severe storms or forest fires, that could pro-
18 vide guidance to crisis managers;

19 (2) establishment and use of experimental
20 testbeds for crisis management-related research and
21 development to allow for testing and validating tech-
22 nologies under realistic conditions; and

23 (3) analyses of the design and operation of ex-
24 isting national-scale infrastructures to identify fea-

1 tures that enable such systems to be scalable and
2 functionally flexible.
3 (c) SELECTION CRITERIA.—In evaluating applica-
4 tions submitted under this section, the Director of the Na-
5 tional Science Foundation shall consider, at a minimum,
6 the extent to which the applicant will work with individ-
7 uals and organizations that would be users of the results
8 of the research conducted by the center in establishing a
9 research agenda and conducting activities under sub-
10 section (b)(2).
11 (d) DEFINITION.—In this section, the term "eligible
12 nonprofit organization" means an institution of higher
13 education as defined by section 101 of the Higher Edu-
14 cation Act of 1965 (20 U.S.C. 1001), or a nonprofit re-
15 search institute or nonprofit association with experience
16 related to applications of information technology in crisis
17 management as determined by the National Science Foun-
18 dation.
19 (e) AUTHORIZATION OF APPROPRIATIONS.—There
20 are authorized to be appropriated to the National Science
21 Foundation for the purposes of this section $10,000,000
22 for each of the fiscal years 2003, 2004, 2005, 2006, and
23 2007.

Chairman BOEHLERT. Thank you very much. It is an excellent amendment. I support it. Mr. Smith supports it. Ms. Johnson supports it. Mr. Hall supports it. We love the amendment. Is there any further discussion? If no, the vote occurs on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to. Are there any other amendments? Mr. Larson.

Mr. LARSON. Yes. Mr. Chairman, I respectfully withdraw the amendment that I have and look forward and commend both the Ranking Members in respect of Chairs of the Committee and look forward to working with the staff, thanking both the democratic and republican staff for working with us on this important issue.

Chairman BOEHLERT. Without objection, so ordered. And we will continue to work together. Thank you so very much. Are there any other amendments? Seeing no hands, hearing none, the question is on the bill, H.R. 3400, the Networking and Information Technology Research Advancement Act. All those in favor say, aye. Opposed, no. It is the opinion of the Chair the ayes have it. I will now recognize Mr. Hall for a motion.

Mr. HALL. Mr. Chairman, I move that the Committee favorably report H.R. 3400, as amended, to the House, with the recommendation that the bill, as amended, do pass. Furthermore, I move that the staff be instructed to prepare the legislative report and make the necessary and technical and conforming changes, and that the Chairman take all necessary steps to bring the bill before the House Committee for consideration.

Chairman BOEHLERT. The Chair notes the presence of a reporting quorum. The question is on the motion to report the bill favorably. Those in favor of the motion, signify by saying aye. Opposed, no. The ayes have it. The bill is favorably reported. Without objection, the motion to reconsider——

Mr. BAIRD. Mr. Chairman——

Chairman BOEHLERT [continuing]. Is laid upon the table. Yes.

Mr. BAIRD. Mr. Chairman, that is the fastest Ralph Hall has ever spoken in his life, I think.

Chairman BOEHLERT. I move that the Members have two subsequent calendar days in which to submit supplemental, minority, or additional views on the measure. Without objection, so ordered. 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 go to conference with the Senate on H.R. 3400, or a similar Senate bill. Without objection, so ordered.

[H.R. 3400 follows:]

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(Original Signature of Member)

107TH CONGRESS
1ST SESSION

H. R. 3400

IN THE HOUSE OF REPRESENTATIVES

Mr. SMITH of Michigan (for himself, Ms. EDDIE BERNICE JOHNSON of Texas, Mr. BOEHLERT, and Mr. HALL of Texas) introduced the following bill; which was referred to the Committee on

A BILL

To amend the High-Performance Computing Act of 1991 to authorize appropriations for fiscal years 2003 through 2007 for the coordinated Federal program on networking and information technology research and development, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the "Networking and Infor-
3 mation Technology Research Advancement Act".

4 **SEC. 2. FINDINGS.**

5 The Congress makes the following findings:

6 (1) Information technology is an enabling tech-
7 nology that contributes to other scientific disciplines.
8 Advances in nanotechnology, bioinformatics, intel-
9 ligent networks, wireless networking, robotics, artifi-
10 cial intelligence, and other fields depend on further
11 advances in information technology research and de-
12 velopment. In turn, advances in networking and in-
13 formation technology depend on research in a wide
14 range of fields, such as computer science and engi-
15 neering, mathematics, and many others, and in the
16 development of electronic components such as semi-
17 conductors and fiber optics that are faster, denser,
18 and cheaper. Research in fields such as materials
19 sciences, physics, chemistry, and photonics lays the
20 foundation for building these advanced components.

21 (2) Federal investment in information tech-
22 nology research and development over the past 50
23 years has led to technological innovations that have
24 transformed our society and stimulated economic
25 growth.

1 (3) A 1999 report from the President's Infor-
2 mation Technology Advisory Committee entitled "In-
3 formation Technology Research: Investing in Our
4 Future" states that—
5 (A) Federal support for research in infor-
6 mation technology is inadequate;
7 (B) Federal investment in information
8 technology research and development should
9 give a higher priority to long-term, basic re-
10 search; and
11 (C) Federal information technology re-
12 search management should develop a long-term
13 and coherent strategy for sustained attention to
14 national goals.
15 (4) Long-term, basic research is necessary to
16 create technological breakthroughs in information
17 technology. The Federal Government is uniquely po-
18 sitioned to support long-term fundamental research.
19 (5) Advances in networking and information
20 technology have permeated and dramatically im-
21 proved product design and development processes,
22 production efficiency, and distribution systems of a
23 wide range of manufacturing and other industries.
24 From the aeronautical and automotive industries to
25 farming, advances in networking and information

1 technology have allowed United States industry to
2 compete more effectively and better utilize limited
3 resources through improved quality control and
4 other means. Therefore, research in networking and
5 information technology that advances the field also
6 advances productivity and economic growth for the
7 United States economy.
8 (6) Information technology encompasses ways
9 to develop, store and retrieve, organize and use,
10 make sense of, compute, and communicate informa-
11 tion to further a number of societal goals, including
12 increasing economic growth through product devel-
13 opment and increased efficiency of services and man-
14 ufacturing, advancing scientific research, and edu-
15 cation.
16 **SEC. 3. DEFINITIONS.**
17 Section 4 of the High-Performance Computing Act
18 of 1991 (15 U.S.C. 5503) is amended—
19 (1) in paragraph (3)—
20 (A) by striking "high-performance com-
21 puting" and inserting "networking and infor-
22 mation technology"; and
23 (B) by striking "(including vector super-
24 computers and large scale parallel systems)";

1 (2) in paragraph (4), by striking "packet
2 switched";
3 (3) by striking paragraphs (5) and (6); and
4 (4) by adding at the end the following new
5 paragraphs:
6 "(5) 'Program' means the Networking and In-
7 formation Technology Research and Development
8 Program described in section 101; and
9 "(6) 'Program Component Areas' means the
10 major subject areas under which are grouped related
11 individual projects and activities carried out under
12 the Program and which are developed according to
13 section 101(a)(3)(B) and identified in the annual re-
14 port required under section 101(a)(3)(A)."

15 **SEC. 4. NETWORKING AND INFORMATION TECHNOLOGY**
16 **RESEARCH AND DEVELOPMENT PROGRAM.**

17 (a) AMENDMENTS.—Section 101 of the High-Per-
18 formance Computing Act of 1991 (15 U.S.C. 5511) is
19 amended—
20 (1) in the section heading, by striking "**NA-**
21 **TIONAL HIGH-PERFORMANCE COMPUTING**" and
22 inserting "**NETWORKING AND INFORMATION**
23 **TECHNOLOGY RESEARCH AND DEVELOPMENT**";
24 (2) by striking "high-performance computing"
25 each place it appears other than in subsection

1 (a)(1)(F) and inserting "networking and information
2 technology";
3 (3) in the subsection heading of subsection (a),
4 by striking "NATIONAL HIGH-PERFORMANCE COM-
5 PUTING" and inserting "NETWORKING AND INFOR-
6 MATION TECHNOLOGY RESEARCH AND DEVELOP-
7 MENT";
8 (4) in subsection (a)—
9 (A) by striking "National High-Perform-
10 ance Computing" and inserting "Networking
11 and Information Technology Research and De-
12 velopment";
13 (B) in paragraph (1)—
14 (i) by striking "and" at the end of
15 subparagraph (A);
16 (ii) by redesignating subparagraph
17 (B) as subparagraph (C); and
18 (iii) by inserting after subparagraph
19 (A) the following new subparagraph:
20 "(B) establish Program Component Areas that
21 implement the goals established under subparagraph
22 (A); and";
23 (C) by striking "and" at the end of para-
24 graph (2)(H);

1 (D) by striking subparagraph (I) of para-
2 graph (2) and inserting the following:
3 "(I) provide for improving the security of
4 networked information systems, including research
5 required to establish security standards and prac-
6 tices for computing systems and networks; and
7 "(J) provide for long-term basic research on
8 networking and information technology, with priority
9 given to research that helps address issues related
10 to—
11 "(i) high end computing and software;
12 "(ii) network stability, fragility, reliability,
13 security (including privacy), and scalability; and
14 "(iii) the social and economic consequences
15 of information technology.";
16 (E) in subparagraph (B) of paragraph (3),
17 by inserting ", including establishing the proc-
18 ess by which Program Component Areas are de-
19 fined" after "of the Program";
20 (F) by amending subparagraph (A) of
21 paragraph (4) to read as follows:
22 "(A) provide a detailed description of the Pro-
23 gram Component Areas, including—

1 "(i) a description of any changes in the
2 Program Component Areas from the preceding
3 report and the reasons for such changes; and
4 "(ii) a description of activities within each
5 Program Component Area that contribute to
6 the improvement of the security of networked
7 information systems;";
8 (G) in paragraph (4)(C), by striking "spe-
9 cific activities" and all that follows through
10 "the Network" and inserting "each Program
11 Component Area";
12 (H) in paragraph (4)(D), by inserting "for
13 each Program Component Area and for all ac-
14 tivities that contribute to the improvement of
15 the security of networked information systems"
16 after "budget submission applies"; and
17 (I) in paragraph (4)(F), by inserting ",
18 and the extent to which the Program incor-
19 porates the recommendations of the Advisory
20 Committee established under subsection (b)"
21 after "for the Program";
22 (5) in subsection (b)—
23 (A) by redesignating paragraphs (1)
24 through (5) as subparagraphs (A) through (E),
25 respectively;

1 (B) by inserting "(1)" after "ADVISORY
2 COMMITTEE.—";
3 (C) in paragraph (1)(C), as so redesig-
4 nated by this paragraph, by inserting ", includ-
5 ing funding levels for the Program Component
6 Areas" after "of the Program";
7 (D) in paragraph (1)(D), as so redesig-
8 nated by this paragraph, by striking "com-
9 puting" and inserting "networking and infor-
10 mation"; and
11 (E) by adding at the end the following new
12 paragraph:
13 "(2) In addition to the duties outlined in paragraph
14 (1), the advisory committee shall conduct periodic evalua-
15 tions of the funding, management, coordination, imple-
16 mentation, and activities of the Program, and shall report
17 not less frequently than once every two fiscal years to the
18 Committee on Science of the House of Representatives
19 and the Committee on Commerce, Science, and Transpor-
20 tation of the Senate on its findings and recommendations.
21 The first report shall be due within one year after the date
22 of the enactment of this paragraph."; and
23 (6) in subsection (c)(1)(A), by striking "Pro-
24 gram or" and inserting "Program Component Areas
25 or".

1 (b) REPEALS.—Sections 102 and 103 of the High-
2 Performance Computing Act of 1991 (15 U.S.C. 5512 and
3 5513) are repealed.
4 (c) CONFORMING AMENDMENT.—The heading of title
5 I of the High-Performance Computing Act of 1991 is
6 amended to read as follows:

7 **"TITLE I—NETWORKING AND IN-**
8 **FORMATION TECHNOLOGY**
9 **RESEARCH AND DEVELOP-**
10 **MENT PROGRAM".**

11 **SEC. 5. AGENCY ACTIVITIES.**

12 (a) NATIONAL SCIENCE FOUNDATION ACTIVITIES.—
13 Section 201 of the High-Performance Computing Act of
14 1991 (15 U.S.C. 5521) is amended to read as follows:

15 **"SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.**

16 "(a) GENERAL RESPONSIBILITIES.—As part of the
17 Program described in title I, the National Science Foun-
18 dation shall—
19 "(1) generate fundamental scientific and tech-
20 nical knowledge with the potential of advancing net-
21 working and information technology and its applica-
22 tions; and
23 "(2) provide computing and networking infra-
24 structure support for all science and engineering dis-
25 ciplines, and support basic research and human re-

1 source development in all aspects of networking and
2 information technology and advanced high speed
3 computer networking.

4 "(b) AUTHORIZATION OF APPROPRIATIONS.—From
5 sums otherwise authorized to be appropriated, there are
6 authorized to be appropriated to the National Science
7 Foundation for the purposes of the Program
8 $704,000,000 for fiscal year 2003; $774,000,000 for fis-
9 cal year 2004, $851,000,000 for fiscal year 2005,
10 $937,000,000 for fiscal year 2006, and $1,030,000,000
11 for fiscal year 2007.".

12 (b) NATIONAL AERONAUTICS AND SPACE ADMINIS-
13 TRATION ACTIVITIES.—Section 202 of the High-Perform-
14 ance Computing Act of 1991 (15 U.S.C. 5522) is amended
15 to read as follows:

16 **"SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINIS-**
17 **TRATION ACTIVITIES.**

18 "(a) GENERAL RESPONSIBILITIES.—As part of the
19 Program described in title I, the National Aeronautics and
20 Space Administration shall conduct basic and applied re-
21 search in networking and information technology, with
22 emphasis on—

23 "(1) computational fluid, thermal, and aero-
24 dynamics;

1 "(2) scientific data dissemination and tools to
2 enable data to be fully analyzed and combined from
3 multiple sources and sensors;
4 "(3) remote exploration and experimentation;
5 and
6 "(4) tools for collaboration in systems design,
7 analysis, and testing.
8 "(b) AUTHORIZATION OF APPROPRIATIONS.—From
9 sums otherwise authorized to be appropriated, there are
10 authorized to be appropriated to the National Aeronautics
11 and Space Administration for the purposes of the Pro-
12 gram $199,000,000 for fiscal year 2003, $219,000,000
13 for fiscal year 2004, $240,000,000 for fiscal year 2005,
14 $265,000,000 for fiscal year 2006, and $292,000,000 for
15 fiscal year 2007.".
16 (c) DEPARTMENT OF ENERGY ACTIVITIES.—Section
17 203 of the High-Performance Computing Act of 1991 (15
18 U.S.C. 5523) is amended—
19 (1) in subsection (a), by striking all after "the
20 Secretary of Energy shall" and inserting "conduct
21 basic and applied research in networking and infor-
22 mation technology, with emphasis on—
23 "(1) supporting fundamental research in the
24 physical sciences and engineering, and energy appli-
25 cations;

1 "(2) providing supercomputer access and ad-
2 vanced communication capabilities to scientific re-
3 searchers; and
4 "(3) developing tools for distributed scientific
5 collaboration."; and
6 (2) in subsection (e)—
7 (A) by striking "(1)";
8 (B) by striking "$93,000,000" and all that
9 follows through "fiscal year 1996" and insert-
10 ing "$193,000,000 for fiscal year 2003,
11 $212,000,000 for fiscal year 2004,
12 $234,000,000 for fiscal year 2005,
13 $258,000,000 for fiscal year 2006, and
14 $283,000,000 for fiscal year 2007"; and
15 (C) by striking paragraph (2).
16 (d) DEPARTMENT OF COMMERCE ACTIVITIES.—Sec-
17 tion 204 of the High-Performance Computing Act of 1991
18 (15 U.S.C. 5524) is amended—
19 (1) by striking paragraphs (1) and (2) of sub-
20 section (a) and inserting the following:
21 "(1) the National Institute of Standards and
22 Technology shall—
23 "(A) conduct basic and applied measure-
24 ment research needed to support various com-
25 puting systems and networks;

1 "(B) develop and propose voluntary stand-
2 ards and guidelines, and develop measurement
3 techniques and test methods, for the interoper-
4 ability of computing systems in networks and
5 for common user interfaces to systems;
6 "(C) be responsible for developing bench-
7 mark tests and standards for computing sys-
8 tems and software; and
9 "(D) encourage the development, deploy-
10 ment, and implementation of voluntary guide-
11 lines and standards for—
12 "(i) robust security technology; and
13 "(ii) best practices and interoper-
14 ability relating to the security of commer-
15 cial and government computer networks;
16 and
17 "(2) the National Oceanic and Atmospheric Ad-
18 ministration shall conduct basic and applied research
19 in networking and information technology, with em-
20 phasis on—
21 "(A) improving weather forecasting and
22 climate prediction;
23 "(B) collection and dissemination of envi-
24 ronmental information; and

1 "(C) development of more accurate models
2 of the atmosphere-ocean system."; and
3 (2) by striking subsections (c) and (d) and in-
4 serting the following:
5 "(c) AUTHORIZATION OF APPROPRIATIONS.—From
6 sums otherwise authorized to be appropriated, there are
7 authorized to be appropriated—
8 "(1) to the National Institute of Standards and
9 Technology for the purposes of the Program
10 $24,000,000 for fiscal year 2003, $27,000,000 for
11 fiscal year 2004, $29,000,000 for fiscal year 2005,
12 $32,000,000 for fiscal year 2006, and $35,000,000
13 for fiscal year 2007; and
14 "(2) to the National Oceanic and Atmospheric
15 Administration for the purposes of the Program
16 $22,000,000 for fiscal year 2003, $24,000,000 for
17 fiscal year 2004, $26,000,000 for fiscal year 2005,
18 $29,000,000 for fiscal year 2006, and $32,000,000
19 for fiscal year 2007.".
20 (e) ENVIRONMENTAL PROTECTION AGENCY ACTIVI-
21 TIES—Section 205 of the High-Performance Computing
22 Act of 1991 (15 U.S.C. 5525) is amended to read as fol-
23 lows:

1 **"SEC. 205. ENVIRONMENTAL PROTECTION AGENCY ACTIVI-**
2 **TIES.**
3 "(a) GENERAL RESPONSIBILITIES.—As part of the
4 Program described in title I, the Environmental Protec-
5 tion Agency shall conduct basic and applied research di-
6 rected toward the advancement and dissemination of com-
7 putational techniques and software tools with an emphasis
8 on modeling of—
9 "(1) ecosystems;
10 "(2) human effects
11 "(3) atmospheric dynamics and chemistry; and
12 "(4) pollutant transport.
13 "(b) AUTHORIZATION OF APPROPRIATIONS.—From
14 sums otherwise authorized to be appropriated, there are
15 authorized to be appropriated to the Environmental Pro-
16 tection Agency for the purposes of the Program
17 $4,000,000 for fiscal year 2003, $4,400,000 for fiscal year
18 2004, $4,800,000 for fiscal year 2005, $5,300,000 for fis-
19 cal year 2006, and $5,800,000 for fiscal year 2007."
20 **SEC. 6. REPORTS.**
21 (a) INTERNATIONAL BENCHMARKING STUDIES.—
22 (1) STUDY.—Not later than 3 months after the
23 date of the enactment of this Act, the Director of
24 the National Science Foundation shall enter into an
25 arrangement with the National Research Council of
26 the National Academy of Sciences to conduct an as-

1 sessment of the state of research on networking and
2 information technology in the United States. The
3 study shall use the methodology and approach devel-
4 oped by the Committee on Science, Engineering, and
5 Public Policy of the National Academies and docu-
6 mented in its 2000 report entitled "Experiments in
7 International Benchmarking of U.S. Research
8 Fields".

9 (2) REPORT.—Not later than 2 years after the
10 date of the enactment of this Act, the Director of
11 the National Science Foundation shall transmit to
12 the Committee on Science of the House of Rep-
13 resentatives, the Committee on Commerce, Science,
14 and Transportation of the Senate, the Director of
15 the Office of Science and Technology Policy, and the
16 advisory committee established under section 101(b)
17 of the High-Performance Computing Act of 1991
18 (15 U.S.C. 5511(b)) (in this section referred to as
19 the "advisory committee") a report setting forth the
20 findings of the study conducted under paragraph
21 (1).

22 (3) ADVISORY COMMITTEE RECOMMENDA-
23 TIONS.—Not later than 3 months after receipt of the
24 report transmitted under paragraph (2), the advi-
25 sory committee shall provide recommendations to the

1 Director of the Office of Science and Technology
2 Policy on appropriate changes to the Program estab-
3 lished by section 101(a) of the High-Performance
4 Computing Act of 1991 (15 U.S.C. 5511(a)) to ad-
5 dress issues raised by the study conducted under
6 paragraph (1).
7 (4) ANNUAL REPORT.—The first annual report
8 required by section 101(a)(3)(A) of the High-Per-
9 formance Computing Act of 1991 (15 U.S.C.
10 5511(a)(3)(A)) that is due after the expiration of 9
11 months after receipt by the Director of the Office of
12 Science and Technology Policy of the report trans-
13 mitted under paragraph (2) shall include a descrip-
14 tion of activities under the Program established by
15 section 101(a) of the High-Performance Computing
16 Act of 1991 (15 U.S.C. 5511(a)) that address issues
17 raised by the study conducted under paragraph (1),
18 including strategies for—
19 (A) raising or maintaining the position of
20 the United States relative to other nations in
21 the research priority areas addressed by the re-
22 port transmitted under paragraph (2); and
23 (B) promoting international research co-
24 operation to leverage international niches of ex-

1 cellence identified by the report transmitted
2 under paragraph (2).
3 (5) AUTHORIZATION OF APPROPRIATIONS.—
4 There are authorized to be appropriated to the Na-
5 tional Science Foundation for carrying out the study
6 under this subsection $850,000.
7 (b) INFORMATION TECHNOLOGY WORKFORCE
8 STUDY.—
9 (1) DATA COLLECTION.—The Director of the
10 National Science Foundation shall on a continuing
11 basis collect data on the information technology
12 workforce, including information on—
13 (A) the size and nature of the information
14 technology workforce by occupation category,
15 level of education and training, personnel demo-
16 graphics, and industry characteristics;
17 (B) the long-term employability of infor-
18 mation technology professionals;
19 (C) various forms of employee compensa-
20 tion, including salaries, bonuses, and stock op-
21 tions;
22 (D) the role of foreign workers in the in-
23 formation technology workforce;
24 (E) the previous and subsequent immigra-
25 tion and employment status of workers who are

1 aliens having the status of a nonimmigrant de-
2 scribed in section 101(a)(15)(H)(i)(b) of the
3 Immigration and Nationality Act (8 U.S.C.
4 1101(a)(15)(H)(i)(b)); and
5 (F) other relevant issues.
6 (2) ANALYSIS.—Not later than 3 months after
7 the date of the enactment of this Act, the Director
8 of the National Science Foundation shall enter into
9 an arrangement with the National Research Council
10 of the National Academy of Sciences to analyze the
11 data collected under paragraph (1) and publish a bi-
12 ennial update to the "Building a Workforce in the
13 Information Economy" report, issued in October of
14 2000.
15 (3) TRANSMITTAL TO CONGRESS.—Biennial up-
16 dates required under paragraph (2) shall be trans-
17 mitted to the Committee on Science of the House of
18 Representatives and the Committee on Commerce,
19 Science, and Transportation of the Senate, and to
20 the National Coordination Office for Information
21 Technology Research and Development, not later
22 than 1 year after the date of the enactment of this
23 Act and biennially thereafter.

[The information referred to follows:]

SECTION-BY-SECTION SUMMARY

THE NETWORKING AND INFORMATION TECHNOLOGY RESEARCH ADVANCEMENT ACT

Introduced by Mr. Smith (MI), Ms. Eddie Bernice Johnson (TX), Mr. Boehlert, and Mr. Hall

SEC. 1. SHORT TITLE.

"Networking and Information Technology Research Advancement Act"

SEC. 2. FINDINGS.

Discusses the key role information technology research and development play in enabling scientific research in a diverse array of scientific and engineering disciplines and, in turn, the dependence of information technology research and development on other fields and technologies; the critical role Federal spending for long term, basic research on information technology has played in stimulating the economy and transforming society, and the importance of maintaining that role; the current inadequacies in Federal support for such research and the unique role the Federal Government has in supporting long-term basic research; the overall importance of information technology research and development to specific industries; and the variety of uses of information technology.

SEC. 3. DEFINITIONS.

Replaces the term "high-performance computing" with "networking and information technology," and re-defines the federal interagency program focused on information technology research and development as the "Networking and Information Technology Research and Development Program" (referred to herein as 'the Program'). Adds a definition to the HPC Act for "Program Component Areas," which are the major subject areas under which projects and activities carried out by the interagency research program are grouped.

SEC. 4. NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM.

Amends Section 101 of the HPC Act, which describes the organization and responsibilities of the interagency research program originally referred to as the National High-Performance Computing Program (and re-named the Networking and Information Technology Research and Development Program in this bill), to include among the Program's research priorities the security of networked information systems, research on high-end computers (so-called 'supercomputers'), software, networks, and the social and economic impacts of Information Technology. Also amends the HPC Act to include the requirement that the Program establish Program Component Areas in line with the overall goals of the program.

Leaves substantively unchanged provisions of the HPC Act requiring 1) the Office of Science and Technology Policy (OSTP) to provide an annual report to Congress, along with the annual budget request, describing the implementation of the program; 2) the OSTP Director to consult with academic, state, industry, and other appropriate groups; 3) Federal agencies to report on their Information Technology research and development activities as part of the yearly budget submission; and, 4) the establishment of a presidential advisory committee for information technology (commonly known as PITAC).

Requires OSTP to include in its report to Congress detailed information about Program Component Areas and PITAC to report to Congress not less than every two years on its findings and recommendations relating to the Program.

Repeals Sec. 102 of the HPC Act, the "National Research and Education Network", which described a network that was to provide for the linkage of research institutions and educational institutions, government, and industry—and which has since been supplanted by the Internet. Also repeals Sec. 103 of the HPC Act, "Next Generation Internet," as this program is also no longer in existence.

Replaces the term "high-performance computing" with "networking and information technology" throughout the section. Renames Title I of the HPC Act "Networking and Information Technology Research and Development Program".

SEC. 5. AGENCY ACTIVITIES.

Amends the HPC Act of 1991 to authorize funds for, and define the specific activities of, certain agencies within the Program. All authorizations are from sums otherwise authorized to be appropriated.

- The National Science Foundation (NSF)—a total of $4.296 billion over fiscal years 2003–2007;
- Department of Energy Office of Science (DOE)—a total of $1.18 billion over fiscal years 2003–2007;
- National Aeronautics and Space Administration (NASA)—a total of $1.215 billion over fiscal years 2003–2007;
- National Institute for Standards and Technology (NIST)—a total of $147 million over fiscal years 2003–2007;
- National Oceanic and Atmospheric Administration (NOAA)—a total of $133 million over fiscal years 2003–2007; and
- Environmental Protection Agency (EPA)—$24.3 million over fiscal years 2003–2007.

SEC. 6. REPORTS.

Directs the National Research Council (NRC) of the National Academy of Sciences to conduct an assessment of the state of research in computer and information science and engineering in the United States, and to report to Congress and the Office of Science and Technology Policy on the assessment's findings. In addition, the bill tasks the presidential advisory committee for information technology to review the NRC's findings and make recommendations to the OSTP Director for addressing them. Finally, the bill requires that, in the OSTP Director's annual report to Congress on the state of the Program, the Director describe how the Program is working to address the issues raised by the NRC's initial study.

The bill also directs the NSF to collect data on the information technology workforce and tasks the NRC with analyzing this data and publishing an annual update to the NRC's "Building a Workforce in the Information Economy" report.

[The information referred to follows:]

COMMITTEE ON SCIENCE

FULL COMMITTEE MARKUP

December 6, 2001

AMENDMENT ROSTER

H.R. 3400, Networking and Information Technology Research Advancement Act
--Motion to adopt the bill, as amended: agreed to by a voice vote.
--Motion to report the bill, as amended: agreed to by a voice vote.

No.	Sponsor	Description	Results
1.	Mr. Matheson	Amendment would add a new section to the bill to establish a Crisis Management Enabling Technology Center.	--Adopted by a voice vote.
2.	Mr. Larson	Amendment would add a new section to the bill to authorize funding for Broadband Demonstration Projects.	--Withdrawn.

1

AMENDMENT TO H.R. 3400

OFFERED BY MR. MATHESON

At the end of the bill, insert the following new section:

1 **SEC. 7. RESEARCH CENTER.**

2 (a) IN GENERAL.—(1) As part of the Program de-
3 scribed in section 101 of the High-Performance Com-
4 puting Act of 1991 (15 U.S.C. 5511), the National
5 Science Foundation, in consultation with the National
6 Aeronautics and Space Administration, the Environmental
7 Protection Agency, ~~and~~ the National Oceanic and Atmos-
8 pheric Administration, and other Federal agencies as appropriate, shall establish a center for research
9 on information technology questions related to crisis man-
10 agement.

11 (2) The award to support the establishment and oper-
12 ation of the center established under paragraph (1) shall
13 be made to an eligible nonprofit organization or consor-
14 tium thereof through a merit-reviewed, competitive proc-
15 ess in accordance with requirements specified by the Na-
16 tional Science Foundation.

17 (b) USE OF FUNDS.—The center established under
18 subsection (a) shall carry out research to advance the role
19 of information technology in crisis management. Such ac-
20 tivities may include—

1 (1) research on—

2 (A) human-computer interface technologies

3 suitable for meeting user needs and limitations;

4 (B) network-based collaboration tools, in-

5 cluding virtual situation rooms;

6 (C) the interconnection, interoperation,

7 and reliability of networks involving diverse in-

8 formation resources;

9 (D) rapidly deployable, self-configuring

10 wireless networks;

11 (E) software to assist crisis managers in

12 making decisions in the absence of complete in-

13 formation;

14 (F) means for improving the performance

15 of distributed systems; and

16 (G) simulation of natural phenomena, such

17 as severe storms or forest fires, that could pro-

18 vide guidance to crisis managers;

19 (2) establishment and use of experimental

20 testbeds for crisis management-related research and

21 development to allow for testing and validating tech-

22 nologies under realistic conditions; and

23 (3) analyses of the design and operation of ex-

24 isting national-scale infrastructures to identify fea-

1 tures that enable such systems to be scalable and
2 functionally flexible.
3 (c) SELECTION CRITERIA.—In evaluating applica-
4 tions submitted under this section, the Director of the Na-
5 tional Science Foundation shall consider, at a minimum,
6 the extent to which the applicant will work with individ-
7 uals and organizations that would be users of the results
8 of the research conducted by the center in establishing a
9 research agenda and conducting activities under sub-
10 section (b)(2).
11 (d) DEFINITION.—In this section, the term "eligible
12 nonprofit organization" means an institution of higher
13 education as defined by section 101 of the Higher Edu-
14 cation Act of 1965 (20 U.S.C. 1001), or a nonprofit re-
15 search institute or nonprofit association with experience
16 related to applications of information technology in crisis
17 management as determined by the National Science Foun-
18 dation.
19 (e) AUTHORIZATION OF APPROPRIATIONS.—There
20 are authorized to be appropriated to the National Science
21 Foundation for the purposes of this section $10,000,000
22 for each of the fiscal years 2003, 2004, 2005, 2006, and
23 2007.

2

AMENDMENT TO H.R. 3400

OFFERED BY MR. LARSON OF CONNECTICUT

At the end of the bill, insert the following new section:

1 **SEC. 7. BROADBAND DEMONSTRATION PROJECTS.**

2 (a) PROJECTS AUTHORIZED.—As part of the Net-
3 working and Information Technology Research and Devel-
4 opment Program authorized under section 101(a) of the
5 High-Performance Computing Act of 1991 (15 U.S.C.
6 5511(a)), the National Science Foundation, in cooperation
7 with other agencies participating in the Program, is au-
8 thorized to carry out research projects to develop novel
9 uses and to evaluate the effectiveness of broadband net-
10 work connections in science, mathematics, and technology
11 education in elementary and secondary schools. Agencies
12 participating in the Program are authorized to provide
13 such broadband Internet connections to schools as are nec-
14 essary to carry out the research projects.

15 (b) ASSESSMENTS.—The National Science Founda-
16 tion shall identify metrics to assess the educational effec-
17 tiveness of the projects, put in place procedures to make
18 such an assessment for each project supported, and docu-
19 ment and disseminate the findings of the assessments. De-
20 scriptions of the projects and the findings of the assess-

1 ments of projects shall be included in the report required
2 under section 101(a)(3)(A) of the High-Performance
3 Computing Act of 1991 (15 U.S.C. 5511(a)(3)(A)).
4 (c) AUTHORIZATION OF APPROPRIATIONS.—There
5 are authorized to be appropriated to the National Science
6 Foundation for the purposes of this section $10,000,000
7 for each of the fiscal years 2003, 2004, and 2005.

Chairman BOEHLERT. This Committee markup is concluded.
[Whereupon, at 11:29 a.m., the Committee was adjourned.]

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