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Part 1

NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT

NOVEMBER 16, 1999.—Ordered to be printed

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

R E P O R T

together with

ADDITIONAL VIEW

[To accompany H.R. 2086]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, to whom was referred the bill (H.R. 2086) to authorize funding for networking and information technology research and development for fiscal years 2000 through 2004, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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I. AMENDMENT

The amendment is as follows:

Strike out all after the enacting clause and insert in lieu thereof the following:

SECTION 1. SHORT TITLE.

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

SEC. 2. FINDINGS.

The Congress makes the following findings:

(1) Information technology will continue to change the way Americans live, learn, and work. The information revolution will improve the workplace and the quality and accessibility of health care and education and make government more responsible and accessible.

(2) Information technology is an imperative enabling technology that contributes to scientific disciplines. Major advances in biomedical research, public safety, engineering, and other critical areas depend on further advances in computing and communications.

(3) The United States is the undisputed global leader in information technology.

(4) Information technology is recognized as a catalyst for economic growth and prosperity.

(5) Information technology represents one of the fastest growing sectors of the United States economy, with electronic commerce alone projected to become a trillion-dollar business by 2005.

(6) Businesses producing computers, semiconductors, software, and communications equipment account for one-third of the total growth in the United States economy since 1992.

(7) According to the United States Census Bureau, between 1993 and 1997, the information technology sector grew an average of 12.3 percent per year.

(8) Fundamental research in information technology has enabled the information revolution.

(9) Fundamental research in information technology has contributed to the creation of new industries and new, high-paying jobs.

(10) Our Nation's well-being will depend on the understanding, arising from fundamental research, of the social and economic benefits and problems arising from the increasing pace of information technology transformations.

(11) Scientific and engineering research and the availability of a skilled workforce are critical to continued economic growth driven by information technology.

(12) In 1997, private industry provided most of the funding for research and development in the information technology sector. The information technology sector now receives, in absolute terms, one-third of all corporate spending on research and development in the United States economy.

(13) The private sector tends to focus its spending on short-term, applied research.

(14) The Federal Government is uniquely positioned to support long-term fundamental research.

(15) Federal applied research in information technology has grown at almost twice the rate of Federal basic research since 1986.

(16) Federal science and engineering programs must increase their emphasis on long-term, high-risk research.

(17) Current Federal programs and support for fundamental research in information technology is inadequate if we are to maintain the Nation's global leadership in information technology.

SEC. 3. AUTHORIZATION OF APPROPRIATIONS.

(a) NATIONAL SCIENCE FOUNDATION.—Section 201(b) of the High-Performance Computing Act of 1991 (15 U.S.C. 5521(b)) is amended—

(1) by striking "From sums otherwise authorized to be appropriated, there" and inserting "There";

(2) by striking "1995; and" and inserting "1995;"; and

(3) by striking the period at the end and inserting "; $439,000,000 for fiscal year 2000; $468,500,000 for fiscal year 2001; $493,200,000 for fiscal year 2002; $544,100,000 for fiscal year 2003; and $571,300,000 for fiscal year 2004. Amounts authorized under this subsection shall be the total amounts authorized to the National Science Foundation for a fiscal year for the Program, and shall not be in addition to amounts previously authorized by law for the purposes of the Program.".

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

(1) by striking "From sums otherwise authorized to be appropriated, there" and inserting "There";

(2) by striking "1995; and" and inserting "1995;"; and

(3) by striking the period at the end and inserting "; $164,400,000 for fiscal year 2000; $201,000,000 for fiscal year 2001; $208,000,000 for fiscal year 2002; $224,000,000 for fiscal year 2003; and $231,000,000 for fiscal year 2004.".

(c) DEPARTMENT OF ENERGY.—Section 203(e)(1) of the High-Performance Computing Act of 1991 (15 U.S.C. 5523(e)(1)) is amended—

(1) by striking "1995; and" and inserting "1995;"; and

(2) by striking the period at the end and inserting "; $106,600,000 for fiscal year 2000; $103,500,000 for fiscal year 2001; $107,000,000 for fiscal year 2002; $125,700,000 for fiscal year 2003; and $129,400,000 for fiscal year 2004.".

(d) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.—(1) Section 204(d)(1) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(d)(1)) is amended—

(A) by striking "1995; and" and inserting "1995;"; and

(B) by striking "1996; and" and inserting "1996; $9,000,000 for fiscal year 2000; $9,500,000 for fiscal year 2001; $10,500,000 for fiscal year 2002; $16,000,000 for fiscal year 2003; and $17,000,000 for fiscal year 2004; and".

(2) Section 204(d) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(d)) is amended by striking "From sums otherwise authorized to be appropriated, there" and inserting "There".

(e) NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.—Section 204(d)(2) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(d)(2)) is amended—

(1) by striking "1995; and" and inserting "1995;"; and

(2) by striking the period at the end and inserting "; $13,500,000 for fiscal year 2000; $13,900,000 for fiscal year 2001; $14,300,000 for fiscal year 2002; $14,800,000 for fiscal year 2003; and $15,200,000 for fiscal year 2004.".

(f) ENVIRONMENTAL PROTECTION AGENCY.—Section 205(b) of the High-Performance Computing Act of 1991 (15 U.S.C. 5525(b)) is amended—

(1) by striking "From sums otherwise authorized to be appropriated, there" and inserting "There";

(2) by striking "1995; and" and inserting "1995;"; and

(3) by striking the period at the end and inserting "; $4,200,000 for fiscal year 2000; $4,300,000 for fiscal year 2001; $4,500,000 for fiscal year 2002; $4,600,000 for fiscal year 2003; and $4,700,000 for fiscal year 2004.".

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

(a) NATIONAL SCIENCE FOUNDATION.—Section 201 of the High-Performance Computing Act of 1991 (15 U.S.C. 5521) is amended by adding at the end the following new subsections:

"(c) NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT.—(1) Of the amounts authorized under subsection (b), $310,000,000 for fiscal year 2000; $333,000,000 for fiscal year 2001; $352,000,000 for fiscal year 2002; $390,000,000 for fiscal year 2003; and $415,000,000 for fiscal year 2004 shall be available for grants for long-term basic research on networking and information technology, with priority given to research that helps address issues related to high end computing and software; network stability, fragility, reliability, security (including privacy), and scalability; and the social and economic consequences of information technology.

"(2) In each of the fiscal years 2000 and 2001, the National Science Foundation shall award under this subsection up to 20 large grants of up to $1,000,000 each, and in each of the fiscal years 2002, 2003, and 2004, the National Science Foundation shall award under this subsection up to 30 large grants of up to $1,000,000 each.

"(3)(A) Of the amounts described in paragraph (1), $40,000,000 for fiscal year 2000; $40,000,000 for fiscal year 2001; $45,000,000 for fiscal year 2002; $45,000,000 for fiscal year 2003; and $50,000,000 for fiscal year 2004 shall be available for grants of up to $5,000,000 each for Information Technology Research Centers.

"(B) For purposes of this paragraph, the term 'Information Technology Research Centers' means groups of 6 or more researchers collaborating across scientific and engineering disciplines on large-scale long-term research projects which will significantly advance the science supporting the development of information technology or the use of information technology in addressing scientific issues of national importance.

"(d) MAJOR RESEARCH EQUIPMENT.—(1) In addition to the amounts authorized under subsection (b), there are authorized to be appropriated to the National Science Foundation $70,000,000 for fiscal year 2000, $70,000,000 for fiscal year 2001, $80,000,000 for fiscal year 2002, $80,000,000 for fiscal year 2003, and $85,000,000 for fiscal year 2004 for grants for the development of major research equipment to establish terascale computing capabilities at 1 or more sites and to promote diverse computing architectures. Awards made under this subsection shall provide for support for the operating expenses of facilities established to provide the terascale computing capabilities, with funding for such operating expenses derived from amounts available under subsection (b).

"(2) Grants awarded under this subsection shall be awarded through an open, nationwide, peer-reviewed competition. Awardees may include consortia consisting of members from some or all of the following types of institutions:

"(A) Academic supercomputer centers.

"(B) State-supported supercomputer centers.

"(C) Supercomputer centers that are supported as part of federally funded research and development centers.

Notwithstanding any other provision of law, regulation, or agency policy, a federally funded research and development center may apply for a grant under this subsection, and may compete on an equal basis with any other applicant for the awarding of such a grant.

"(3) As a condition of receiving a grant under this subsection, an awardee must agree—

"(A) to connect to the National Science Foundation's Partnership for Advanced Computational Infrastructure network;

"(B) to the maximum extent practicable, to coordinate with other federally funded large-scale computing and simulation efforts; and

"(C) to provide open access to all grant recipients under this subsection or subsection (c).

"(e) INFORMATION TECHNOLOGY EDUCATION AND TRAINING GRANTS.—

"(1) INFORMATION TECHNOLOGY GRANTS.—The National Science Foundation shall provide grants under the Scientific and Advanced Technology Act of 1992 for the purposes of section 3(a) and (b) of that Act, except that the activities supported pursuant to this paragraph shall be limited to improving education in fields related to information technology. The Foundation shall encourage institutions with a substantial percentage of student enrollments from groups underrepresented in information technology industries to participate in the competition for grants provided under this paragraph.

"(2) INTERNSHIP GRANTS.—The National Science Foundation shall provide—

"(A) grants to institutions of higher education to establish scientific internship programs in information technology research at private sector companies; and

"(B) supplementary awards to institutions funded under the Louis Stokes Alliances for Minority Participation program for internships in information technology research at private sector companies.

"(3) MATCHING FUNDS.—Awards under paragraph (2) shall be made on the condition that at least an equal amount of funding for the internship shall be provided by the private sector company at which the internship will take place.

"(4) DEFINITION.—For purposes of this subsection, the term 'institution of higher education' has the meaning given that term in section 1201(a) of the Higher Education Act of 1965 (20 U.S.C. 1141(a)).

"(5) AVAILABILITY OF FUNDS.—Of the amounts described in subsection (c)(1), $10,000,000 for fiscal year 2000, $15,000,000 for fiscal year 2001, $20,000,000 for fiscal year 2002, $25,000,000 for fiscal year 2003, and $25,000,000 for fiscal year 2004 shall be available for carrying out this subsection.

"(f) EDUCATIONAL TECHNOLOGY RESEARCH.—

"(1) RESEARCH PROGRAM.—As part of its responsibilities under subsection (a)(1), the National Science Foundation shall establish a research program to develop, demonstrate, assess, and disseminate effective applications of information and computer technologies for elementary and secondary education. Such program shall—

"(A) support research projects, including collaborative projects involving academic researchers and elementary and secondary schools, to develop innovative educational materials, including software, and pedagogical approaches based on applications of information and computer technology;

"(B) support empirical studies to determine the educational effectiveness and the cost effectiveness of specific, promising educational approaches, techniques, and materials that are based on applications of information and computer technologies; and

"(C) include provision for the widespread dissemination of the results of the studies carried out under subparagraphs (A) and (B), including maintenance of electronic libraries of the best educational materials identified accessible through the Internet.

"(2) REPLICATION.—The research projects and empirical studies carried out under paragraph (1)(A) and (B) shall encompass a wide variety of educational settings in order to identify approaches, techniques, and materials that have a high potential for being successfully replicated throughout the United States.

"(3) AVAILABILITY OF FUNDS.—Of the amounts authorized under subsection (b), $10,000,000 for fiscal year 2000, $10,500,000 for fiscal year 2001, $11,000,000 for fiscal year 2002, $12,000,000 for fiscal year 2003, and $12,500,000 for fiscal year 2004 shall be available for the purposes of this subsection.

"(g) PEER REVIEW.—All grants made under this section shall be made only after being subject to peer review by panels or groups having private sector representation.".

(b) OTHER PROGRAM AGENCIES.—

(1) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.—Section 202(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5522(a)) is amended by inserting ", and may participate in or support research described in section 201(c)(1)" after "and experimentation".

(2) DEPARTMENT OF ENERGY.—Section 203(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5523(a)) is amended by striking the period at the end and inserting a comma, and by adding after paragraph (4) the following: "and may participate in or support research described in section 201(c)(1).".

(3) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.—Section 204(a)(1) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(a)(1)) is amended by striking "; and" at the end of subparagraph (C) and inserting a comma, and by adding after subparagraph (C) the following:

"and may participate in or support research described in section 201(c)(1); and".

(4) NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.—Section 204(a)(2) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(a)(2)) is amended by inserting ", and may participate in or support research described in section 201(c)(1)" after "agency missions".

(5) ENVIRONMENTAL PROTECTION AGENCY.—Section 205(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5525(a)) is amended by inserting ", and may participate in or support research described in section 201(c)(1)" after "dynamics models".

SEC. 5. NEXT GENERATION INTERNET.

Section 103 of the High-Performance Computing Act of 1991 (15 U.S.C. 5513) is amended—

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

"(c) STUDY OF INTERNET PRIVACY.—

"(1) STUDY.—Not later than 90 days after the date of enactment of the Networking and Information Technology Research and Development Act, the National Science Foundation may enter into an arrangement with the National Research Council of the National Academy of Sciences for that Council to conduct a study of privacy on the Internet.

"(2) SUBJECTS.—The study shall address—

"(A) research needed to develop technology for protection of privacy on the Internet;

"(B) current public and private plans for the deployment of privacy technology, standards, and policies;

"(C) policies, laws, and practices under consideration or formally adopted in other countries and jurisdictions to protect privacy on the Internet;

"(D) Federal legislation and other regulatory steps needed to ensure the development of privacy technology, standards, and policies; and

"(E) other matters that the National Research Council determines to be relevant to Internet privacy.

"(3) TRANSMITTAL TO CONGRESS.—The National Science Foundation shall transmit to the Congress within 21 months of the date of enactment of the Networking and Information Technology Research and Development Act a report setting forth the findings, conclusions, and recommendations of the National Research Council.

"(4) FEDERAL AGENCY COOPERATION.—Federal agencies shall cooperate fully with the National Research Council in its activities in carrying out the study under this subsection.

"(5) AVAILABILITY OF FUNDS.—Of the amounts described in subsection (d)(2), $900,000 shall be available for the study conducted under this subsection."; and

(2) in subsection (d)—

(A) in paragraph (1)—

(i) by striking "1999 and" and inserting "1999,"; and

(ii) by inserting ", $15,000,000 for fiscal year 2001, and $15,000,000 for fiscal year 2002" after "fiscal year 2000";

(B) in paragraph (2), by inserting ", and $25,000,000 for fiscal year 2001 and $25,000,000 for fiscal year 2002" after "Act of 1998";

(C) in paragraph (4)—

(i) by striking "1999 and" and inserting "1999,"; and

(ii) by inserting ", $10,000,000 for fiscal year 2001, and $10,000,000 for fiscal year 2002" after "fiscal year 2000"; and

(D) in paragraph (5)—

(i) by striking "1999 and" and inserting "1999,"; and

(ii) by inserting ", $5,500,000 for fiscal year 2001, and $5,500,000 for fiscal year 2002" after "fiscal year 2000".

SEC. 6. REPORTING REQUIREMENTS.

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

(1) in subsection (b)—

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

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

(C) 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, implementation, and activities of the Program, the Next Generation Internet program, and the Networking and Information Technology Research and Development program, and shall report not less frequently than once every 2 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 1 year after the date of the enactment of the Networking and Information Technology Research and Development Act."; and

(2) in subsection (c)(1)(A) and (2), by inserting ", including the Next Generation Internet program and the Networking and Information Technology Research and Development program" after "Program" each place it appears.

SEC. 7. EVALUATION OF CAPABILITIES OF FOREIGN ENCRYPTION.

(a) STUDY.—The National Science Foundation shall undertake a study comparing the availability of encryption technologies in foreign countries to the encryption technologies subject to export restrictions in the United States.

(b) REPORT TO CONGRESS.—Not later than 6 months after the date of enactment of this Act, the National Science Foundation shall transmit to the Congress a report on the results of the study undertaken under subsection (a).

SEC. 8. RESEARCH CREDIT MADE PERMANENT.

(a) IN GENERAL.—Section 41 of the Internal Revenue Code of 1986 (relating to credit for increasing research activities) is amended by striking subsection (h).

(b) CONFORMING AMENDMENT.—Paragraph (1) of section 45C(b) of such Code is amended by striking subparagraph (D).

(c) EFFECTIVE DATE.—The amendments made by this section shall apply to amounts paid or incurred after June 30, 1999.

SEC. 9. STUDY OF APPROPRIATIONS IMPACT ON INFORMATION TECHNOLOGY RESEARCH.

Within 90 days after the date of the enactment of this Act, the Comptroller General, in consultation with the National Science and Technology Council and the President's Information Technology Advisory Committee, shall transmit to the Congress a report on the impact on information technology research of the fiscal year 2000 appropriations acts for the Departments of Veterans Affairs and Housing and

Urban Development, and Independent Agencies; for the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies; and for Energy and Water Development.

II. Purpose of the Bill

The purpose of H.R. 2086 is to authorize appropriations for networking and information technology research and development (R&D) at the National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), Department of Energy (DOE), National Institute of Standards and Technology (NIST), National Oceanic and Atmospheric Administration (NOAA), and Environmental Protection Agency (EPA). The bill authorizes appropriations of $4,768.7 million over Fiscal Years 2000 through 2004.

III. Background and Need for Legislation

Information technology (IT) research has been instrumental in bringing about the information revolution, creating new industries and high-paying jobs, and advancing science. The importance of IT to the economy has grown spectacularly over the past 20 years. IT now represents one of the fastest growing sectors of the U.S. economy, growing at an annual rate of 12 percent between 1993 and 1997. Since 1992, businesses producing computers, semiconductors, software, and communications equipment have accounted for one-third of the economic growth in the U.S. In 1998, the Internet economy generated more than $300 billion in U.S. revenue and 1.2 million jobs.

The Federal Government has been a leader in IT research. The first high-performance computers were placed in government installations, primarily for national defense purposes. 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, these programs were linked by the High-Performance Computing and Communications (HPCC) initiative, which ultimately involved 10 federal agencies.

These activities were formalized by the High-Performance Computing Act of 1991 (P.L. 102–194). This Act established a multiagency program of research and authorized appropriations for Fiscal Years 1992 through 1996 at six agencies: NSF, NASA, DOE, the Department of Commerce (NIST and NOAA), EPA, and the Department of Education.

More recently, the 105th Congress authorized the Next Generation Internet (NGI) program (P.L. 105–305), which amended the High-Performance Computing Act of 1991. The goals of the NGI program are threefold: to promote experimental research into advanced network technologies; to establish a network testbed that will increase network speed and capacity; and to link the missions of federal agencies with the needs of universities, laboratories, and industry through revolutionary applications. P.L. 105–305 authorizes a total of $142 million for Fiscal Years 1999 and 2000 at DOE, NSF, the National Institutes of health (NIH), NASA, and NIST.

The President's Information Technology Advisory Committee (PITAC), established pursuant to the High-Performance Computing Act of 1991, recently looked at a number of issues in high-performance computing and communications research and, in February

1999, issued Information Technology Research: An Investment in Our Future. In general, PITAC concluded that U.S. leadership in IT provides an essential foundation for promoting economic growth, education and research, environmental stewardship, public health, and national security. It also concluded that support for long-term fundamental research in IT has eroded and that current research is too focused on near-term problems linked to agency missions.

To address these and other issues, PITAC recommended the Federal Government develop a strategic initiative for long-term R&D, fund projects for longer periods, establish an effective structure for managing and coordinating R&D, and increase spending $1.4 billion by Fiscal Year 2004.

As part of its Fiscal Year 2000 Budget Request, the Administration proposed a $366 million research initiative—Information Technology for the 21st Century, or IT^2. As envisaged, the program would support activities in three areas: long-term IT research; advanced computing for science, engineering, and the Nation; and research on the economic and social implications of the Information Revolution. The Administration's IT^2 request represented a 28 percent increase in IT research at six agencies: the Department of Defense (DOD), DOE, NASA, NIH, NOAA, and NSF. In addition, the Administration proposed an increase of $89 million for HPCC separate from IT^2. For Civilian IT research overall—including HPCC and IT^2—the Administration proposed a $455 million increase from Fiscal Year 1999.

The Administration proposal did not address fully the need for increased basic IT research. Specifically, IT^2 was a one-year request without a long-term commitment to funding. As the Congressional Budget Office (CBO) April 1999 Memorandum "Current Investment in the Information Technology Sector: Statistical Background" points out, the Administration has not yet formulated funding proposals for the years beyond 2000. In fact, the total budget proposed by the Administration for each of the civilian technology agencies that would fund the President's initiative would remain flat or decline in those years. In addition, the Administration's proposal provided a large share of the 2000 funding to the DOE, which has shifted much of its research funding to applied research. According to the CBO Memorandum, in 1986 the ratio of applied vs. basic IT research spending at DOE was five-to-one basic research; by 1996 DOE spent $187 million on applied IT research but only $14 million on basic IT research, a ration of 13-to-one. In light of the PITAC report, the selection of DOE for a large share of the new funding seems inappropriate.

On June 9, 1999, Committee on Science Chairman F. James Sensenbrenner, Jr. and the late Ranking Minority Member George Brown introduced H.R. 2086, the Networking and Information Technology Research and Development Act (NITRD), which is intended to meet the needs identified by PITAC while addressing the shortcoming of IT^2. NITRD is a five-year authorization bill that would amend the High-Performance Computing Act of 1991 (15 U.S.C. 5503) and reinvigorate basic research programs in IT under the jurisdiction of the Science Committee. This bipartisan legislation was introduced with 24 additional co-sponsors.

IV. Summary of Hearings

On October 6, 1998, the Subcommittee on Basic Research held a hearing on high-performance computing and information technology. Witnesses appearing before the Subcommittee were: Dr. Ken Kennedy, Co-Chair of PITAC; Dr. Neal Lane, Assistant to the President for Science and Technology and Director, Office of Science and Technology Policy (OSTP); Dr. Joseph Bordogna, Deputy Director, NSF; Dr. Edward Lazowska, Professor and Chair, Computer Science and Engineering, University of Washington; and Dr. Joe Thompson, William L. Giles Distinguished Professor of Aerospace Engineering, Mississippi State University.

Dr. Kennedy summarized the findings and recommendations of PITAC's Interim Report. He testified that the principal finding of the report was that there has been a pronounced shift in federal funding away from long-term, high-risk projects and toward short-term, applied and mission-related research in the last decade. He noted that while there has been explosive growth in the size of the IT endeavor as a proportion of the economy, federal funding has grown at about the rate of inflation. In addition to its importance to the economy, IT is critical to solving problems in business, science, medicine, and education.

Dr. Kennedy said the shift away from fundamental research needs to be reversed if we are to preserve the Nation's economic leadership in the coming decade. The PITAC Interim Report listed a number of areas that would benefit from the increased support, including: secure, robust, and reliable software; scalable information infrastructure; high-end computing and communications; and sociological and economic impacts and workforce impacts of IT.

Dr. Lane began his testimony by noting that the Nation's security, health care, education, and environment all depend on our ability to master the power of IT. IT is an industry that requires constant innovation tightly linked to IT research begun decades earlier. He said that the Administration agrees with many of PITAC's findings and is working to address their recommendations. Under OSTP, an interagency team has been assembled to respond to PITAC's advice and to build on the foundation of interagency coordination that began with the HPCC Program.

Dr. Bordogna said that the U.S.'s commanding lead in IT was the result of a partnership among government, industry, and academia. R&D conducted by private firms is almost entirely focused on products and activities that yield short-term payoffs. The PITAC report sets out a plan for more long-term research and recommends that NSF play a lead coordinating role. Dr. Bordogna said NSF can and should play a strong role, but contended that any IT partnership could only proceed through consensus, trust, and close cooperation among participating agencies. He outlines three priorities for NSF in IT: (1) fundamental, high-risk research, including software, scalable infrastructure, and high-end computing; (2) competitive access to high-end computing and networking; and (3) education at all levels.

Dr. Lazowska testified that IT is more than high-performance computing. He said that the Science Committee has demonstrated an awareness of four things: (1) computing enables all of science

and engineering; (2) sustaining the Nation's science effort requires more than just buying hardware and cable—investment computing and computational research is needed; (3) there is more to IT than enabling other fields of study—computing science and engineering are disciplines of their own; and (4) a broad-based research program is required to support these other goals. The PITAC report says that to advance computer science, engineering, and communications requires investment in research in those areas closely coupled to the demands of applications. He said that the PITAC has five bottom-line messages: (1) leadership in IT is critical; (2) the return on past IT research has been spectacular; (3) current federal support for IT is inadequate; (4) the focus has been too much on short-term problems; and (5) critical problems are going unsolved.

Dr. Thompson also endorsed the PITAC Interim Report and made two general points: (1) we have neglected to fund software research to the same degree as we fund hardware acquisitions; and (2) we are reaping the fruits of last decade's research while we have neglected research this decade. He noted that government and academia are not the only sectors using high-performance computing; industry is now a big user. He added that we cannot allow other nations to exceed our capabilities and that more powerful machines do not increase capability proportionally until software suitable to the hardware is developed.

On Tuesday, March 16, 1999, the Subcommittee on Basic Research held a hearing on the Administration's "Information Technology for the 21st Century" initiative, better known as IT^2. Witnesses appearing before the Subcommittee were: Dr. Neal Lane, Assistant to the President for Science and Technology, and Director, OSTP; Dr. Ken Kennedy, Co-Chair, PITAC and Director, Center for Research on Parallel Computation, Rice University; Dr. Erich Bloch, President, Washington Advisory Group and Distinguished Fellow, Council on Competitiveness; Dr. Stephen Wolff, Executive Director, Advanced Internet Initiatives Division, Cisco Systems; Dr. Fred Hausheer, Chairman and CEO, BioNumerick Pharmaceuticals; and Dr. Hal R. Varian, Dean, School of Information Management, University of California, Berkeley.

Dr. Lane testifies that the Administration focused on IT research in the Fiscal Year 2000 R&D budget for three central reasons: (1) IT has become a key driver of the economy; (2) IT is essential for achieving some of our most overarching public goals; and (3) federal investment in fundamental IT research is essential to provide the reservoir of ideas that will lead to IT innovations in the generations to come. The President's IT^2 initiative, which would provide $366 million in new funding at six agencies (DOD, DOE, NASA, NIH, NOAA, and NSF), is a direct response to the PITAC's recommendation for increased federal support of fundamental, long-term IT research. Ideally, additional incremental investments would be needed over the next 5 years, but until the funding issues surrounding Social Security, Medicare and the budget surplus are resolved, the picture for the outyears of the IT^2 initiative remains uncertain, he said.

Dr. Lane described the three elements comprising IT^2: (1) long-term fundamental research aimed at fundamental advances in

computing and communications; (2) advanced computing infrastructure as a tool to facilitate important scientific and engineering discoveries of national interest; and (3) expanded research into social, economic, and workforce impacts of information technology, including transformation of social institutions, impact of legislation and regulation, electronic commerce, barriers to information technology diffusion, and effective use of technology in education.

Dr. Kennedy summarized PITAC's principal finding, noting that there has been a pronounced shift in federal IT programs away from long-term high-risk projects toward short-term, applied research linked to mission agencies. It is PITAC's view that unless this shift away from fundamental high-risk research is reversed, it will threaten the Nation's economic leadership, along with the continued beneficial effects on the health and welfare of its citizens. PITAC recommended four areas requiring greater research: (1) software; (2) scalable information infrastructure; (3) high-end computing; and (4) social, economic, and workforce implications. In addition, PITAC recommended developing a strategic initiative for long-term R&D, funding projects for longer periods, establishing an effective structure for managing and co-ordinating R&D, and increasing spending by $1.4 billion by Fiscal Year 2004.

Dr. Erich Bloc summarized the findings of a recent National Research Council report, Funding a Revolution: Government Support for Computing Research. He noted that the history of federal investment in information technology research is full of examples of research that would never have been done—and discoveries that could never have been made—if it had been left to the private sector alone. This research has generated an information revolution that has impacted not only science and research, but also the economy, education, and health. Dr. Bloc agreed with PITAC that there is an increased need for research to address the challenges of an evolving information infrastructure and to ensure its continued development and he supported the government's continuing role in supporting basic IT research.

Dr. Wolff testified that Cisco strongly supports the principal findings of PITAC and the Administration's response to its recommendations. The proposed long-term research in "deeply networked systems" will support and complement nascent industry initiatives in Electronic Persistent Presence—ubiquitous, very large-scale, and permanent Internet connectivity. The IT^2 thrust in modeling and simulation also will support this massive growth. However, he also advocated a research thrust related to cryptography within both the software and the socio-economic areas. IT^2's sub-programs on economic and social implications and on workforce development complement and support industry activities.

Dr. Hausheer discussed the importance of IT to biomedical research. The successful application of IT to NIH programs is critical to using the vast amount of genomic and biological information generated by the human genome project to benefit patients. Saving more lives, reducing health care costs, compressing the time to discover new and better drugs, making biomedical education more effective, and maintaining the U.S. leadership in this field should be goals of the IT^2 initiative. Specifically, Dr. Hausheer said NIH's IT goals should include: (1) on-site supercomputing capability ad-

vanced in the near term to multi-teraflops, and ultimately petaflop capability; (2) dedicated biomedical IT training and research program for physicians and scientists; (3) dedicated NIH software development on-site with laboratory validation of simulations; (4) avoid "off-the-shelf, just as fast, but cheaper" computing research projects; and (5) greater IT-biomedical research representation on PITAC.

Dr. Varian spoke to the socio-economic aspects of the IT^2 proposal. Basic IT research has had, and will continue to have, a major impact on our economy and society, but it also will have a significant impact on law, education, commerce, organizations, and communities. Policy choices made now, such as definition of technological and legal standards, will be with us of a long time, and attention must be paid not only to their technological merit, but also their social and economic impact. Understanding the social and economic consequences of our technological choices is vitally important in achieving the full potential of advances in IT.

On July 1, 1999, the Subcommittee on Technology held a hearing on "The Networking and Information Technology Research and Development Act of 1999." Witnesses appearing before the Subcommittee were: Dr. William Destler, Interim Vice President for University Advancement, University of Maryland; Ms. Laura Allbritten, Director of Tax, PeopleSoft, Inc.; and Mr. Kevin Hassett, Resident Scholar, American Enterprise Institute.

Dr. Destler testified that the United States corporate sector has been steadily reducing its expenditures on medium- and long-term R&D to remain price competitive with companies abroad. He stated that this is especially true in the areas of computer networking, encryption, and information technology due to the intense competition for expanding world markets. Compounding these problems is the fact U.S. corporate demand for IT professionals currently far outstrips supply, thereby raising IT labor costs and limiting corporate expansion even when opportunities for growth are strong. Dr. Destler stated that for the United States to maintain its position of global leadership in these critical areas, it is essential that H.R. 2086 become law.

Ms. Allbritten testified that making the existing R&D tax credit permanent serves the Nation's long term economic interests. She argued that by eliminating uncertainty over the credit's future, a permanent extension would allow R&D performing businesses to make important long-term business decisions regarding research spending and investment. Furthermore, by creating an environment favorable to private sector R&D investment through the permanent extension, jobs and economic value would remain in the United States. She concluded by stating that the R&D tax credit is essential for the United States economy for its industries to compete globally.

Mr. Hassett testified the R&D is a classic example of an activity that has external benefits; when a firm uncovers something new, the knowledge will ultimately help some other firm perform its own R&D. Therefore, the benefits to society of R&D are likely to be higher than the benefits to individual firms doing the research, since these firms tend to look only at their own payoffs. Without the R&D tax credit, it is likely that there would be relatively little

long-term R&D. Mr. Hassett continued by stating that the current situation where the R&D credit is continually renewed exposes firms to a great deal of uncertainty, leading them to respond with less R&D than they might otherwise perform. He cited a Coopers and Lybrand report which estimated that a permanent credit would stimulate an additional $41 billion of R&D spending between 1998–2010, but would produce more than $58 billion worth of new goods over this same period, and thus pay for itself.

On Wednesday, July 14, 1999, the Subcommittee on Basic Research held a hearing on H.R. 2086, "The Networking and Information Technology Research and Development Act." Witnesses appearing before the Subcommittee were: Dr. Neal Lane, Assistant to the President for Science and Technology, and Director, OSTP; Dr. Roberta Katz, President and CEO, Technology Network (TechNet); Dr. Edward D. Lazowska, Professor and Chair, Department of Computer Science & Engineering, University of Washington and Chair, Computing Research Association; and Mr. Alan Blatecky, Vice President for Information Technology, MCNC.

Dr. Lane testified that the Administration strongly supports the aims of H.R. 2086 but believes there are areas where bill could be improved. These include: (1) including DOD and NIH in the proposed legislation; (2) providing funding for DOE's Scientific Simulation Initiative, including terascale computing infrastructure; (3) providing increased funding for DOE's base advanced mathematics and computation programs; (4) funding the NIST at the requested level for Fiscal Year 2000; and (5) incorporating all of the NOAA's IT programs in H.R. 2086. In addition, the Administration also is concerned about a provision in H.R. 2086 calling for the NSF to conduct a study to assess foreign encryption technologies and domestic technologies subject to export restriction. The Administration supports the bill's provision making the R&D tax credit permanent, but takes the position that it must be paid for per the PAYGO requirements of the Budget Enforcement Act.

Dr. Katz began at stating that TechNet has adopted strengthening the Nation's federal investment in basic IT R&D and enacting a permanent R&D tax credit as top priorities. H.R. 2086 is an important first step in achieving consistent increases in federal support for critical IT research programs. She noted TechNet appreciates the bill's reliance on the recommendations of PITAC. In particular, TechNet supports H.R. 2086's emphasis on fundamental IT research. TechNet also supports the bill's provisions on the large-scale IT grants and internship programs and completion of the NGI program. Dr. Katz also agreed that NSF was the appropriate agency to run the terascale computing competition. She concluded by noting that the five-year authorizations in the bill demonstrate a commitment to a continued strong federal investment in basic IT research and by relaying TechNet's strong support for permanent extension of the R&D tax credit.

Dr. Lazowska praised the bill, saying that it exemplifies a sound approach to making research policy by responding to clear national needs with recognizable objectives and setting forth a well defined program for meeting them. Concerning the legislation, Dr. Lazowska made three main points: (1) H.R. 2086 expands fundamental research in targeted critical areas and sustains successful

interagency programs with multi-year funding; (2) H.R. 2086 strengthens the federal role in long-term IT research, a role that industry cannot be expected to assume; and (3) H.R. 2086 appropriately increases support for NSF, the agency with the broadest role in computing research and infrastructure. Concerning the current environment, he said: (1) NSF is undertaking a thorough planning process to maximize the benefits of IT research for all of science and engineering, and for all of society; (2) expanding the federal investment in information technology research is widely supported by the scientific community; and (3) the impact of IT on society and the economy clearly demonstrates the need for and timeliness of the NITRD Act. Dr. Lazowska also signified his support for having NSF conduct the terascale computing competition.

Mr. Blatecky noted the importance of IT to the Nation's economy and talked about the impact IT has had on the economy of North Carolina. He also noted the importance of a national grid of communication and computing resources and said that the technology development cycle does not address the equally important issues of scalability, long term basic research in networking and computing, software development, human interfaces, network security, information and training. H.R. 2086 directly address these needs through three key provisions: (1) long-term basic research grants for high end computing and networking; (2) provision of 20 to 30 large focused grants by NSF; and (3) establishment of eight to ten IT research centers. In addition, he supported the establishment of a scientific internship program to encourage and develop an effective mechanism to link the private sector with the universities and community colleges that will broaden the educational experience of students and create a more effective way to transfer technology.

V. Committee Actions

As summarized above, the Subcommittee on Basic Research of the Committee on Science heard testimony relevant to NITRD at hearings held on October 6, 1998 and on March 16 and July 14, 1999, and the Subcommittee on Technology heard testimony at a hearing held on July 1, 1999.

On April 26, 1999, F. James Sensenbrenner, Jr. (WI), Chairman of the Committee on Science, and the late Congressman George Brown (CA), joined by 24 other co-sponsors, introduced H.R. 2086, the Networking and Information Technology Research and Development Act, a bill to authorize appropriations for six agencies networking and information technology R&D for Fiscal Year 2000 through 2004.

The Full Science Committee met to consider H.R. 2086 on Thursday, September 9, 1999, and entertained the following amendments and report language.

Amendment 1.—Mrs. Biggert (IL) offered an en bloc amendment: (1) to increase the Fiscal Year 2000 authorization for DOE by $6 million and to reduce the authorization for NSF by $6 million; and (2) to ensure that federally-funded research and development centers (FERDCs) could compete in the NSF terascale computing competition authorized in the bill. The amendment was adopted by voice vote.

Amendments 2 and 3.—A Unanimous consent request was granted to offer Amendments 2 and 3 en bloc. Ms. Johnson (TX) offered the en bloc amendment: (1) to include language on the economic and social consequences of IT; and (2) to amend language on the internship program authorized in the bill to allow the participation of NSF's Advanced Technology Education and Louis Stokes Alliances for Minority Participating programs. The amendment was adopted by voice vote.

Amendment 4.—Mr. Doyle (PA) offered an en bloc amendment: (1) to provide that awards made through the terascale computing competition cover base operating expenses; and (2) to provide that the terascale computing competition be nationwide and that awardees may include consortia. The amendment was adopted by voice vote.

Amendment 5.—Ms. Woolsey (CA) offered an amendment to establish a research program at NSF that would develop, demonstrate, assess, and disseminate effective applications of IT for elementary and secondary education. The amendment was adopted by voice vote.

Amendment 6.—Mr. Wu (OR) offered an amendment to allow NSF to arrange with the National Research Council for a study on Internet privacy. The amendment was adopted by voice vote.

Amendment 7.—Mr. Doyle (PA) offered an amendment to transfer authorized funding from NSF to DOE to raise the DOE authorization to the level proposed in the IT^2 initiative, except for terascale infrastructure acquisitions. The amendment was withdrawn.

Amendment 8.—Capuano (MA) offered an amendment to require from the Comptroller General a study on the impact of Fiscal Year 2000 appropriations on IT research. The amendment was adopted by voice vote.

Report Language.—Mr. Doyle (PA) offered report language encouraging public-private partnerships to increase use of underutilized supercomputing facilities. The report language was adopted by voice vote.

Report Language.—Mr. Baird (WA) offered report language encouraging the use of new computing architectures, including Multi-Thread Architecture. The report language was adopted by voice vote.

Report Language.—Mr. Udall (CO) offered report language stressing the importance of including physics, mathematics, chemistry, engineering, and other fields of science in the IT research effort. The report language was adopted by voice vote.

Report Language.—Mr. Smith (MI) offered report language urging NSF to make available on the Internet the results of the research carried out under the Networking and Information Technology Research program authorized under the bill. The report language was adopted by voice vote.

With a quorum present, Ms. Johnson moved that the Committee report the bill, H.R. 2086, as amended, to the House, that the staff prepare the legislative report and make technical and conforming changes, and that the Chairman take all necessary steps to bring the bill before the House for consideration. the motion was approved by a recorded vote of 41 to 0.

Mr. Sensenbrenner asked and received unanimous consent that Committee Members have two subsequent calendar days in which to submit supplemental, minority or additional views on the measure, and that, pursuant to Clause 1 of rule XXII of the Rules of the House of Representatives, 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. 2086 or a similar Senate bill.

VI. Summary of Major Provisions of the Bill

For Fiscal Years 2000 through 2004, H.R. 2086 authorizes a total of $4,768.7 million for the six agencies participating in the HPCC, NGI, and new NITRD programs. Over the five years, these authorizations represent a 92 percent increase in IT funding for the agencies under the jurisdiction of the Committee on Science. Total funding authorizations by agency and program are as follows:

- $2,951.1 million for NSF, including:
  - $130 million for large grants of up to $1 million for high-end computing, software, and networking research;
  - $220 million for information technology research centers;
  - $385 million for terascale computing;
  - $95 million for universities to establish internship programs for research at private companies;
  - $56 million for educational technology research; and
  - $50 million for the NGI program;
- $602.2 million for DOE (including $30 million for the NGI program);
- $1,048.4 million for NASA (including $20 million for the NGI program);
- $73 million NIST (including $11 million for the NGI program);
- $71.7 million NOAA; and
- $22.3 million for EPA.

Table 1 provides a detailed summary of the authorizations in H.R. 2086.

TABLE 1.—THE NETWORKING INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT

[In millions of dollars]

Activity/Agency	HPCC/NGI FY 1999 enacted	HPCC/NGI/IT [2] FY 2000 request	NITRD					
			FY 2000 authorization	FY 2001 authorization	FY 2002 authorization	FY 2003 authorization	FY 2004 authorization	Total authorization
HPCC/NITRD								
NSF:								
Total Grants	151.2	269.3	310.0	333.0	352.0	390.0	415.0	1,800.0
Individual/Team Grants	151.2	293.3	240.0	258.0	257.0	290.0	310.0	1,355.0
Large Grants	0.0	0.0	0.0	20.0	20.0	30.0	30.0	130.0
IT Centers	0.0	30.0	40.0	40.0	45.0	45.0	50.0	220.0
Internships	0.0	0.0	10.0	15.0	20.0	25.0	25.0	95.0
Education Technology Research	0.0	0.0	10.0	10.5	11.0	12.0	12.5	56.0
Other HPCC	122.5	128.3	119.0	135.5	141.2	154.1	156.1	660.1
Total, NSF	273.7	397.5	439.0	468.5	493.2	544.1	571.3	2,516.1
NASA	83.0	164.4	164.4	201.0	208.0	224.0	231.0	1,028.4
DOE	110.8	140.8	106.6	103.5	107.0	125.7	129.4	572.2
NIST	10.0	9.0	9.0	9.5	10.5	16.0	17.0	62.0
NOAA	12.0	13.5	13.5	13.9	14.3	14.8	15.2	71.7
EPA	4.0	4.2	4.2	4.3	4.5	4.6	4.7	22.3
Total HPCC/NITRD	493.5	729.4	736.7	800.7	837.5	929.2	968.6	4,272.7
Terascale Computing:								
DOE	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0
NSF	0.0	36.0	70.0	70.0	80.0	80.0	85.0	385.0
Total, Terascale Computing	0.0	65.4	70.0	70.0	80.0	80.0	85.0	385.0
NGI:								
NSF	25.0	[1] 25.0	[1] [25.0]	25.0	25.0	0.0	0.0	[2] 50.0
NASA	10.0	[1] 10.0	[1] 10.0	10.0	10.0	0.0	0.0	[2] 20.0
DOE	15.0	[1] 14.6	[1] [25.0	15.0	15.0	0.0	0.0	[2] 30.0

TABLE 1.—THE NETWORKING INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT—Continued

[In millions of dollars]

Activity/Agency	HPCC/NGI FY 1999 enacted	HPCC/NGI/IT [2] FY 2000 request	NITRD					
			FY 2000 authorization	FY 2001 authorization	FY 2002 authorization	FY 2003 authorization	FY 2004 authorization	Total authorization
NIST	5.0	[1] 5.2	[1] 7.5	5.5	5.5	0.0	0.0	[2] 11.0
Total, NGI	55.0	[1] 54.8	[1] [67.5]	55.5	55.5	0.0	0.0	[2] 111.0
Totals, excluding FY 2000 NGI	548.5	[2] 794.9	[2] 806.7	926.2	973.0	1,009.2	1,053.6	[2] 4,768.7
Totals, including FY 2000 NGI	548.5	[3] 849.7	[3] 874.2	926.2	973.0	1,009.2	1,053.6	[3] 4,836.2

[1] The NGI program for Fiscal Year 2000 is authorized under the Next Generation Internet Research Act of 1998 (P.L. 105–305).
[2] Total does not include NGI for Fiscal Year 2000, which is authorized under the Next Generation Internet Research Act of 1998 (P.L. 105–305).
[3] Total includes NGI for Fiscal Year 2000, which is authorized under the Next Generation Internet Research Act of 1998 (P.L. 105–305).

Other highlights of the bill include:

• New Large Research Grants—H.R. 2086 establishes a new pool of grant funding at NSF. The grants are limited to long-term, basic IT research with priority given to research that helps address issues related to high-end computing, software, social and economic consequences of IT, and network stability, security (including privacy) and scalability. All grants are required to be peer reviewed by panels that include private sector representatives.

• IT Research Centers—H.R. 2086 sets aside $220 million for the establishment of IT centers of six or more researchers enter into multi-disciplinary collaborations for large-scale, long-term basic IT research projects.

• Education and Training—H.R. 2086 establishes a $95 million program to award grants (1) to colleges (including community colleges) to create for credit internships programs at IT companies and (2) to two-year colleges and fund NSF's Advanced Technology Education program to improve education in fields related to IT. To participate in the internship program, a company must commit to providing 50 percent of the cost of the internship.

• Hardware Acquisition—H.R. 2086 authorizes NSF to administer a terascale computing acquisition program. The program is authorized a total of $385 million to be allocated in an open competitions by NSF. Awardees must agree to integrate with the existing Advanced Partnership for Advanced Computational Infrastructure program and give access to NITRD research grant recipients.

• Tax Policy—H.R. 2086 makes the Research and Development Tax Credit permanent.

• Computer Security—H.R. 2086 requires NSF to research and report to Congress on the availability of encryption in foreign countries.

VII. Section-by-Section Analysis

Section 1. Short title

Cites the Act as the "Networking and Information Technology Research and Development Act."

Section 2. Finding

The Congress finds that: (1) information technology will continue to change the way Americans live, learn, and work; (2) information technology is an important enabling technology, (3) the U.S. is the world leader in information technology; (4) information technology is a catalyst for economic growth; (5) information technology is the fastest growing sector for the U.S. economy; (6) information technology companies have accounted for about a third of the growth in the U.S. economy since 1992; (7) the information technology sector has been growing at 12.3 percent per year since 1993; (8) the information revolution is linked to fundamental research in information technology; (9) information technology research has created entirely new industries; (10) the social and economic consequences of IT need further research; (11) continued growth in information technology depends on research and a skilled workforce; (12) private industry provides most of the information technology research funding; (13) the private sector tends to focus on short-term re-

search; (14) the Federal Government is positioned to support fundamental research; (15) federal applied research has growth at twice the rate of basic research since 1986; (16) federal programs must increase their emphasis on fundamental research; and (17) current federal support for long-term information technology research is inadequate.

Section 3. Authorization of appropriations

Amends the High-Performance Computing Act of 1991 to authorize a total of $4,272.7 million over Fiscal Year 2000 to 2004 for six agencies participating in the National High-Performance Computing (HPC) and National Research and Education Network programs. Specifically, it:

(a) Amends section 201(b) to authorize a total of $2,516.1 million for NSF over Fiscal Years 2000 to 2004.

(b) Amends section 202(b) to authorize a total of $1,028.4 million for NASA over Fiscal Years 2000 to 2004.

(c) Amends section 203(e)(1) to authorize a total of $572.2 million for DOE over Fiscal Years 2000 to 2004.

(d) Amends section 204(d)(1) to authorize a total of $62.0 million for NIST over Fiscal Years 2000 to 2004.

(e) Amends section 204(d)(2) to authorize a total of $71.7 million for NOAA over Fiscal Years 2000 to 2004.

(f) Amends section 205(b) to authorize a total of $22.3 million for EPA over Fiscal Years 2000 to 2004.

Section 4. Networking and information technology research and development

(a) NSF—Amends the High-Performance Computing Act of 1991 by adding the following new sections:

"(c) Networking and Information Technology Research and Development—(1) Authorizes, out of sums authorized for NSF in section 3, a total of $1,800.0 million over Fiscal Years 2000 to 2004 for long-term, basic research grants into networking and information technology, including high-end computing, software, social and economic consequences of IT, and network fragility, security, and scalability. (2) Sets aside a total of $130 million over Fiscal Years 2000 to 2004 for large grants of up to 1.0 million each. (3) Sets aside a total of $220.0 million over Fiscal Years 2000 to 2004 for Information Technology Research Centers, which shall be made up of groups of six of more researchers entering into multi-disciplinary collaborations for large-scale, long-term IT projects.

"(d) Major Research Equipment—(1) Authorizes a total of $385 million over Fiscal Years 2000 to 2004 to NSF to establish terascale computing capabilities at one or more sites and to promote diverse computer architectures. Awards made under this section shall provide for operating expenses. (2) Requires that grants be awarded through a nationwide, peer-reviewed competition, allows awardees to include consortia, and makes clear that FFRDCs may compete for these funds. (3) Requires that awardees must agree to connect to the existing partnership for Advanced Computational Infrastructure (PACI) network, co-ordinate with other large-scale, federal-funded computing and simulation programs, and provide open access to all NITRD program grant recipients.

"(e) Information Technology Education and Training Grants—(1) Requires NSF to make grants to improve education in fields related to IT under the Advanced Technology Education program authorized in the Scientific and advanced Technology Act of 1992 (P.L. 102–476). (2) Authorizes NSF to establish information technology internship programs for research at private companies and to award supplementary grants through the Louis Stokes Alliances for Minority Participation program. (3) Requires companies participating in the program to match at least 50 percent of the funding of the grant. (4) Defines institution of higher learning consistent with the Higher Education Act of 1965. (5) Authorizes, out of sums authorized for NSF in section 3, a total of $95.0 million over Fiscal years 2000 to 2004.

"(f) Educational Technology Research—(1) Requires NSF to establish a research program to develop, demonstrate, assess and disseminate effective applications for IT for elementary and secondary education. (2) Requires that empirical studies use a wide variety of settings. (3) Authorizes, out of sums authorized for NSF in subsection (b), a total of $56 million over Fiscal Years 2000 to 2004.

"(g) Peer Review—Requires that peer review panels have private-sector representation."

(b) Other Programs Agencies—Amends Title II—Agency Activities of the High-Performance Computing Act of 1991 to allow NASA, DOE, NIST, NOAA, and EPA to participate in or support the NSF research programs authorized under section 4 of NITRD.

Section 5. Next Generation Internet

Amends section 103 of the High-Performance Computing Act of 1991. (1) Adds the following new section:

"(c) Study of Internet Privacy—(1) Allows NSF to engage the National Research Council (NRC) to conduct a study on Internet privacy. (2) Requires that such a study address privacy technology research, deployment, and policy, laws, and practices in other countries, federal legislation and regulation needed to ensure development of privacy technologies, and other relevant matters. (3) Requires NSF, if it goes forward with the study, to report to Congress on the results of the study within 21 months of enactment. (4) Requires federal agencies to cooperate with NRC in such a study. (5) Makes available, out of funds authorized in subsection (d)(2), $900,000 for such a study."

(2) Provides two-year authorizations for completion for the Next Generation Internet (NGI) programs. Authorizes a total of $111.0 million over Fiscal Year 2001 to 2002 for the four agencies participating in the program as follows: $30.0 million for DOE; $50.0 million for NSF; $20.0 million for NASA; and $11.0 million for NIST.

Section 6. Reporting requirements

Amends section 101 of the High-Performance Computing Act of 191 by (1) requiring the Advisory Committee established under the High-Performance Computing Act of 1991 to provide to Congress not less than once every two years of report evaluating the funding, management, implementation, and activities of the HPC, NGI, and NITRD programs, and (2) requiring that the agencies include in their annual requests for appropriations to the Office of Manage-

ment and Budget information on the NGI and NITRD programs in addition to the HPC program.

Section 7. Evaluation of capabilities of foreign encryption

(a) Requires NSF to conduct a study on the availability of encryption technologies in foreign countries and how they compare with encryption technologies subject to export restrictions in the United States.

(b) Requires NSF to transmit this report within 6 months after enactment.

Section 8. Research credit made permanent

Amends Sections 41 and 45C(b) of the Internal Revenue Code of 1986 to make permanent the R&D tax credit.

Section 9. Study of Appropriations Impact on Information Technology Research

Requires, within 90 days of enactment, the Comptroller General to report to Congress on the impact on IT research of the Fiscal Year 2000 appropriations for the following bills: the Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies; the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies and Energy and Water.

VIII. COMMITTEE VIEWS

GENERAL

Today, the United States is the undisputed global leader in computing and communications. A healthy information-technology industry is a critical component of U.S. economic and National security. IT represents one of the fastest growing sectors of the U.S economy. Between 1993 and 1997, the IT sector grew at an annual rate of 12 percent. And since 1992, one-third of U.S. economic growth has come from businesses producing computers, semiconductors, software, and communications equipment.

Fundamental IT research has played an essential role in fueling the Information Revolution and creating new industries and millions of new, high-paying jobs. The Committee believes that maintaining the Nation's global leadership in information technology will require keeping open the pipeline of new ideas, technologies, and innovations that flow from fundamental research. Although the private sector provides the lion's share of the research funding, its spending tends to focus on short-term, applied work. The Federal Government, therefore, has a critical role to play in supporting the long-term, basic research the private sector requires but is ill-suited to pursue.

However, as the Congressionally-chartered PITAC noted in its recent report, Information Technology Research: Investing in Our Future, the emphasis of federal IT research programs in recent years has shifted from long-term, high-risk research to short-term, mission-orientated research—a trend that began in 1986, but that has accelerated over the last six years. PITAC concluded that current federal support for fundamental research in information technology is inadequate to maintain the Nation's global leadership in

this area, and it advocated a five-year initiative that would increase significantly basic IT research funding.

It is the Committee's view that PITAC has made a compelling case for increasing funding for basic IT research. H.R. 2086 provides long-term funding and a comprehensive research agenda for the agencies under the Committee's jurisdiction. Further, the Committee believes that, given the bill's emphasis on basic research, NSF should play a major role. Most of the newly authorized funding, therefore, is provided for research programs at NSF.

PITAC also made specific recommendations about the mix of research. H.R. 2086 has responded by designing a new research program at NSF—the Networking and Information Technology Research and Development program. This program establishes funds for large team and individual grants of up to $1.0 million, IT research center grants of up to $5 million, for-credit internships programs at universities and community colleges, education technology research, and terascale computing. The Committee agrees with PITAC that, while funding for individual investigators remains important, funding team research, centers, and interdisciplinary projects can lead to dramatic progress and create a broader research community. This initiative and the other initiatives in the bill represent a major commitment to revitalizing long-term, fundamental IT research that will keep the Nation at the cutting edge of science and technology.

TERASCALE COMPUTING COMPETITION

H.R. 2086 authorizes $385 million for NSF to establish one or more terascale supercomputing centers. The Committee did not include funding authorizations in the bill for a similar competition at DOE, which was requested by the Administration as part of its IT[2] proposal. Recent General Accounting Office (GAO) testimony and reports[1] have cast doubt on DOE's ability to run an effective competition and research program.

As important, the Committee is satisfied that NSF is more than capable of conducting the competition. Indeed, NSF's PACI centers have done a credible job of bringing together universities, industry, and the national laboratories in fruitful partnerships. Open access also is important. The Committee believes that the vBNS and Abilene networks to the PACI machines provide better nationwide access than DOE's ESNet. Moreover, running the competition out of one agency will improve program coordination and efficiency.

The Committee, nevertheless, recognizes that the national laboratories possess intellectual resources that can contribute to the Nation's IT effort. Therefore, H.R. 2086 includes language allowing the national laboratories and other FFRDCs to participate in the terascale computing competition.

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[1] "Department of Energy: Problems in the Management and Use of Supercomputers," Statement for the Record by Susan D. Kladiva, Associate Director, Energy, Resources, and Social Science Issues, Resources, Community, and Economic Development Division, GAO (GAO/RCED–99–257), July 14, 1999; Information Technology: Department of Energy Does Not Effectively Manage Its Supercomputers, GAO (GAO/RCED–98–208), July 1998; Nuclear Weapons: DOE Needs to Improve Oversight of the $5 billion Strategic Computing Initiative, GAO (GAO/RCED–99–195), June 1999.

COMPUTING ARCHITECTURES

The Committee acknowledges the critical role of high-performance computers to Federal Government missions such as cryptology, nuclear weapons testing and monitoring, data mining, etc. The Committee recognizes that the Massively Parallel (MP) approach to high performance computing, used in many areas of the Federal Government, has been an effective architecture for many mission areas.

However, the Committee remains concerned over performance limitations inherent in the MP approach and agrees with PITAC's assessment that alternative architectures must be pursued with federal funding in order to meet current and future computationally-intensive challenges.

Accordingly, the Committee included in section 4 of the bill a requirement for NSF to promote diverse computing architectures in developing terascale computing capabilities. The Committee is aware of recent breakthroughs in the Multi-Thread Architecture and encourages that the most promising high performance computing architectures be explored for providing the terascale computing capability required to address the most challenging computational problems in science and engineering.

TERASCALE SUPERCOMPUTING CAPABILITIES

The Committee supports the goal of sustaining and increasing federal participation and support for high-end supercomputing research, including the procurement of major research equipment. The intent of the Committee is to encourage high-end supercomputing that is national in impact, respects the existing diversity in supercomputing architectures, and efficiently mobilizes resources across the U.S. supercomputing community. The Committee expects NSF to encourage collaborations and consortia among existing major supercomputer centers in the competition for terascale computing equipment. Partnerships are to be encouraged among centers, both members and non-members in NSF's PACI, in an effort to mobilize resources that have been underutilized.

MULTIDISCIPLINARY IT RESEARCH

Advances at the cutting edge in information technology are in turn dependent on new developments in various fields of science, mathematics, and engineering. This is especially true for terascale computing which is pushing the limits of our knowledge in various aspects of physics, mathematics, chemistry, and engineering. Basic and applied research in each of these disciplines will be required if the goals of this legislation are to be met. Therefore, it is imperative that the research program anticipated under this legislation include support for fundamental research in pertinent areas of science, mathematics, and engineering which are related to the goals of the information technology initiative.

DISSEMINATING THE RESULTS OF NITRD RESEARCH

H.R. 2086 recognizes the importance of basic IT research as a catalyst for economic growth and prosperity. IT represents one of the fastest growing sectors of the U.S. economy and provides mil-

lions of good, high-paying jobs. The Nation's future economic success will depend in part on our ability to stay at the cutting edge of technology. Transferring the knowledge gained through H.R. 2086 to the private sector is, therefore, vitally important. To ensure that the fruits of this research are available to the private sector and to other researchers, the Committee expects NSF to make accessible through its Internet home page, to the greatest extent possible, the results of the research funded through the NITRD program authorized under this Act.

IX. Committee 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 that would be incurred in carrying out such bill or joint resolution in the Fiscal Year in that 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 practical, 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 403 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 403 of the Congressional Budget Act of 1974 has been timely submitted prior to the filing of this report and is included in Section X of this report pursuant to House Rule XIII, clause 3(c)(3).

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 changes 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. 2086 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. 2086 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in Section X of this report.

X. Congressional Budget Office Cost Estimate

U.S. Congress,
Congressional Budget Office,
Washington, DC, September 21, 1999.

Hon. F. James Sensenbrenner, Jr.,
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. 2086, the Networking and Information Technology Research and Development 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. 2086—Networking and Information Technology Research and Development Act

Summary: H.R. 2086 would authorize appropriations for research and development (R&D) on information technology and reinstate the expired research and experimentation tax credit. 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. The authorization for high-performance computing programs would extend from fiscal years 2000 through 2004, while the authorization for R&D on a next-generation Internet would extend from fiscal year 2001 through 2002. In addition, the bill would direct the Comptroller General to submit a report within 90 days of enactment of the impact of information technology research funded by certain appropriation acts for fiscal year 2000.

CBO estimates that appropriating the amounts authorized by H.R. 2086 would result in discretionary spending totaling $3.7 billion over the 2000–2004 period. The Joint Committee on Taxation (JCT) estimates that extending the research and experimentation tax credit would reduce governmental receipts by $1.6 billion in 2000, $10.7 billion over the 2000–2004 period, and $26.3 billion over the 2000–2009 period. Because the legislation would affect receipts, pay-as-you-go procedures would apply. H.R. 2086 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. 2086 is shown in the following table. The discretionary costs of this legislation fall within budget functions 250 (general science, space, and technology), 300 (natural resources and the environment), 370 (commerce and housing credit), and 40 (transportation).

	By fiscal years, in millions of dollars—					
	1999	2000	2001	2002	2003	2004
SPENDING SUBJECT TO APPROPRIATION						
Spending Under Current Law:						
Budget Authority/Authorization Level [1]	551	68	0	0	0	0
Estimated Outlays	522	348	99	25	7	1
Proposed Changes:						
Authorization Level	0	807	926	973	1,009	1,054
Estimated Outlays	0	276	698	860	931	981
Spending Under H.R. 2086:						
Authorization Level [1]	551	875	926	973	1,009	1,054
Estimated Outlays	522	624	797	885	938	982
CHANGES IN REVENUES						
Estimated Revenues	0	−1,603	−1,793	−2,153	−2,454	−2,676

[1] The 1999 level is the amount appropriated for that year for the information technology R&D programs included in H.R. 2086. The fiscal year 2000 level includes the amount authorized under current law for the next-generation Internet programs covered by this bill.

Sources: Congressional Budget Office and Joint Committee on Taxation.

Basis of estimate: For purposes of this estimate, CBO assumes that the amounts authorized in the bill will be appropriated by the start of each fiscal year and that outlays will follow the historical spending patterns for such activities. The outlay estimates are drive by trends at NSF, which accounts for about 60 percent of the funding authorized by the bill. CBO estimates that the General Accounting Office would spend less than $125,000 to prepare the study on research funded in fiscal year 2000, assuming appropriation of the necessary amounts.

This bill also would make the research and experimentation taxation credit permanent as of June 30, 1999, the date on which it expired. JCT estimates that this extension would reduce federal tax receipts by a total of $26.3 billion over the next 10 years. This estimate assumes that H.R. 2086 is enacted by October 1, 1999.

Pay-as-you-go considerations: The Balanced Budget and Emergency Deficit Control Act sets up pay-as-you-go procedures for legislation affecting direct spending or receipts. The net changes in governmental receipts that are subject to pay-as-you-go procedures are shown in the following table. For the purposes of enforcing pay-as-you-go procedures, only the effects in the current year, the budget year, and the succeeding four years are counted.

	By fiscal years, in millions of dollars—										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Changes in outlays	Not applicable										
Changes in receipts	0	−1,603	−1,793	−2,153	−2,454	−2,676	−2,830	−2,972	−3,120	−3,276	−3,440

Intergovernmental and private-sector impact: H.R. 2086 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments. Some of the funds authorized in the bill would be used for internships and research at academic institutions, including public universities.

Estimate prepared by: Kathleen Gramp.

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

XI. Compliance With Public Law 104–4

H.R. 2086 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 has no oversight findings.

XIII. Oversight Findings and Recommendations by the Committee on Government Reform

Rule XIII, clause 3(c)(4) of the House of Representatives requires each committee report to contain a summary of the oversight findings and recommendations made by the House Committee on Government Reform pursuant to clause 4(c)(2) of rule X, whenever such findings and recommendations have been submitted to the Committee in a timely fashion. The Committee on Science has received no such findings or recommendations from the Committee on Government Reform.

XIV. 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. 2086.

XV. Federal Advisory Committee Statement

H.R. 2086 does not establish, nor authorize the establishment of, any advisory committee.

XVI. Congressional Accountability Act

The Committee finds that H.R. 2086 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVII. Changes in Existing Law Made by the Bill, as Reported

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

HIGH-PERFORMANCE COMPUTING ACT OF 1991

* * * * * * *

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

SEC. 101. NATIONAL HIGH-PERFORMANCE COMPUTING PROGRAM.

(a) * * *

(b) ADVISORY COMMITTEE.—*(1)* The President shall establish an advisory committee on high-performance computing 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. The recommendations of the advisory committee shall be considered in reviewing and revising the Program. The advisory committee 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;

[(4)] *(D)* whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in computing 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, implementation, and activities of the Program, the Next Generation Internet program, and the Networking and Information Technology Research and Development program, and shall report not less frequently than once every 2 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 1 year after the date of the enactment of the Networking and Information Technology Research and Development Act.

(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 activities which contributes directly to the Program*, including the Next Generation Internet program and the Networking and Information Technology Research and Development program* or benefits from the Program*, including the Next Generation Internet program and the Networking and Information Technology Research and Development program*; and

* * * * * * *

(2) The Office of Management and Budget shall review each such report in light of the goals, priorities, and agency and departmental responsibilities set forth in the annual report submitted under subsection (a)(3)(A), and shall include, in the President's annual budget estimate, a statement of the portion of each appropriate agency's or department's annual budget estimate relating to its activities undertaken pursuant to the Program*, including the Next Genera-*

tion Internet program and the Networking and Information Technology Research and Development program.

* * * * * * *

SEC. 103. NEXT GENERATION INTERNET.

(a) * * *

* * * * * * *

[(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 National Security 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.]

(c) STUDY OF INTERNET PRIVACY.—

(1) STUDY.—Not later than 90 days after the date of enactment of the Networking and Information Technology Research and Development Act, the National Science Foundation may enter into an arrangement with the National Research Council of the National Academy of Sciences for that Council to conduct a study of privacy on the Internet.

(2) SUBJECTS.—The study shall address—

(A) research needed to develop technology for protection of privacy on the Internet;

(B) current public and private plans for the deployment of privacy technology, standards, and policies;

(C) policies, laws, and practices under consideration or formally adopted in other countries and jurisdictions to protect privacy on the Internet;

(D) Federal legislation and other regulatory steps needed to ensure the development of privacy technology, standards, and policies; and

(E) other matters that the National Research Council determines to be relevant to Internet privacy.

(3) TRANSMITTAL TO CONGRESS.—The National Science Foundation shall transmit to the Congress within 21 months of the date of enactment of the Networking and Information Technology Research and Development Act a report setting forth the findings, conclusions, and recommendations of the National Research Council.

(4) FEDERAL AGENCY COOPERATION.—Federal agencies shall cooperate fully with the National Research Council in its activities in carrying out the study under this subsection.

(5) AVAILABILITY OF FUNDS.—Of the amounts described in subsection (d)(2), $900,000 shall be available for the study conducted under this subsection.

(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] *1999,* $25,000,000 for fiscal year 2000*, $15,000,000 for fiscal year 2001, and $15,000,000 for fiscal year 2002*;

(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*, and $25,000,000 for fiscal year 2001 and $25,000,000 for fiscal year 2002*;

* * * * * * *

(4) for the National Aeronautics and Space Administration, $10,000,000 for fiscal year [1999 and] *1999,* $10,000,000 for fiscal year 2000*, $10,000,000 for fiscal year 2001, and $10,000,000 for fiscal year 2002*; and

(5) for the National Institute of Standards and Technology, $5,000,000 for fiscal year [1999 and] *1999,* $7,500,000 for fiscal year 2000*, $5,500,000 for fiscal year 2001, and $5,500,000 for fiscal year 2002*.

* * * * * * *

TITLE II—AGENCY ACTIVITIES

SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

(a) * * *

* * * * * * *

(b) AUTHORIZATION OF APPROPRIATIONS.—[From sums otherwise authorized to be appropriated, there] *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[.]*; $439,000,000 for fiscal year 2000; $468,500,000 for fiscal year 2001; $493,200,000 for fiscal year 2002; $544,100,000 for fiscal year 2003; and $571,300,000 for fiscal year 2004. Amounts authorized under this subsection shall be the total amounts authorized to the National Science Foundation for a fiscal year for the Program, and shall not be in addition to amounts previously authorized by law for the purposes of the Program.*

(c) NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT.—(1) Of the amounts authorized under subsection (b), $310,000,000 for fiscal year 2000; $333,000,000 for fiscal year 2001; $352,000,000 for fiscal year 2002; $390,000,000 for fiscal year 2003; and $415,000,000 for fiscal year 2004 shall be available for grants for long-term basic research on networking and information technology, with priority given to research that helps address issues related to high end computing and software; network stability, fragility, reliability, security (including privacy), and scalability; and the social and economic consequences of information technology.

(2) In each of the fiscal years 2000 and 2001, the National Science Foundation shall award under this subsection up to 20 large grants of up to $1,000,000 each, and in each of the fiscal years 2002, 2003, and 2004, the National Science Foundation shall award under this subsection up to 30 large grants of up to $1,000,000 each.

(3)(A) Of the amounts described in paragraph (1), $40,000,000 for fiscal year 2000; $40,000,000 for fiscal year 2001; $45,000,000 for fiscal year 2002; $45,000,000 for fiscal year 2003; and $50,000,000 for fiscal year 2004 shall be available for grants of up to $5,000,000 each for Information Technology Research Centers.

(B) For purposes of this paragraph, the term "Information Technology Research Centers" means groups of 6 or more researchers collaborating across scientific and engineering disciplines on large-scale long-term research projects which will significantly advance the science supporting the development of information technology or the use of information technology in addressing scientific issues of national importance.

(d) MAJOR RESEARCH EQUIPMENT.—(1) In addition to the amounts authorized under subsection (b), there are authorized to be appropriated to the National Science Foundation $70,000,000 for fiscal year 2000, $70,000,000 for fiscal year 2001, $80,000,000 for fiscal year 2002, $80,000,000 for fiscal year 2003, and $85,000,000 for fiscal year 2004 for grants for the development of major research equipment to establish terascale computing capabilities at 1 or more sites and to promote diverse computing architectures. Awards made under this subsection shall provide for support for the operating expenses of facilities established to provide the terascale computing capabilities, with funding for such operating expenses derived from amounts available under subsection (b).

(2) Grants awarded under this subsection shall be awarded through an open, nationwide, peer-reviewed competition. Awardees may include consortia consisting of members from some or all of the following types of institutions:

(A) Academic supercomputer centers.

(B) State-supported supercomputer centers.

(C) Supercomputer centers that are supported as part of federally funded research and development centers.

Notwithstanding any other provision of law, regulation, or agency policy, a federally funded research and development center may apply for a grant under this subsection, and may compete on an equal basis with any other applicant for the awarding of such a grant.

(3) As a condition of receiving a grant under this subsection, an awardee must agree—

(A) to connect to the National Science Foundation's Partnership for Advanced Computational Infrastructure network;

(B) to the maximum extent practicable, to coordinate with other federally funded large-scale computing and simulation efforts; and

(C) to provide open access to all grant recipients under this subsection or subsection (c).

(e) INFORMATION TECHNOLOGY EDUCATION AND TRAINING GRANTS.—

(1) INFORMATION TECHNOLOGY GRANTS.—The National Science Foundation shall provide grants under the Scientific and Advanced Technology Act of 1992 for the purposes of section 3(a) and (b) of that Act, except that the activities supported pursuant to this paragraph shall be limited to improving education in fields related to information technology. The Founda-

tion shall encourage institutions with a substantial percentage of student enrollments from groups underrepresented in information technology industries to participate in the competition for grants provided under this paragraph.

(2) INTERNSHIP GRANTS.—The National Science Foundation shall provide—

(A) grants to institutions of higher education to establish scientific internship programs in information technology research at private sector companies; and

(B) supplementary awards to institutions funded under the Louis Stokes Alliances for Minority Participation program for internships in information technology research at private sector companies.

(3) MATCHING FUNDS.—Awards under paragraph (2) shall be made on the condition that at least an equal amount of funding for the internship shall be provided by the private sector company at which the internship will take place.

(4) DEFINITION.—For purposes of this subsection, the term "institution of higher education" has the meaning given that term in section 1201(a) of the Higher Education Act of 1965 (20 U.S.C. 1141(a)).

(5) AVAILABILITY OF FUNDS.—Of the amounts described in subsection (c)(1), $10,000,000 for fiscal year 2000, $15,000,000 for fiscal year 2001, $20,000,000 for fiscal year 2002, $25,000,000 for fiscal year 2003, and $25,000,000 for fiscal year 2004 shall be available for carrying out this subsection.

(f) EDUCATIONAL TECHNOLOGY RESEARCH.—

(1) RESEARCH PROGRAM.—As part of its responsibilities under subsection (a)(1), the National Science Foundation shall establish a research program to develop, demonstrate, assess, and disseminate effective applications of information and computer technologies for elementary and secondary education. Such program shall—

(A) support research projects, including collaborative projects involving academic researchers and elementary and secondary schools, to develop innovative educational materials, including software, and pedagogical approaches based on applications of information and computer technology;

(B) support empirical studies to determine the educational effectiveness and the cost effectiveness of specific, promising educational approaches, techniques, and materials that are based on applications of information and computer technologies; and

(C) include provision for the widespread dissemination of the results of the studies carried out under subparagraphs (A) and (B), including maintenance of electronic libraries of the best educational materials identified accessible through the Internet.

(2) REPLICATION.—The research projects and empirical studies carried out under paragraph (1)(A) and (B) shall encompass a wide variety of educational settings in order to identify approaches, techniques, and materials that have a high potential for being successfully replicated throughout the United States.

(3) AVAILABILITY OF FUNDS.—Of the amounts authorized under subsection (b), $10,000,000 for fiscal year 2000, $10,500,000 for fiscal year 2001, $11,000,000 for fiscal year 2002, $12,000,000 for fiscal year 2003, and $12,500,000 for fiscal year 2004 shall be available for the purposes of this subsection.

(g) PEER REVIEW.—All grants made under this section shall be made only after being subject to peer review by panels or groups having private sector representation.

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*, and may participate in or support research described in section 201(c)(1)*.

(b) AUTHORIZATION OF APPROPRIATIONS.—**[**From sums otherwise authorized to be appropriated, there**]** *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**[**.**]***; $164,400,000 for fiscal year 2000; $201,000,000 for fiscal year 2001; $208,000,000 for fiscal year 2002; $224,000,000 for fiscal year 2003; and $231,000,000 for fiscal year 2004.*

SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.

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

(1) * * *

* * * * * * *

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

and may participate in or support research described in section 201(c)(1).

* * * * * * *

(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**[**.**]***; $106,600,000 for fiscal year 2000; $103,500,000 for fiscal year 2001; $107,000,000 for fiscal year 2002; $125,700,000 for fiscal year 2003; and $129,400,000 for fiscal year 2004.*

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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) * * *

* * * * * * *

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

and may participate in or support research described in section 201(c)(1); 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*, and may participate in or support research described in section 201(c)(1).*

* * * * * * *

(d) AUTHORIZATION OF APPROPRIATIONS.—[From sums otherwise authorized to be appropriated, there] *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] *1996; $9,000,000 for fiscal year 2000; $9,500,000 for fiscal year 2001; $10,500,000 for fiscal year 2002; $16,000,000 for fiscal year 2003; and $17,000,000 for fiscal year 2004; 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[.]*; $13,500,000 for fiscal year 2000; $13,900,000 for fiscal year 2001; $14,300,000 for fiscal year 2002; $14,800,000 for fiscal year 2003; and $15,200,000 for fiscal year 2004.*

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*, and may participate in or support research described in section 201(c)(1).*

(b) AUTHORIZATION OF APPROPRIATIONS.—[From sums otherwise authorized to be appropriated, there] *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[.]*; $4,200,000 for fiscal year 2000; $4,300,000 for fiscal year 2001; $4,500,000 for*

fiscal year 2002; $4,600,000 for fiscal year 2003; and $4,700,000 for fiscal year 2004.

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INTERNAL REVENUE CODE OF 1986

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Subtitle A—Income Taxes

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CHAPTER 1—NORMAL TAXES AND SURTAXES

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Subchapter A—Determination of tax liability

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PART IV—CREDITS AGAINST TAX

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Subpart D—Business Related Credits

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SEC. 41. CREDIT FOR INCREASING RESEARCH ACTIVITIES.

(a) * * *

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[(h) TERMINATION.—

[(1) IN GENERAL.—This section shall not apply to any amount paid or incurred—

[(A) after June 30, 1995, and before July 1, 1996, or

[(B) after June 30, 1999.

Notwithstanding the preceding sentence, in the case of a taxpayer making an election under subsection (c)(4) for its first taxable year beginning after June 30, 1996, and before July 1, 1997, this section shall apply to amounts paid or incurred during the 36-month period beginning with the first month of such year. The 36 months referred to in the preceding sentence shall be reduced by the number of full months after June 1996 (and before the first month of such first taxable year) during which the taxpayer paid or incurred any amount which is taken into account in determining the credit under this section.

[(2) COMPUTATION OF BASE AMOUNT.—In the case of any taxable year with respect to which this section applies to a number of days which is less than the total number of days in such taxable year, the base amount with respect to such taxable year shall be the amount which bears the same ratio to the base amount for such year (determined without regard to this paragraph) as the number of days in such taxable year to

which this section applies bears to the total number of days in such taxable year.]

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SEC. 45C. CLINICAL TESTING EXPENSES FOR CERTAIN DRUGS FOR RARE DISEASES OR CONDITIONS.

(a) * * *

(b) QUALIFIED CLINICAL TESTING EXPENSES.—For purposes of this section—

(1) QUALIFIED CLINICAL TESTING EXPENSES.—

(A) * * *

* * * * * * *

[(D) SPECIAL RULE.—For purposes of this paragraph, section 41 shall be deemed to remain in effect for periods after June 30, 1995, and before July 1, 1996, and periods after June 30, 1999.]

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XVIII. COMMITTEE RECOMMENDATIONS

On September 9, 1999, a quorum being present, the Committee favorably reported H.R. 2086, the Networking and Information Technology Research and Development Act, by a recorded vote of 41 to 0, and recommends its enactment.

XIX. Additional View

Mr. Chairman, I am a proud co-sponsor of the Networking and Information Technology Research and Development Act, H.R. 2086, and I am pleased that the Science Committee is moving on legislation that is essential to maintaining America's leading role in advancing technological progress.

Fundamental, basic research in IT was instrumental in bringing about the information revolution and has contributed to the creation of new industries and new, high-paying jobs. Information technology will, indeed, change the way Americans live, learn, and work.

I believe Congress has a responsibility to place the interest of our future economic and educational growth and our global competitiveness in the forefront of our national concerns. Congress can accomplish this by passing this important piece of legislation.

Mr. Chairman, I would like to praise your leadership for making basic IT research a priority for this country. Your efforts to provide a long-term plan for increasing and sustaining federal IT research into the next century are a testament to your commitment to ensure America's continued economic growth and your support for scientific and technological progress in our nation.

Thank you very much, Mr. Chairman.

John B. Larson.

XX. PROCEEDINGS OF FULL COMMITTEE MARKUP

MARKUP OF H.R. 2086, THE NETWORKING INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 1999

THURSDAY, SEPTEMBER 9, 1999

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

Next, we get to H.R. 2086, the Networking Information Technology Research and Development Act of 1999.

[The bill H.R. 2086 follows:]

I

106TH CONGRESS
1ST SESSION

H. R. 2086

To authorize funding for networking and information technology research and development for fiscal years 2000 through 2004, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JUNE 9, 1999

Mr. SENSENBRENNER (for himself, Mr. BROWN of California, Mr. DAVIS of Virginia, Mrs. MORELLA, Mr. EWING, Mr. COOK, Mr. BRADY of Texas, Mr. EHLERS, Mr. ETHERIDGE, Mr. WELDON of Florida, Mr. KUYKENDALL, Ms. STABENOW, Mr. LUCAS of Oklahoma, Mr. SMITH of Michigan, Mr. DOYLE, Mr. ROHRABACHER, Ms. EDDIE BERNICE JOHNSON of Texas, Ms. JACKSON-LEE of Texas, Mr. CAPUANO, Mr. BARTLETT of Maryland, Mr. UDALL of Colorado, Ms. WOOLSEY, Mr. CALVERT, Mr. GUTKNECHT, Ms. LOFGREN, and Mr. GORDON) introduced the following bill; which was referred to the Committee on Science, and in addition to the Committee on the Ways and Means, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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A BILL

To authorize funding for networking and information technology research and development for fiscal years 2000 through 2004, and for other purposes.

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

SECTION 1. SHORT TITLE.

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

SEC. 2. FINDINGS.

The Congress makes the following findings:

(1) Information technology will continue to change the way Americans live, learn, and work. The information revolution will improve the workplace and the quality and accessibility of health care and education and make government more responsible and accessible.

(2) Information technology is an imperative enabling technology that contributes to scientific disciplines. Major advances in biomedical research, public safety, engineering, and other critical areas depend on further advances in computing and communications.

(3) The United States is the undisputed global leader in information technology.

(4) Information technology is recognized as a catalyst for economic growth and prosperity.

(5) Information technology represents one of the fastest growing sectors of the United States economy, with electronic commerce alone projected to become a trillion-dollar business by 2005.

(6) Businesses producing computers, semiconductors, software, and communications equipment account for one-third of the total growth in the United States economy since 1992.

(7) According to the United States Census Bureau, between 1993 and 1997, the information technology sector grew an average of 12.3 percent per year.

(8) Fundamental research in information technology has enabled the information revolution.

(9) Fundamental research in information technology has contributed to the creation of new industries and new, high-paying jobs.

(10) Scientific and engineering research and the availability of a skilled workforce are critical to continued economic growth driven by information technology.

(11) In 1997, private industry provided most of the funding for research and development in the information technology sector. The information technology sector now receives, in absolute terms, one-third of all corporate spending on research and development in the United States economy.

(12) The private sector tends to focus its spending on short-term, applied research.

(13) The Federal Government is uniquely positioned to support long-term fundamental research.

(14) Federal applied research in information technology has grown at almost twice the rate of Federal basic research since 1986.

(15) Federal science and engineering programs must increase their emphasis on long-term, high-risk research.

(16) Current Federal programs and support for fundamental research in information technology is inadequate if we are to maintain the Nation's global leadership in information technology.

SEC. 3. AUTHORIZATION OF APPROPRIATIONS.

(a) NATIONAL SCIENCE FOUNDATION.—Section 201(b) of the High-Performance Computing Act of 1991 (15 U.S.C. 5521(b)) is amended—

(1) by striking "From sums otherwise authorized to be appropriated, there" and inserting "There";

(2) by striking "1995; and" and inserting "1995;"; and

(3) by striking the period at the end and inserting "; $445,000,000 for fiscal year 2000; $468,500,000 for fiscal year 2001; $493,200,000 for fiscal year 2002; $544,100,000 for fiscal year 2003;

and $571,300,000 for fiscal year 2004. Amounts authorized under this subsection shall be the total amounts authorized to the National Science Foundation for a fiscal year for the Program, and shall not be in addition to amounts previously authorized by law for the purposes of the Program.".

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

(1) by striking "From sums otherwise authorized to be appropriated, there" and inserting "There";

(2) by striking "1995; and" and inserting "1995;"; and

(3) by striking the period at the end and inserting "; $164,400,000 for fiscal year 2000; $201,000,000 for fiscal year 2001; $208,000,000 for fiscal year 2002; $224,000,000 for fiscal year 2003; and $231,000,000 for fiscal year 2004.".

(c) DEPARTMENT OF ENERGY.—Section 203(e)(1) of the High-Performance Computing Act of 1991 (15 U.S.C. 5523(e)(1)) is amended—

(1) by striking "1995; and" and inserting "1995;"; and

(2) by striking the period at the end and inserting "; $100,600,000 for fiscal year 2000; $103,500,000 for fiscal year 2001; $107,000,000 for fiscal year 2002; $125,700,000 for fiscal year 2003; and $129,400,000 for fiscal year 2004.".

(d) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.—(1) Section 204(d)(1) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(d)(1)) is amended—

(A) by striking "1995; and" and inserting "1995;"; and

(B) by striking "1996; and" and inserting "1996; $9,000,000 for fiscal year 2000; $9,500,000 for fiscal year 2001; $10,500,000 for fiscal year 2002; $16,000,000 for fiscal year 2003; and $17,000,000 for fiscal year 2004; and".

(2) Section 204(d) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(d)) is amended by striking "From sums otherwise authorized to be appropriated, there" and inserting "There".

(e) NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.—Section 204(d)(2) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(d)(2)) is amended—

(1) by striking "1995; and" and inserting "1995;"; and

(2) by striking the period at the end and inserting "; $13,500,000 for fiscal year 2000; $13,900,000 for fiscal year 2001; $14,300,000 for fiscal year 2002; $14,800,000 for fiscal year 2003; and $15,200,000 for fiscal year 2004.".

(f) ENVIRONMENTAL PROTECTION AGENCY.—Section 205(b) of the High-Performance Computing Act of 1991 (15 U.S.C. 5525(b)) is amended—

(1) by striking "From sums otherwise authorized to be appropriated, there" and inserting "There";

(2) by striking "1995; and" and inserting "1995;"; and

(3) by striking the period at the end and inserting "; $4,200,000 for fiscal year 2000; $4,300,000 for fiscal year 2001; $4,500,000 for fiscal year 2002; $4,600,000 for fiscal year 2003; and $4,700,000 for fiscal year 2004.".

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

(a) NATIONAL SCIENCE FOUNDATION.—Section 201 of the High-Performance Computing Act of 1991 (15

U.S.C. 5521) is amended by adding at the end the following new subsections:

"(c) NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT.—(1) Of the amounts authorized under subsection (b), $316,000,000 for fiscal year 2000; $333,000,000 for fiscal year 2001; $352,000,000 for fiscal year 2002; $390,000,000 for fiscal year 2003; and $415,000,000 for fiscal year 2004 shall be available for grants for long-term basic research on networking and information technology, with priority given to research that helps address issues related to high end computing and software and network stability, fragility, reliability, security (including privacy), and scalability.

"(2) In each of the fiscal years 2000 and 2001, the National Science Foundation shall award under this subsection up to 20 large grants of up to $1,000,000 each, and in each of the fiscal years 2002, 2003, and 2004, the National Science Foundation shall award under this subsection up to 30 large grants of up to $1,000,000 each.

"(3)(A) Of the amounts described in paragraph (1), $40,000,000 for fiscal year 2000; $40,000,000 for fiscal year 2001; $45,000,000 for fiscal year 2002; $45,000,000 for fiscal year 2003; and $50,000,000 for fiscal year 2004 shall be available for grants of up to $5,000,000 each for Information Technology Research Centers.

"(B) For purposes of this paragraph, the term 'Information Technology Research Centers' means groups of 6 or more researchers collaborating across scientific and engineering disciplines on large-scale long-term research projects which will significantly advance the science supporting the development of information technology or the use of information technology in addressing scientific issues of national importance.

"(d) MAJOR RESEARCH EQUIPMENT.—(1) In addition to the amounts authorized under subsection (b), there are authorized to be appropriated to the National Science Foundation $70,000,000 for fiscal year 2000, $70,000,000 for fiscal year 2001, $80,000,000 for fiscal year 2002, $80,000,000 for fiscal year 2003, and $85,000,000 for fiscal year 2004 for grants for the development of major research equipment to establish terascale computing capabilities at 1 or more sites and to promote diverse computing architectures.

"(2) Grants awarded under this subsection shall be awarded through an open, peer-reviewed competition.

"(3) As a condition of receiving a grant under this subsection, an awardee must agree—

"(A) to connect to the National Science Foundation's Partnership for Advanced Computational Infrastructure network;

"(B) to the maximum extent practicable, to coordinate with other federally funded large-scale computing and simulation efforts; and

"(C) to provide open access to all grant recipients under this subsection or subsection (c).

"(e) INFORMATION TECHNOLOGY INTERNSHIP GRANTS.—(1) Of the amounts described in subsection (c)(1), $10,000,000 for fiscal year 2000, $15,000,000 for fiscal year 2001, $20,000,000 for fiscal year 2002, $25,000,000 for fiscal year 2003, and $25,000,000 for fiscal year 2004 shall be available for institutions of higher education to establish scientific internship programs in information technology research at private sector companies. Grants under this subsection shall be made on the condition that at least an equal amount of funding for the internship shall be provided by the private sector company at which the internship will take place.

"(2) For purposes of this subsection, the term 'institution of higher education' has the meaning given that term in section 1201(a) of the Higher Education Act of 1965 (20 U.S.C. 1141(a)).

"(f) PEER REVIEW.—All grants made under this section shall be made only after being subject to peer review by panels or groups having private sector representation.".

(b) OTHER PROGRAM AGENCIES.—

(1) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.—Section 202(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5522(a)) is amended by inserting ", and may participate in or support research described in section 201(c)(1)" after "and experimentation".

(2) DEPARTMENT OF ENERGY.—Section 203(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5523(a)) is amended by striking the period at the end and inserting a comma, and by adding after paragraph (4) the following:

"and may participate in or support research described in section 201(c)(1).".

(3) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.—Section 204(a)(1) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(a)(1)) is amended by striking "; and" at the end of subparagraph (C) and inserting a comma, and by adding after subparagraph (C) the following: "and may participate in or support research described in section 201(c)(1); and".

(4) NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.—Section 204(a)(2) of the High-Performance Computing Act of 1991 (15 U.S.C. 5524(a)(2)) is amended by inserting ", and may

participate in or support research described in section 201(c)(1)" after "agency missions".

(5) ENVIRONMENTAL PROTECTION AGENCY.—Section 205(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5525(a)) is amended by inserting ", and may participate in or support research described in section 201(c)(1)" after "dynamics models".

SEC. 5. NEXT GENERATION INTERNET.

Section 103 of the High-Performance Computing Act of 1991 (15 U.S.C. 5513) is amended—

(1) by striking subsection (c) and redesignating subsection (d) and subsection (c); and

(2) in subsection (c), as so redesignated by paragraph (1) of this section—

(A) in paragraph (1)—

(i) by striking "1999 and" and inserting "1999,"; and

(ii) by inserting ", $15,000,000 for fiscal year 2001, and $15,000,000 for fiscal year 2002" after "fiscal year 2000";

(B) in paragraph (2), by inserting ", and $25,000,000 for fiscal year 2001 and $25,000,000 for fiscal year 2002" after "Act of 1998";

(C) in paragraph (4)—

(i) by striking "1999 and" and inserting "1999,"; and

(ii) by inserting ", $10,000,000 for fiscal year 2001, and $10,000,000 for fiscal year 2002" after "fiscal year 2000"; and

(D) in paragraph (5)—

(i) by striking "1999 and" and inserting "1999,"; and

(ii) by inserting ", $5,500,000 for fiscal year 2001, and $5,500,000 for fiscal year 2002" after "fiscal year 2000".

SEC. 6. REPORTING REQUIREMENTS.

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

(1) in subsection (b)—

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

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

(C) 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, implementation, and activities of the Program, the Next Generation Internet program, and the Networking and Information Technology Research and Development program, and shall report not less frequently than once every 2 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 1 year after the date of the enactment of the Networking and Information Technology Research and Development Act."; and

(2) in subsection (c)(1)(A) and (2), by inserting ", including the Next Generation Internet program and the Networking and Information Technology Research and Development program" after "Program" each place it appears.

SEC. 7. EVALUATION OF CAPABILITIES OF FOREIGN ENCRYPTION.

(a) STUDY.—The National Science Foundation shall undertake a study comparing the availability of encryption technologies in foreign countries to the encryption technologies subject to export restrictions in the United States.

(b) REPORT TO CONGRESS.—Not later than 6 months after the date of enactment of this Act, the National Science Foundation shall transmit to the Congress a report on the results of the study undertaken under subsection (a).

SEC. 8. RESEARCH CREDIT MADE PERMANENT.

(a) IN GENERAL.—Section 41 of the Internal Revenue Code of 1986 (relating to credit for increasing research activities) is amended by striking subsection (h).

(b) CONFORMING AMENDMENT.—Paragraph (1) of section 45C(b) of such Code is amended by striking subparagraph (D).

(c) EFFECTIVE DATE.—The amendments made by this section shall apply to amounts paid or incurred after June 30, 1999.

O

H.R. 2086
THE NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT:
SECTION-BY-SECTION SUMMARY

The Networking and Information Technology Research and Development Act authorizes programs under the High-Performance Computing (HPC) Act of 1991, as amended, including the Next Generation Internet program. For fiscal years 2000 through 2004, H.R. 2086 authorizes $4,768.7 million.

Sec. 1 Short Title.

Cites the Act as the "Networking and Information Technology Research and Development Act."

Sec. 2. Findings.

The Congress finds that (1) information technology will continue to change the way Americans live, learn, and work; (2) information technology is an important enabling technology; (3) the U.S. is the world leader in information technology; (4) information technology is a catalyst for economic growth; (5) information technology is the fastest growing sector of the U.S. economy; (6) information technology companies have accounted for about a third of the growth in the U.S. economy since 1992; (7) the information technology sector has been growing at 12.3 percent per year since 1993; (8) the information revolution is linked to fundamental research in information technology; (9) information technology research has created entirely new industries; (10) continued growth in information technology depends on research and a skilled workforce; (11) private industry provides most of the information technology research funding; (12) the private sector tends to focus on short-term research; (13) the Federal Government is positioned to support fundamental research; (14) federal applied research has grown at twice the rate of basic research since 1986; (15) federal programs must increase their emphasis on fundamental research; and (16) current federal support for long-term information technology research is inadequate.

Sec. 3. Authorization of Appropriations.

Authorizes a total of $4,272.7 million over fiscal years 2000-2004. Specifically, it amends section 201 of the HPC Act of 1991 to provide five-year authorizations for six agencies participating in the National High-Performance Computing and National Research and Education Network programs as follows:

(a) National Science Foundation (NSF) - Authorizes a total of $2,522.1 million over fiscal years 2000-2004.

(b) National Aeronautics and Space Administration (NASA) - Authorizes a total of $1,028.4 million over fiscal years 2000-2004.

(c) Department of Energy (DOE) - Authorizes a total of $566.2 million over fiscal years 2000-2004.

(d) National Institute for Standards and Technology (NIST) - Authorizes a total of $62.0 million over fiscal years 2000-2004.

(e) National Oceanographic and Atmospheric Administration (NOAA) - Authorizes a total of $71.7 million over fiscal years 2000-2004.

(f) Environmental Protection Agency (EPA) - Authorizes a total of $22.3 million over fiscal years 2000-2004.

Sec. 4. Networking and Information Technology Research and Development.

(a) Amends the HPC Act of 1991 by adding the following new subsections:

"(c) Networking and Information Technology Research and Development (NITRD) - (1) Authorizes, out of sums authorized for NSF in section 3, a total of $1,806.0 million over fiscal years 2000-2004 for long-term, basic research grants into networking and information technology, including high-end computing and software and network fragility, security, and scalability. (2) Sets aside a total of $130 million over fiscal years 2000-2004 for large grants of up to 1.0 million each. (3) Sets aside a total of $220.0 million over fiscal years 2000-2004 for Information Technology Research Centers, which shall be made up of groups of six of more researchers entering into multi-disciplinary collaborations for large-scale, long-term information technology projects.

"(d) Major Research Equipment - (1) Authorizes a total of $385 million over fiscal years 2000-2004 to NSF for establishing terascale computing capabilities at one or more sights, promoting diverse computer architectures, and broadening NSF's Advanced Partnership for Advanced Computational Infrastructure (PACI) program. (2) Requires that awardees must agree to connect to the existing PACI network, provide open access to all NITRD program grant recipients, and to the maximum extent practicable, coordinate with existing computing and simulation programs.

"(e) (1) Authorizes, out of sums authorized for NSF in section 3, a total of $95.0 million over fiscal years 2000-2004 for colleges and universities to establish information technology internship programs for research at private companies. Companies participating in the program are required to match at least 50 percent of the funding of the grant. (2) Defines institution of higher learning consistent with the Higher Education Act of 1965.

"(f) Peer Review - Requires that peer review panels have private-sector representation."

(b) Amends Title II-Agency Activities, subsections 202(a), 203(a), 204(a)(1), 204(a)(2), and 205(a), of the HPC Act of 1991 to allow NASA, DOE, NIST, NOAA, and EPA,

respectively, to participate in or support the programs authorized under NITRD section 201(c)(1).

Sec. 5. Next Generation Internet.

Authorizes a total of $111.0 million over fiscal years 2001-2002. Specifically, it amends section 103 of the HPC Act of 1991 to provide authorization to completion of the Next Generation Internet (NGI) program. The authorizations are as follows:

(a) NSF - Authorizes a total of $50.0 million over fiscal years 2001-2002.

(b) NASA - Authorizes a total of $20.0 million over fiscal years 2001-2002.

(c) DOE - Authorizes a total of $30.0 million over fiscal years 2001-2002.

(d) NIST - Authorizes a total of $11.0 million over fiscal years 2001-2002.

Sec. 6. Reporting Requirements.

Requires the Advisory Committee established under the HPC Act of 1991 to provide to Congress not less than once every two years a report evaluating the funding, management, implementation, and activities of the HPC, NGI, and NITRD programs.

It further requires that the agencies include in their annual requests for appropriations to the Office of Management and Budget information on the NGI and NITRD programs in addition to the HPC program.

Sec. 7. Evaluation of Capabilities of Foreign Encryption.

(a) Requires NSF to conduct a study on the availability of encryption technologies in foreign countries and how they compare with encryption technologies subject to export restrictions in the United States.

(b) Requires NSF to transmit this report within 6 months after enactment.

Sec. 8. Research Credit Made Permanent.

Amends Sections 41 and 45C(b) of the Internal Revenue Code of 1986 to make permanent the research and development tax credit.

Chairman SENSENBRENNER. I will recognize myself for five minutes.

There is no dispute that the United States is the global leader in computing and communications information technology. Maintaining our Nation's lead, however, is not a given. Today's global reality is that economic strength is as important as military strength and that the $500 billion a year information technology industry accounts for ⅓ of our Nation's economic growth. This current growth is predicated on the federal research conducted 10, 20, even 30 years ago.

H.R. 2086, the Networking Information Technology Research and Development Act, is bipartisan legislation that demonstrates a commitment to upholding our Nation's preeminence in information technology. The intent of this bill, which is a 5-year authorization, is to comprehensively authorize the Federal Government's basic IT research effort.

Among other things, this bill focuses on information technology research grants for long-term basic research and provides authorizations for terascale computing hardware. The bill authorizes a comprehensive, new, federal peer-reviewed research program administered by the National Science Foundation to ensure that the funding is used for the highest-quality of basic research.

The funding will not only ensure that science keeps up with the needs of our information-driven economy, but will also help produce the next generation of highly skilled IT workers, as increased research funding leads to more and better qualified research graduates and Ph.D.'s.

Our future global influence lies in the hands of our young people, the education and training they receive, and the new scientific breakthroughs they produce. This bill offers opportunities for all. The bill also ensures open competition that allows diverse groups from 2-year community colleges to DOE labs to benefit.

Thirty-three of the members of this Committee are co-sponsors of the bill. The bill is also supported by the President's Information Technology Advisory Committee, better known as PITAC, as well as academia and industry.

The reason for such widespread support is simple. Everyone realizes that information technology research assists all fields of science. The research funded under this bill will help physicists, mathematicians, engineers, and computer scientists alike.

STATEMENT OF CHAIRMAN F. JAMES SENSENBRENNER, JR., HOUSE COMMITTEE ON SCIENCE

H.R. 2086—THE NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT

There is no dispute that the United States is the global leader in computing and communications information technology. Maintaining our Nation's lead, however, is not given. Today's global reality is that economic strength is as important as military strength and the $500 billion-a-year information technology industry accounts for ⅓ of our Nation's economic growth. This current growth is predicated on Federal research conducted 10, 20, and even 30 years ago. H.R. 2086, the Networking and Information Technology Research and Development Act, is bipartisan legislation that demonstrates a commitment to upholding our Nation's preeminence in information technology. The intent of H.R. 2086, a five-year authorization bill, is to comprehensively authorize the Federal Government's basic information technology research effort.

Among other things, this bill focuses on information technology research grants for long-term basic research and provides authorizations for terascale computing hardware. The bill authorizes a comprehensive new federal peer-reviewed research program administered by the National Science Foundation to ensure that the funding is used for the highest quality of basic research.

This funding will not only ensure that science keeps up with the needs of our information-driven economy but also will help produce the next generation of highly skilled IT workers—as increased research funding leads to more and better qualified research graduate students and Ph.d's. Our future global influence lies in the hands of our young people, the education and training they receive, and the new scientific breakthroughs they produce. This bill offers opportunities for all.

The bill also ensures open competition that allows, diverse groups from two year community colleges to DOE labs to benefit. Thirty-three of the Members of this Committee are cosponsors of the bill. The bill is also supported by the President's Information Technology Advisory Committee (PITAC) as well as academia and industry. The reason for such widespread support is simple—everyone realizes that information technology research assist all fields of science. The research funded under this bill will help physicists, mathematicians, engineers, and computer scientists a like.

Chairman SENSENBRENNER. And I will now yield to the gentleman from Texas, Mr. Hall, whom I welcome as our new Ranking Democratic Member, for the opening statement on the Democratic side.

Mr. HALL. Mr. Chairman, you are exactly right that this bill enjoys the broad support of the members of this Committee, and I congratulate you for—in your efforts to bring it before the Committee.

Actually, information technology is transforming the way people live, the way people learn, the way that people work, and the way people play. And it will constitute an ever-growing portion of the economy in the 21st century.

This bill will support the research that's needed to underpin the advances in information technology that are going to create new infrastructure for business, scientific research, and personal communication.

It's a good bill; we support it, and, at this time, Mr. Chairman, I'd like to ask unanimous consent to insert into the record a statement made—to be made by Congresswoman Johnson, the Ranking Member of the Basic Research Subcommittee, to have her comments seen on the bill.

Chairman SENSENBRENNER. Without objection.

[The statement of Ms. Johnson follows:]

OPENING STATEMENT EDDIE BERNICE JOHNSON

Mr. Chairman, I am pleased you have brought H.R. 2086 before the Committee for its consideration. The bill has received the bipartisan co-sponsorship of many Members. It authorizes a major new research investment in information technology, which is largely consistent with the Present's Information Technology for the 21st Century initiative, as proposed in the fiscal year 2000 budget request. This is a very important research initiative, and it is appropriate that the Committee is moving expeditiously to authorize it.

H.R. 2086 will establish a mult-agency research initiative that responds to findings and recommendations reported by the President's Information Technology Advisory Committee. The report documents the results of a comprehensive assessment of federally funded information technology research conducted by the advisory committee. The Committee reviewed this report in a hearing last October.

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 performance 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 believe that in most respects H.R. 2086 will adequately implement the advisory committee's recommendations. There are a few changes that will be offered by myself and some of my colleagues on this side of the aisle, which will strengthen the bill and which I hope the Chairman will support.

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 along makes the case for the unexpected, and often spectacular, outcomes from federal long-term research investments in information technologies. H.R. 2086 will provide for the basis research needed to underpin the technologies 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.

Opening Statement of Congresswoman Debbie Stabenow of the 8th District, State of Michigan

Chairman Sensenbrenner, Ranking Member Hall, I appreciate the Committee convening today to address the legislation before us. As this is our first meeting after the August recess, I would like to again note the contributions that our colleague George Brown made to this Committee, to the Congress, and to our nation. I am sure that I speak for all of my colleagues when I say it was a tremendous honor to serve with him.

We have some important bills to consider this afternoon and I would like to comment generally on a few of them. I am a cosponsor of H.R. 2086, the Networking and Information Technology Research and Development Act, and believe that our commitment to funding federal research must remain strong. President Clinton has provided a great deal of leadership on these issues and this bill endorses many of the recommendations of the President's Information Technology Advisory Committee. However, I am concerned that despite Republicans rhetoric on funding this important work, they have failed to commit dollars during our current appropriations process. As White House Chief of Staff John Podesta recently described the Republican budget for Fiscal Year 2000 cuts the President's long-term Information Technology Initiative by 70%. This includes the Republican tax cut proposal. The centerpiece initiative of the high tech research effort is the permanent extension of the Research & Experimentation tax credit, which is part of H.R. 2086. The Republican tax package includes only a five-year extension of this credit. By contract, the Democratic tax proposal made it permanent. Words are not enough. Technology and research have fueled our economic prosperity, and are the keys to prolonging it. We must appropriate dollars for this purpose.

I am also a cosponsor of H.R. 1883, the Iran Nonproliferation Act of 1999. I am pleased that the Subcommittee brought this bill forward and share the concern of all of my colleagues regarding the need to address the issue of nuclear proliferation. I look forward to a discussion concerning the role of the International Space Station in this bill, and to the bill's eventual passage out of the Committee. Also of importance is H.R. 2607, the Commercial Space Transportation Competitiveness Act of 1999. It would extent the Commercial Space Indemnification Extension for five years, providing a needed boost to the commercial space industry. I support an amendment to be offered by Mr. Capuano which would require a study of the effect current proposed cuts in NASA appropriations will have on this industry. The NASA cuts are another example of a decreased Republican commitment to research.

Of particular concern to me is the consideration of H.R. 1744, the National Institute of Standards and Technology Authorization Act of 1999. It is unfortunate that we have not been able to complete our consideration of this legislation that we first attempted to markup in May. Given that the Commerce, Justice, State Appropriations bill for Fiscal Year 2000 has already passed the House, with gratuitions cuts to many of the programs contained in this bill, our work today is largely moot. But it does provide an important opportunity to speak out against those cuts, particularly to the Advanced Technology Program (ATP). This is a battle we have fought before, and I am confident we will ultimately win again, but I believe it is indicative of Republican doublespeak on the question of research funding. The ATP program provides federal funding in tandem with private funding for research into cutting edge technologies-work that otherwise would not occur. 55% of all ATP projects are led by small businesses, and 70% of projects include small businesses. Hence, the impact on our economy is significant. Over 100 universities take part in this important program. If funding is zeroed out, 240 projects in 30 states will be terminated.

In Michigan, the technologies developed through the ATP program have greatly benefitted the auto industry, leading to improvements in products as diverse as lightweight components for cars and high-performance spindles for machine tools. I will be offering an amendment with Congresswoman Rivers to increase the amount of money available for new awards over the next two fiscal years, and urge my colleagues to support it. This is an important program that is part of our federal commitment to research and development.

Mr. Chairman, Mr. Ranking Member, I hope we are able to complete the entirety of our agenda today. And I sincerely hope that we will work together to ensure that the federal government continues to take a leadership role in not only advocating for, but funding, critical research initiatives.

Mr. HALL. I yield back my time, sir.

Chairman SENSENBRENNER. Okay, the gentleman yields back the balance of his time.

We have a number of amendments and report language suggestions that are on the roster.

The first amendment on the roster is one by the gentlewoman from Illinois, Ms. Biggert. For what purpose does she seek recognition?

Mrs. BIGGERT. Thank you, Mr. Chairman. I have an amendment at the desk.

Chairman SENSENBRENNER. Clerk will report the amendment.

The CLERK. "Amendment to H.R. 2086, offered by Mrs. Biggert."

Chairman SENSENBRENNER. Without objection, the amendment is considered as read, open for amendment at any point, and the gentlewoman from Illinois is recognized for 5 minutes.

[The amendment of Mrs. Biggert follows:]

AMENDMENT TO H.R. 2086

OFFERED BY MRS. BIGGERT

Page 4, line 23, strike "$445,000,000" and insert "$439,000,000".

Page 6, line 2, strike "$100,600,000" and insert "$106,600,000".

Page 8, line 5, strike "$316,000,000" and insert "$310,000,000".

Page 9, line 20, insert "Notwithstanding any other provision of law, regulation, or agency policy, a federally funded research and development center may apply for a grant under this subsection, and may compete on an equal basis with any other applicant for the awarding of such a grant." after "peer-reviewed competition.".

Mrs. BIGGERT. Thank you, Mr. Chairman. I want to commend you for recognizing and responding to the need to increase support for basic information technology research here in the United States.

H.R. 2086 is an important step in that direction, and the amendment I'm offering today seeks to ensure that the Department of Energy and the federally funded research and development centers will keep us moving in that direction.

There are two parts to my amendment, the first of which corrects an error that the Department of Energy made in the budget it submitted to Congress. My amendment replaces $6 million that was inadvertently removed in base funding for information technology research at the Department of Energy.

The budget submitted by DOE for Fiscal Year 2000 mistakenly identified $6 million of its base funding as new funding. While this legislation, H.R. 2086—when this legislation was drafted, no new funding was provided for DOE. As a result, $6 million was removed from DOE's Fiscal Year 1999 funding. It is my understanding, Mr. Chairman, that it was not your intention to cut DOE's base funding. With this $6 million, H.R. 2086 would authorize a decrease of approximately $10 million below levels enacted in Fiscal Year 1999 for DOE.

Chairman SENSENBRENNER. Will the gentlewoman yield?

Mrs. BIGGERT. Yes, I yield.

Chairman SENSENBRENNER. The gentlewoman accurately states my intent which resulted from wrong information being given to us by DOE. First, this corrects an error, which is good, but even better, the correction is offset by reductions in other areas. So, there is a no net increase cost in the bill, and I am pleased to support the amendment.

Mrs. BIGGERT. Thank you, Mr. Chairman. I would then thank the Chairman for working with me on this amendment, and I would ask my colleagues for their support with passage of this amendment. I look forward to adding my name as a co-sponsor of this legislation.

Chairman SENSENBRENNER. The gentlewoman's time has expired.

Is there further discussion on the Biggert amendment?

Hearing none, all those in favor of the amendment will signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it, and the amendment is agreed to.

Amendments number two and three by the gentlewoman from Texas, Ms. Johnson. In her absence, I would recognize the gentleman from Texas, Mr. Hall. For what purpose do you seek recognition?

Mr. HALL. Mr. Chairman, I'd like to explain the amendment.

Chairman SENSENBRENNER. Okay. Well, will the gentleman offer——

Mr. HALL. I offer the amendment.

Chairman SENSENBRENNER. OK.

Mr. HALL. The first part of the amendment——

Chairman SENSENBRENNER. Well——

Mr. HALL. Go ahead, sir.

Chairman SENSENBRENNER. The clerk will report the amendment.

The CLERK. Amendments to H.R. 2086, offered by Ms. Eddie Bernice Johnson of Texas.

[The amendments of Ms. Johnson follows:]

AMENDMENT TO H.R. 2086
OFFERED BY MS. EDDIE BERNICE JOHNSON OF TEXAS

Page 3, after line 13, insert the following new paragraph:

(10) Our Nation's well-being will depend on the understanding, arising from fundamental research, of the social and economic benefits and problems arising from the increasing pace of information technology transformations.

Page 3, lines 14, 18, and 24, and page 4, lines 1, 3, 6, and 9, redesignate paragraphs (10) through (16) as paragraphs (11) through (17), respectively.

Page 8, line 12, strike "software and" and insert "software;".

Page 8, line 13, insert "; and the social and economic consequences of information technology" after "and scalability".

AMENDMENT TO H.R. 2086
OFFERED BY MS. EDDIE BERNICE JOHNSON OF TEXAS

Page 10, lines 6 through 21, amend subsection (e) to read as follows:

"(e) INFORMATION TECHNOLOGY EDUCATION AND TRAINING GRANTS.—

"(1) INFORMATION TECHNOLOGY GRANTS.—The National Science Foundation shall provide grants under the Scientific and Advanced Technology Act of 1992 for the purposes of section 3(a) and (b) of that Act, except that the activities supported pursuant to this paragraph shall be limited to improving education in fields related to information technology. The Foundation shall encourage institutions with a substantial percentage of student enrollments from groups underrepresented in information technology industries to participate in the competition for grants provided under this paragraph.

"(2) INTERNSHIP GRANTS.—The National Science Foundation shall provide—

"(A) grants to institutions of higher education to establish scientific internship programs in information technology research at private sector companies; and

"(B) supplementary awards to institutions funded under the Louis Stokes Alliances for Minority Participation program for internships in information technology research at private sector companies.

"(3) MATCHING FUNDS.—Awards under paragraph (2) shall be made on the condition that at least an equal amount of funding for the internship shall be provided by the private sector company at which the internship will take place.

"(4) DEFINITION.—For purposes of this subsection, the term 'institution of higher education' has the meaning given that term in section 1201(a) of the Higher Education Act of 1965 (20 U.S.C. 1141(a)).

"(5) AVAILABILITY OF FUNDS.—Of the amounts described in subsection (c)(1), $10,000,000 for fiscal year 2000, $15,000,000 for fiscal year 2001, $20,000,000 for fiscal year 2002, $25,000,000 for fiscal year 2003, and $25,000,000 for fiscal year 2004 shall be available for carrying out this subsection.

Chairman SENSENBRENNER. OK. First of all, is it the gentleman's intention to offer amendment two and amendment three and ask that they be considered en bloc?

Mr. HALL. It is.

Chairman SENSENBRENNER. OK. Without objection, amendments two and three will be considered en bloc. Without objection, the amendment will be considered as read and open for amendment at any point, and the gentleman from Texas is recognized for 5 minutes.

Mr. HALL. Can I go now? [Laughter.]

Chairman SENSENBRENNER. For all of 5 minutes.

Mr. HALL. Mr. Chairman, thank you.

The gentlelady who knows much more about the amendment than I could read to you from this printed page is here and present, and, at this time, I'd like to yield to her the remaining time I have on the 5 minutes.

Chairman SENSENBRENNER. And, without objection, we'll start the clock again in order to allow the gentlewoman from Texas to catch her breath.

The gentlewoman from Texas is recognized in support of amendments two and three, which are being considered en bloc.

Ms. JOHNSON. Thank you very much.

Thank you, Mr. Chairman. Let me apologize to both you and Mr. Hall and the rest of the members for being held up a little at the last meeting—I'm trying to get my breath. And thank you for accepting my two amendments into the manager's amendment.

Both of these amendments make a very good bill even better. My first amendment attempts to take some of the future shock out of the information age. We all recognize that new developing technology has been creating a rash of unintended consequences. For example, doctors are now able to treat patients in far places because of the advent of Internet and other technological inventions that have helped to coin the phrase "telemedicine." However, for telemedicine to be fully integrated into the health care delivery system, we have to develop standards and practices for privacy and security of patient records.

How do we address state-by-state licensing of doctors, and, finally, how do we establish trust between patients and doctors in an on-line environment?

While the bill before us authorizes long-term research related to computing and networking technology, it does not address socioeconomic research that can be helpful in dealing with the unintended consequences of the information age. This recommendation is in keeping with the President's Information Technology Committee's report entitled "Information Technology Research: Investing in our Future." My amendment would include the use of socioeconomic research under section four in the bill.

My second amendment focuses on ensuring workplace readiness. We know that there is a 10 percent job vacancy in high-technology fields, that a lack of qualified applicants contribute to the vacancy rate. My amendment authorizes the use of funds to provide grants to 2-year institutions of higher education that are now eligible for the NSF Advanced Technology Education Program.

The ATE Program, as authorized by this Committee, provides grants to 2-year colleges for developing, in consultation with industry, course instruction in high technology areas, development of faculty and student recruitment, and retention through internships and other work related activities.

The amendment leaves in place the general authorization for the National Science Foundation to provide information technology related internships grants separate from the ATE Program and also authorizes NSF to provide supplementary awards for such internships to institutions supported under the Louis Stokes Alliances for Minority Participation Program.

The Stokes Program does not—does support internships, but they are not currently directed to the information technology field. The inclusion of the ATE Program and the Stokes Program into the mix will strengthen the bill's provision dealing with the workplace training.

Thank you very much, Mr. Chairman.

Chairman SENSENBRENNER. Will the gentlewoman yield?

Ms. JOHNSON. Yes.

Chairman SENSENBRENNER. I believe that the gentlewoman's amendments make constructive additions to the bill, and I am pleased to support them.

Ms. JOHNSON. Thank you very much.

Chairman SENSENBRENNER. The gentlewoman's time has expired.

Is there further discussion on the Johnson amendments en bloc?

If not, all those in favor will signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it, and the amendments are agreed to.

The next amendment on the roster is by the gentleman from Pennsylvania, Mr. Doyle. For what purpose does he seek recognition?

Mr. DOYLE. Mr. Chairman, I have an amendment at the desk.

Chairman SENSENBRENNER. The clerk will report the amendment.

The CLERK. Amendment to H.R. 2086, offered by Mr. Doyle.

Chairman SENSENBRENNER. Without objection, the amendments will be considered en bloc, considered as read, open for amendment at any point, and the gentleman from Pennsylvania, Mr. Doyle, will be recognized for 5 minutes.

[The amendment of Mr. Doyle follows:]

AMENDMENT TO H.R. 2086

OFFERED BY MR. DOYLE

Page 9, line 18, insert "Awards made under this subsection shall provide for support for the operating expenses of facilities established to provide the terascale computing capabilities, with funding for such operating expenses derived from amounts available under subsection (b)." after "computing architectures.".

Page 9, line 20, strike "peer-reviewed competition" and insert "nationwide, peer-reviewed competition. Awardees may include consortia consisting of members from some or all of the following types of institutions:

"(A) Academic supercomputer centers.

"(B) State-supported supercomputer centers.

"(C) Supercomputer centers that are supported as part of federally funded research and development centers".

Mr. DOYLE. Thank you, Mr. Chairman.

Mr. Chairman, I'm pleased to have been able to work with you and your staff on this amendment and accompanying report language, which addresses some of the concerns that have been brought to our attention by representatives of the Pittsburgh Supercomputer Center and other centers with an interest in the competition for terascale supercomputing equipment.

The first part of the amendment would clarify that for any terascale facilities funded by NSF, NSF would support their regular operating expenses. This change was made to conform with the current grants practices in supercomputing where a portion of the grants typically goes to cover the indirect operating cost.

The second major part of the amendment would clarify that consortia are welcome to join together in the competition to build the terascale supercomputing facilities.

The report language states that partnerships are to be encouraged among centers that are both members and non-members in the NSF Partnership for Advanced Computing Infrastructure Program. I think I can speak for all of us on the Committee in stating that we would like to see major members of the supercomputing community come together when this work goes forward.

I would think that the major centers could join together as equal partners in an effort to tap some of the personnel and knowledge resources that have been underutilized since NSF decreased its support for supercomputing centers in 1996.

With that, Mr. Chairman, I thank you, and I'll yield back the balance of my time.

Chairman SENSENBRENNER. Will the gentleman yield?

Mr. DOYLE. Yes, I will.

Chairman SENSENBRENNER. These amendments are also very constructive in that they clarify and make sure that the consortia are able to bid on the money through the NSF, and I think the more competition we get, the better science we get, and I think the consortia ought to be able to compete and to win. So, I'm happy to support the amendment.

Mr. DOYLE. Thank you.

Chairman SENSENBRENNER. The gentleman's time has expired.

Further discussion on Doyle amendment number four?

Hearing none, all those in favor will signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it, and the amendments en bloc are agreed to.

Amendment number five is by the gentlewoman from California, Ms. Woolsey. For what purpose does she seek recognition?

Ms. WOOLSEY. Mr. Chairman, I have an amendment at the desk.

Chairman SENSENBRENNER. The clerk will report the amendment.

The CLERK. Amendment to H.R. 2086, offered by Ms. Woolsey.

Chairman SENSENBRENNER. Without objection, the amendment is considered as read, open for amendment at any point, and the gentlewoman from California is recognized for 5 minutes.

[The amendment of Ms. Woolsey follows:]

AMENDMENT TO H.R. 2086

OFFERED BY MS. WOOLSEY

Page 10, after line 21, insert the following new subsection:

"(f) EDUCATIONAL TECHNOLOGY RESEARCH.—

"(1) RESEARCH PROGRAM.—As part of its responsibilities under subsection (a)(1), the National Science Foundation shall establish a research program to develop, demonstrate, assess, and disseminate effective applications of information and computer technologies for elementary and secondary education. Such program shall—

"(A) support research projects, including collaborative projects involving academic researchers and elementary and secondary schools, to develop innovative educational materials, including software, and pedagogical approaches based on applications of information and computer technology;

"(B) support empirical studies to determine the educational effectiveness and the cost effectiveness of specific, promising educational approaches, techniques, and materials that are

based on applications of information and computer technologies; and

"(C) include provision for the widespread dissemination of the results of the studies carried out under subparagraphs (A) and (B), including maintenance of electronic libraries of the best educational materials identified accessible through the Internet.

"(2) REPLICATION.—The research projects and empirical studies carried out under paragraph (1)(A) and (B) shall encompass a wide variety of educational settings in order to identify approaches, techniques, and materials that have a high potential for being successfully replicated throughout the United States.

"(3) AVAILABILITY OF FUNDS.—Of the amounts authorized under subsection (b), $10,000,000 for fiscal year 2000, $10,500,000 for fiscal year 2001, $11,000,000 for fiscal year 2002, $12,000,000 for fiscal year 2003, and $12,500,000 for fiscal year 2004 shall be available for the purposes of this subsection.

Page 10, line 22, redesignate subsection (f) as subsection (g).

Ms. WOOLSEY. Thank you, Mr. Chairman.

As we enter the 21st century, we must give our children every single advantage possible to compete in the global marketplace. My amendment establishes a research program at the National Science Foundation to develop, evaluate, and disseminate effective applications of computer and other information technology for elementary and secondary education.

The purpose of this proposed program is to link academic researchers to teachers to—well, in developing effective materials and teaching methods that will be used in information technologies. This program requires that demonstrations be conducted in a broad range of educational settings to assess the real effectiveness of such materials and methods in order to gain quantitative evidence about what works and what does not work.

Finally, the program includes provisions to establish electronic libraries with ready access to this information in order to disseminate best practices and materials.

Mr. Chairman, for this program, $10 million is authorized in the first year. The authorizations are from amounts already provided in the bill for NSF activities. It is a modest beginning to bring our children and our primary and secondary education into the 21st century, and I would hope that my colleagues will support this.

Chairman SENSENBRENNER. Will the gentlewoman yield?

Ms. WOOLSEY. Yes, Mr. Chairman.

Chairman SENSENBRENNER. This amendment establishes a new research program on how best to utilize the technology in the classroom. It is funded from existing authorizations, and thus does not add to the cost of the bill. It's a good amendment, and I am prepared to accept it.

Ms. WOOLSEY. Thank you very much, Mr. Chairman.

Chairman SENSENBRENNER. The gentlewoman yields back the balance of her time.

Is there further discussion on the Woolsey amendment?

Hearing none, all those in favor will signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it, and the amendment is agreed to.

Amendment number six is by the gentleman from Oregon, Mr. Wu. For what purpose does he seek recognition?

Mr. WU. Mr. Chairman, I have an amendment at the desk.

Chairman SENSENBRENNER. Clerk will report the amendment.

The CLERK. Amendment to H.R. 2086——

Mr. WU. I ask unanimous consent that the amendment be considered as read.

Chairman SENSENBRENNER. Without objection. The gentleman is recognized for 5 minutes.

[The amendment of Mr. Wu follows:]

AMENDMENT TO H.R. 2086

OFFERED BY MR. WU

Page 12, lines 12 and 13, amend paragraph (1) to read as follows:

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

"(c) STUDY OF INTERNET PRIVACY.—

"(1) STUDY.—Not later than 90 days after the date of enactment of the Networking and Information Technology Research and Development Act, the National Science Foundation may enter into an arrangement with the National Research Council of the National Academy of Sciences for that Council to conduct a study of privacy on the Internet.

"(2) SUBJECTS.—The study shall address—

"(A) research needed to develop technology for protection of privacy on the Internet;

"(B) current public and private plans for the deployment of privacy technology, standards, and policies;

"(C) policies, laws, and practices under consideration or formally adopted in other countries and jurisdictions to protect privacy on the Internet;

"(D) Federal legislation and other regulatory steps needed to ensure the development of privacy technology, standards, and policies; and

"(E) other matters that the National Research Council determines to be relevant to Internet privacy.

"(3) TRANSMITTAL TO CONGRESS.—The National Science Foundation shall transmit to the Congress within 21 months of the date of enactment of the Networking and Information Technology Research and Development Act a report setting forth the findings, conclusions, and recommendations of the National Research Council.

"(4) FEDERAL AGENCY COOPERATION.—Federal agencies shall cooperate fully with the National Research Council in its activities in carrying out the study under this subsection.

"(5) AVAILABILITY OF FUNDS.—Of the amounts described in subsection (d)(2), $900,000 shall be available for the study conducted under this subsection."; and

Page 12, lines 14 and 15, strike "subsection (c)" and all that follows through "this section" and insert "subsection (d)".

Mr. WU. Mr. Chairman, my amendment would lay the groundwork for the National Science Foundation to enter into an agreement with the National Research Council of the National Academy of Sciences to carry out a study of privacy issues associated with the Internet.

Internet privacy is a concern for both computer users and the information technology industry. A 1997 survey found that 54 percent of Internet users report that they are concerned that information about sites they visit will be linked to their e-mail address and disclosed without their consent or knowledge. The survey also found lower trust generally in on-line institutions and communication.

Mr. Chairman E-Commerce is an important part of America's growing economy to help ensure the continued growth of this industry. Congress needs to get the possible information on this crucial issue to ensure that any legislation we consider does not either unduly burden industry or leave consumer rights unprotected in the on-line world.

I believe our ultimate goal should be to offer the same degree of protection and anonymity that people hope to enjoy when they travel; that is, they can either choose to interact and share information with those that they meet or not, as the case may be.

Mr. Chairman, thank you very much, and I yield back the balance of my time.

Chairman SENSENBRENNER. Will the gentleman yield?

Mr. WU. Yes, Mr. Chairman.

Chairman SENSENBRENNER. This amendment proposes a $900,000 National Academy of Science study of privacy issues on the Internet. The bill already funds privacy research through NSF grants. I believe that the NSF can best determine if it feels an NRC study is needed. Since the amendment's language is discretionary, allowing the NSF to decide whether it wants to spend almost a million dollars on the study, I have no objection to the amendment and hope that it is supported.

The gentleman yields back the balance of his time.

Is there further discussion on the Wu amendment?

Hearing none, all those in favor of the amendment will signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it, and the Wu amendment is agreed to.

The next amendment, number seven, is by the gentleman from Pennsylvania, Mr. Doyle. For what purpose does he seek recognition?

Mr. DOYLE. Mr. Chairman, I have an amendment at the desk.

Chairman SENSENBRENNER. The clerk will report the amendment.

The CLERK. Amendment to H.R. 2086, offered by Mr. Doyle.

Chairman SENSENBRENNER. Without objection, the amendment is considered as read, open for amendment at any point, and the gentleman from Pennsylvania is recognized for 5 minutes.

[The amendment of Mr. Doyle follows:]

AMENDMENT TO H.R. 2086

OFFERED BY MR. DOYLE

Page 4, line 23, strike "$445,000,000" and insert "$404,400,000".

Page 4, line 24, strike "$468,500,000" and insert "$425,500,000".

Page 4, line 24, strike "$493,200,000" and insert "$448,200,000".

Page 4, line 25, strike "$544,100,000" and insert "$497,100,000".

Page 5, line 1, strike "$571,300,000" and insert "$522,300,000".

Page 6, line 2, strike "$100,600,000" and insert "$141,200,000".

Page 6, line 3, strike "$103,500,000" and insert "$146,500,000".

Page 6, line 3, strike "$107,000,000" and insert "$152,000,000".

Page 6, line 4, strike "$125,700,000" and insert "$172,700,000".

Page 6, line 5, strike "$129,400,000" and insert "$178,400,000".

Page 8, line 5, strike "$316,000,000" and insert "$275,400,000".

Page 8, line 6, strike "$333,000,000" and insert "$290,000,000".

Page 8, line 7, strike "$352,000,000" and insert "$307,000,000".

Page 8, line 7, strike "$390,000,000" and insert "$343,000,000".

Page 8, line 8, strike "$415,000,000" and insert "$366,000,000".

I understand our time is limited today, so I'll be brief.

My amendment was drafted to restore to DOE a baseline of funds starting at $40.6 million to be used only for basic research into networking and information technology. The point is to restore to DOE a portion of the program funds it was proposed to manage under the Clinton Administration IT-squared proposal, but that the Chairman's mark moved to NSF to administer.

I intend to withdraw my amendment, but I do think the question of the involvement of the Department of Energy in managing IT research bears some discussion. As a result of decades of work in high performance computing, most recently with the Advanced Strategic Computing Initiative Program, DOE possesses a range of core competencies in IT and supercomputing. The advanced challenges we hope to address through the passage of H.R. 2086 are sufficiently complex that we need to bring the whole compliment of federal agencies to bear on them.

I know that with this year's very disturbing spy scandal and with the other difficulties that some of us have experienced in dealing with the very complex organization that DOE is, it may not be very popular to stand up for them. But the Department's strengths in information technology and supercomputing are too significant for us to ignore.

With DOE as a client agency competing for funds, rather than managing program dollars, we run a strong risk of wasting important resources the Government already possesses.

And, finally, an additional argument in favor of DOE's participation in supercomputing is the agency's very near proximity to missions that federal IT research must address. Challenges like combustion modeling and climate research lie squarely within DOE's agency mission.

Mr. Chairman, I'd like to submit for the record a letter written by Rita Colwell, Director of NSF, Neal Lane, the President's Science and Technology Policy Advisor, and Energy Secretary Bill Richardson, outlining some of the reasons DOE was originally proposed to play a very strong role in the Administration's IT research bill.

And I would urge you to consider——

Chairman SENSENBRENNER. Without objection, the amendment will be included in the record.

[The information follows:]

EXECUTIVE OFFICE OF THE PRESIDENT
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL
WASHINGTON, D.C. 20502

July 23, 1999

The Honorable James Sensenbrenner, Jr.
Chairman
U.S. House of Representatives
Committee on Science
2320 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Sensenbrenner:

The Administration's information technology initiative for the 21st century, and your proposed Networking and Information Technology Research and Development Act, both recognize that advances in information technology are vital to the overall success of our nation's scientific and technical expertise as well as to its economic prosperity. Both respond to the recommendations of the congressionally-chartered President's Information Technology Advisory Committee (PITAC), which state that fundamental research on software, on scalable information infrastructure, on high-end computing, on human-computer interfaces and information management, and on studies of the social, economic, workforce issues are all research venues requiring an increased Federal investment. The PITAC report also recommends the acquisition of a terascale computing capability to provide the nation's civilian research community with access to state-of-the-art computers and to the unique expertise needed to employ them in solving practical research problems of high national importance. We applaud the leadership taken by you and your Committee in moving forward to strengthen research in the area of information technology.

For an initiative of this complexity and importance to succeed, we must coordinate in a coherent way the unique strengths and capabilities of the federal science and technology agencies that support research in information technology. In the area of high performance modeling and simulation, a close collaboration between the National Science Foundation (NSF) and the Department of Energy (DOE) is important to achieve the goal of procuring, developing and making available to the scientific community large civilian high-performance computing infrastructure.

Over the past year, the partnership between NSF and DOE has developed a plan for launching such an initiative. That continued partnership is crucial to the eventual success of the national initiative. DOE would match its longstanding strengths in high-end computation and scientific application with NSF's large community of academic researchers and university students to form a very strong partnership across the entire base of expertise and talent.

Together, NSF and DOE – through the universities and their students and faculty, national laboratories, and their industry partners – bring significant strengths to the challenge of developing our nation's first-ever terascale computing infrastructure for civilian science. Such a partnership would be another successful chapter in a long history of cooperation and collaboration between DOE and NSF in research areas spanning physics, chemistry, materials science, as well as in computation.

We believe that we can best achieve the vision expressed in the President's Initiative and in the bill you have introduced by bringing the full complement of relevant technical assets in the Federal government to bear on this important national priority. To this end, we ask you to support the full participation, collaboration, and funding of all agencies participating in the Networking and Information Technology Research and Development Act.

Sincerely,

Neal Lane
Assistant to the President
for Science & Technology

Bill Richardson
Secretary
Department of Energy

Rita Colwell
Director
National Science Foundation

Mr. DOYLE. Thank you, Mr. Chairman.

I'd urge you to consider these points and whatever conference we might enter into with the other body regarding this important legislation.

Mr. Chairman, with that, I withdraw my amendment, and I yield back the balance of my time.

Chairman SENSENBRENNER. Okay, the amendment is withdrawn.

The next amendment is by the gentleman from Massachusetts, Mr. Capuano. For what purpose does he seek recognition?

Mr. CAPUANO. Mr. Chairman, I have an amendment at the desk.

Chairman SENSENBRENNER. The clerk will report the amendment.

The CLERK. Amendment to H.R. 2086, offered by Mr. Capuano.

Mr. CAPUANO. Mr. Chairman, I ask for consent that the amendment be considered as read.

Chairman SENSENBRENNER. Without objection, and the gentleman is recognized for 5 minutes.

[The amendment of Mr. Capuano follows:]

AMENDMENT TO H.R. 2086
OFFERED BY MR. CAPUANO

Page 15, after line 15, add the following new section:

SEC. 9. STUDY OF APPROPRIATIONS IMPACT ON INFORMATION TECHNOLOGY RESEARCH.

Within 90 days after the date of the enactment of this Act, the Comptroller General, in consultation with the National Science and Technology Council and the President's Information Technology Advisory Committee, shall transmit to the Congress a report on the impact on information technology research of the fiscal year 2000 appropriations acts for the Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies; for the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies; and for Energy and Water Development.

Mr. CAPUANO. Thank you, Mr. Chairman.

This is an issue that we discussed in general the last time we had some of these bills before us.

And basically what it does is—I believe that there is an appropriate role for Government to invest in our future, both as a society and as an economy. And I believe that these particular programs are a great public-private partnership that we should invest in. However, I have concerns that these investments are not enough. At the same time, there are—sometimes these programs, though well-intended and well-funded, don't work out.

All this is is a request for a report from the Comptroller General in consultation with the National Science and Technology Council and PITAC on the impact on information technology research of the appropriations that we are considering now and will have done for the Fiscal Year 2000.

And, simply put, I want to see if the amounts of money we are appropriating are sufficient, that they are sufficient and whether they are being used properly.

Chairman SENSENBRENNER. Does the gentleman yield back the balance of his time?

Mr. CAPUANO. Yes, Mr. Chairman.

Chairman SENSENBRENNER. I recognize myself for 5 minutes.

First of all, let me say that I share the gentleman from Massachusetts concern about the meager level of appropriations for IT funding in the bill that is currently being debated on the Floor of the House of Representatives, as well as unacceptably low levels of appropriations for other science accounts.

I am concerned, however, about us trying to involve the GAO in what is essentially a political decision that will have to be made by the appropriations process with votes on the Floor of the House and on the Floor of the Senate.

In the interest of saving time, I will accept the amendment by the gentleman from Massachusetts, but I think it is largely a waste of GAO's time and limited resources particularly since the fiscal year ends in 2½ weeks time. And by the time the GAO comes with the report that the gentleman from Massachusetts has requested, the entire budget imbroglio will, hopefully, be solved with some kind of an agreement which will command a majority of votes in the Congress and a signature of the President of the United States.

We're all committed to increasing IT funding at the NSF and elsewhere, and that's what this bill is all about that 33 of the members of the Committee have co-sponsored.

So, in the interest of passing the bill quickly, I'm willing to accept your amendment, but I really don't think we should make a practice of drawing the GAO into political disputes, because then their resources will be taken away from doing the type of professional management analyses of these programs that I think is an essential element of oversight of federal agencies, regardless of whose administration it is and who has the majority in the Congress.

So, having said that, I'll yield back the balance of my time.

Is there further discussion on the Capuano amendment?

If not, all those in favor will signify by saying aye.

Opposed, no.

The ayes have it, and the amendment is agreed to.

Mr. SMITH of Michigan. Mr. Chairman.

Chairman SENSENBRENNER. Are there further amendments to the bill?

The gentleman from Michigan.

Mr. SMITH of Michigan. I move to strike the last word.

Chairman SENSENBRENNER. The gentleman is recognized for 5 minutes.

Mr. SMITH of Michigan. Mr. Chairman, I'd like to note at this time that there is an agency other than those recognized in this bill that is a valuable stakeholder in this research, and that's the United States Geological Survey.

I understand the jurisdictional issues that necessitated not including them in this bill and also their role, but I believe the USGS, by virtue of the work it does with exceptionally large datasets and computer processing, has much to offer in the area of research and development.

And what we're dealing with is huge volumes of data—how we collect that data, how we store that data, how we make that data available to other governmental agencies and to the public. And it's a situation I will look to resolve, either in coordination with its oversight committee Resources, either as a Floor amendment or as a separate bill for this tremendous job and challenge that the USGS has undertaken.

Chairman SENSENBRENNER. Will the gentleman yield?

Mr. SMITH of Michigan. And certainly I would yield to you, Mr. Chairman.

Chairman SENSENBRENNER. The only reason the authorization for the research by the U.S. Geological Survey is not included in this bill is for jurisdictional purposes, because we don't authorize the USGS. The Resource Committee did. And as a result of my desire to avoid sequential referrals, which will only slow down this important legislation, the agencies where there are authorizations in this bill are exclusively under the jurisdiction of this Committee.

I would hope that the Committee on Resources would get on board and approve some type of an amendment which we could add to this bill with a waiver from the Rules Committee when it reaches the Floor, but I don't want them or anybody else derailing this train, because it is a necessary train to get out of the station.

Mr. SMITH of Michigan. Concurring with your wish that nobody else mess around with our good bill, Mr. Chairman, I yield back the balance of my time.

Chairman SENSENBRENNER. I thank the gentleman.

Are there further amendments to the bill?

If not, all those in favor of the bill, please signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it.

Now, we get to report language. The first on the roster is proposed language by the gentleman from Pennsylvania, Mr. Doyle. For what purpose does he seek recognition?

Mr. DOYLE. Mr. Chairman, I have report language at the desk.

Chairman SENSENBRENNER. Clerk will report the language.

The CLERK. Report language by Congressman Doyle to H.R. 2086.

Chairman SENSENBRENNER. Without objection, the report language is considered as read, and the gentleman's recognized for 5 minutes.

[The information follows:]

REPORT LANGUAGE BY CONGRESSMAN DOYLE TO H.R. 2086

TERASCALE SUPERCOMPUTING CAPABILITIES

The Committee supports the goal of sustaining and increasing federal participation and support for high-end supercomputing research, including the procurement of major research equipment. The intent of the Committee is to encourage high-end supercomputing that is national in impact, respects the existing diversity in supercomputing architectures, and efficiently mobilizes resources across the U.S. supercomputing community. The Committee expects the National Science Foundation to encourage collaborations and consortia among existing major supercomputer centers in the competition for terascale computing equipment. Partnerships are to be encouraged among centers, both members and non-members in NSF's Partnership for Advanced Computing Infrastructure (PACI), in an effort to mobilize resources that have been underutilized.

Mr. DOYLE. Thank you, Mr. Chairman. I'll be very brief.

As I stated earlier, that this report language states that partnerships are to be encouraged among centers that are both members and non-members in the NSF Partnership for Advanced Computing Program, and I think that this is some language——

Chairman SENSENBRENNER. Will the gentleman yield?

Mr. DOYLE. Yes, I will.

Chairman SENSENBRENNER. Very good idea. I support it.

Mr. DOYLE. Thank you. Let's move on then.

Chairman SENSENBRENNER. The gentleman yields back the balance of his time.

Further discussion on the Doyle report language?

If there's none, all those in favor of agreeing to the language will signify by saying aye.

Opposed, no.

The ayes have it, and the language is agreed to.

Next on the list is proposed report language by the gentleman from Washington, Mr. Baird. For what purpose does he seek recognition?

Mr. BAIRD. Mr. Chairman, I have report language at the desk.

Chairman SENSENBRENNER. Clerk will report the language.

The CLERK. Report language offered by Congressman Baird to H.R. 2086.

Chairman SENSENBRENNER. Without objection, the language is considered as read, and the gentleman is recognized for 5 minutes.

[The information follows:]

HIGH PERFORMANCE COMPUTING, THE VALUE OF MULTI-THREAD ARCHITECTURE NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT (HR 2086) SUGGESTED REPORT LANGUAGE OFFERED BY REPRESENTATIVE BAIRD

The Committee acknowledges the critical role of high performance computers to Federal Government missions such as cryptology, nuclear weapons testing and monitoring, data mining, etc. The Committee recognizes that the Massively Parallel (MP) approach to high performance computing, used in many areas of the federal government, has been an effective architecture for many mission areas.

However, the Committee remains concerned over performance limitations inherent in the MP approach and agrees with the Presidents' Information Technology Advisory Committee (PITAC) assessment that alternative architectures must be pursued with federal funding in order to meet current and future computationally-intensive challenges.

Accordingly, the Committee included in section 4 of the bill a requirement for the National Science Foundation to promote diverse computing architectures in developing terascale computing capabilities. The Committee is aware of recent breakthroughs in the Multi-Thread Architecture (MTA) and encourages that the most promising high performance computing architectures be explored for providing the terascale computing capability required to address the most challenging computational problems in science and engineering.

Mr. BAIRD. Mr. Chairman, I'll be very brief.

Essentially, this language deals with the issue of the architecture that's used in supercomputing, essentially a model involving what is a massively parallel design has been used to date. It's coming under limitations on software design and other capacity limitations.

This language would just encourage the exploration of alternative architectures, particularly one known as multithread architecture, which is showing great promise and recently has shown the possibility of breaking some speed records.

I encourage the Committee to approve the——

Chairman SENSENBRENNER. Will the gentleman yield?

Mr. BAIRD. Yes.

Chairman SENSENBRENNER. Another good idea, and I support it.

The gentleman yields back the balance of his time?

Mr. BAIRD. Yes.

Chairman SENSENBRENNER. OK.

Further discussion on the Baird report language?

Hearing none, all those in favor will signify by saying aye.

Opposed, no.

The ayes have it, and the language is agreed to.

Next suggestion for report language is by the gentleman from Colorado, Mr. Udall. For what purpose does he seek recognition?

Mr. UDALL. Mr. Chairman, I have report language at the desk.

Chairman SENSENBRENNER. The clerk will report the language.

The CLERK. Report language to H.R. 2068, offered by Congressman Mark Udall.

Chairman SENSENBRENNER. Without objection, the language is considered as read, and the gentleman is recognized for 5 minutes.

[The information follows:]

REPORT LANGUAGE TO H.R. 2086 OFFERED BY CONGRESSMAN MARK UDALL

Advances at the cutting edge in information technology are in turn dependent on new developments in various fields of science, mathematics, and engineering. This is especially true for terascale computing which is pushing the limits of our knowledge in various aspects of physics, mathematics, chemistry, and engineering. Basic and applied research in each of these disciplines will be required if the goals of this legislation are to be met. Therefore, it is imperative that the research program anticipated under this legislation include support for fundamental research in pertinent areas of science, mathematics, and engineering which are related to the goals of the information technology initiative.

Mr. UDALL. Thank you, Mr. Chairman. I will also attempt to be as a brief as my colleague from the State of Washington.

This language would ensure that the NSF and the other agencies that participate in the research initiative authorized by the bill tap into the expertise and capabilities of other disciplines in addition to computer science and engineering. It also would send a message that the planning processes in these agencies should have an inclusive approach in order to encourage ideas in long-term thinking.

If you look at the bill, really the goal is to ensure that research undertaken under the initiative helps inform and build the information technologies of the next 20 years. And, to that end, we ought to be making sure that basic research plays a key role. So, mathematicians, physicists, social scientists, and representatives from other disciplines should all be at the table.

I would point out that this is consistent with the views of the President's Information Technology Advisory Committee.

I would also remind the Committee that the report encouraged and recommended that the agencies encourage research that is visionary and high-risk, and it anticipated supporting researchers at many institutions in large-scale projects that will explore future technologies with multidisciplinary teams.

So, this language is intended to remind the agencies that multidisciplinary research is at the heart of the initiative established by H.R. 2086, and I urge its adoption.

Thank you, Mr. Chairman.

Chairman SENSENBRENNER. Would the gentleman yield?

Mr. UDALL. I will yield.

Chairman SENSENBRENNER. A third good idea.

Gentleman yield back the balance of his time?

Mr. UDALL. I certainly do.

Chairman SENSENBRENNER. Further discussion on the Udall report language?

Hearing none, all those in favor will signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it, and the language is agreed to.

Next report language proposal is by the gentleman from Michigan, Mr. Smith.

Mr. SMITH of Michigan. Mr. Chairman, I have report language at the desk.

Chairman SENSENBRENNER. The clerk will report the language.

The CLERK. Report language to H.R. 2086, offered by Mr. Smith of Michigan.

Chairman SENSENBRENNER. Without objection, the language is considered as read, and the gentleman from Michigan is recognized for 5 minutes.

[The information follows:]

REPORT LANGUAGE OFFERED BY MR. SMITH OF MICHIGAN TO H.R. 2086, THE NETWORK AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT

H.R. 2086 recognizes the importance of basic IT research as a catalyst for economic growth and prosperity. IT represents one of the fastest growing sectors of the U.S. economy and provides millions of good, high-paying jobs. The Nation's future economic success will depend in part on our ability to stay at the cutting edge of technology. Transferring the knowledge gained through H.R. 2086 to the private sector is, therefore, vitally important. To ensure that the fruits of this research are available to the private sector and to other researchers, the Committee expects the National Science Foundation to make accessible through its Internet home page, to the greatest extent possible, the results of the research funded through the Networking and Information Technology Research and Development program authorized under this Act.

Mr. SMITH of Michigan. Mr. Chairman, thank you. Looking for the key statements before I yield to you.

As H.R. 2086 makes clear, information technology plays a crucial role in the Nation's prosperity. It represents one of the fastest growing sectors of our economy, accounting for ⅓ of our growth since 1992. It's created new industries, new high paying jobs.

This report language says that—let's make sure we make the new knowledge available and we make it available on the Internet, that we maximize the encouragement to the private sector that they can do the kind of research and development to further implement what we discover in this effort.

I would yield to the Chairman.

Chairman SENSENBRENNER. A fourth good idea.

The gentleman yield back the balance of his time?

Mr. SMITH of Michigan. I yield back the balance of my time.

Chairman SENSENBRENNER. Is there further discussion on the proposed Smith report language?

Hearing none, all those in favor, please signify by saying aye.

Opposed, no.

The ayes appear to have it. The ayes have it, and the language is agreed to.

Are there any further good ideas for report language?

Are there any bad ideas for report language? [Laughter.]

If not, the Chair will recognize the gentleman from Texas, Mr. Hall, to make the reporting motion.

Ms. JOHNSON. Mr. Chairman?

Chairman SENSENBRENNER. The gentlewoman——

Mr. HALL. The gentleman will yield to Mrs. Johnson.

Chairman SENSENBRENNER. For what purpose does the gentlewoman, Ms. Johnson, seek recognition?

Ms. JOHNSON. Mr. Chairman, I'd like to offer a motion.

Mr. Chairman, I move that the Committee seek——

Chairman SENSENBRENNER. Okay, well, the other gentlewoman from Texas, Ms. Jackson Lee, wants to say something. Can you just hold for a second?

For what purpose does the gentlewoman from Texas, Ms. Jackson Lee, seek recognition?

Ms. JACKSON LEE. To strike the last word, Mr. Chairman.

Chairman SENSENBRENNER. The gentlewoman is recognized for 5 minutes.

Ms. JACKSON LEE. I thank the Chairman. I will not use it and would like to acknowledge that there have been a lot of good report language and other amendments offered, and so I will not add that.

But I do want to add my support for the legislation as a co-sponsor, particularly on the precipice of the 21st century to emphasize information technology and also the outreach into vast, diverse communities. Far too often, the private sector focuses on the short-term. That's why I've always said the Federal Government is a risk-taker, giving opportunity for new types of research on technology that will then expand opportunities for business.

And I think this legislation, Mr. Chairman, is an excellent vehicle for that and would offer and hope that this legislation will ultimately pass on the Floor of the House.

I yield back.

Chairman SENSENBRENNER. The gentlewoman yields back the balance of her time.

Now, the gentlewoman from Texas, Ms. Johnson.

Ms. JOHNSON. Thank you, Mr. Chairman.

I move that the Committee favorably report H.R. 2086, as amended, to the House with a recommendation that the bill, as amended, do pass.

And, further, I move that staff be instructed to prepare the legislative report and make necessary and conforming amendments and that the Chairman take all necessary steps to bring this bill before the House for consideration.

Chairman SENSENBRENNER. The Chair—you've heard the motion. The question is on reporting the bill favorably.

The Chair notes the presence of a reporting quorum and feels that it is important that this bill be reported by a recorded vote.

The clerk will call the roll.

Those in favor of reporting the bill favorably will signify by saying aye.

Those opposed, by saying no.

The clerk will call the roll.

The CLERK. Mr. Sensenbrenner.

Chairman SENSENBRENNER. Aye.

The CLERK. Mr. Sensenbrenner votes aye. Mr. Boehlert.

Mr. BOEHLERT. Aye.

The CLERK. Mr. Boehlert votes yes. Mr. Smith of Texas.

Mr. SMITH of Texas. Aye.

The CLERK. Mr. Smith votes yes. Mrs. Morella.

Mrs. MORELLA. Aye.

The CLERK. Mrs. Morella votes yes. Mr. Weldon of Pennsylvania.

[No response.]

The CLERK. Mr. Rohrabacher.

Mr. ROHRABACHER. Yes.

The CLERK. Mr. Rohrabacher votes yes. Mr. Barton.

[No response.]

The CLERK. Mr. Calvert.

Mr. CALVERT. Aye.

The CLERK. Mr. Calvert votes yes. Mr. Smith of Michigan.

Mr. SMITH of Michigan. Yes.

The CLERK. Mr. Smith votes yes. Mr. Bartlett.

Mr. BARTLETT. Yes.

The CLERK. Mr. Bartlett votes yes. Mr. Ehlers.

Mr. EHLERS. Yes.

The CLERK. Mr. Ehlers votes yes. Mr. Weldon of Florida.

Mr. WELDON of Florida. Yes.

The CLERK. Mr. Weldon votes yes. Mr. Gutknecht.

Mr. GUTKNECHT. Yes.

The CLERK. Mr. Gutknecht votes yes. Mr. Ewing.

[No response.]

The CLERK. Mr. Cannon.

Mr. CANNON. Yes.

The CLERK. Mr. Cannon votes yes. Mr. Brady.

Mr. BRADY. Yes.

The CLERK. Mr. Brady votes yes. Mr. Cook.

Mr. COOK. Yes.

The CLERK. Mr. Cook votes yes. Mr. Nethercutt.

[No response.]

The CLERK. Mr. Lucas.
Mr. LUCAS. Yes.
The CLERK. Mr. Lucas votes yes. Mr. Green.
[No response.]
The CLERK. Mr. Kuykendall.
Mr. KUYKENDALL. Yes.
The CLERK. Mr. Kuykendall votes yes. Mr. Miller.
Mr. MILLER. Yes.
The CLERK. Mr. Miller votes yes. Mrs. Biggert.
Mrs. BIGGERT. Yes.
The CLERK. Mrs. Biggert votes yes. Mr. Sanford.
[No response.]
The CLERK. Mr. Metcalf.
Mr. METCALF. Yes.
The CLERK. Mr. Metcalf votes yes. Mr. Hall.
Mr. HALL. Aye.
The CLERK. Mr. Hall votes yes. Mr. Gordon.
Mr. GORDON. Aye.
The CLERK. Mr. Gordon votes yes. Mr. Costello.
Mr. COSTELLO. Aye.
The CLERK. Mr. Costello votes yes. Mr. Barcia.
Mr. BARCIA. Aye.
The CLERK. Mr. Barcia votes yes. Ms. Johnson.
Ms. JOHNSON. Yes.
The CLERK. Ms. Johnson votes yes. Ms. Woolsey.
Ms. WOOLSEY. Yes.
The CLERK. Ms. Woolsey votes yes. Ms. Rivers.
Ms. RIVERS. Yes.
The CLERK. Mr. Rivers votes yes. Ms. Lofgren.
Ms. LOFGREN. Yes.
The CLERK. Ms. Lofgren votes yes. Mr. Doyle.
Mr. DOYLE. Yes.
The CLERK. Mr. Doyle votes yes. Ms. Jackson Lee.
Ms. JACKSON LEE. Aye.
The CLERK. Ms. Jackson Lee votes yes. Ms. Stabenow.
Ms. STABENOW. Yes.
The CLERK. Ms. Stabenow votes yes. Mr. Etheridge.
Mr. ETHERIDGE. Yes.
The CLERK. Mr. Etheridge votes yes. Mr. Lampson.
Mr. LAMPSON. Yes.
The CLERK. Mr. Lampson votes yes. Mr. Larson.
Mr. LARSON. Yes.
The CLERK. Mr. Larson votes yes. Mr. Udall.
Mr. UDALL. Yes.
The CLERK. Mr. Udall votes yes. Mr. Wu.
Mr. WU. Yes.
The CLERK. Mr. Wu votes yes. Mr. Weiner.
Mr. WEINER. Yes.
The CLERK. Mr. Weiner votes yes. Mr. Capuano.
Mr. CAPUANO. Yes.
The CLERK. Mr. Capuano votes yes. Mr. Baird.
Mr. BAIRD. Yes.
The CLERK. Mr. Baird votes yes. Mr. Hoeffel.
Mr. HOEFFEL. Yes.

The CLERK. Mr. Hoeffel votes yes. Mr. Moore.

Mr. MOORE. Yes.

The CLERK. Mr. Moore votes yes.

Chairman SENSENBRENNER. Are there additional members who desire to cast their vote or to change their vote?

The gentleman from Illinois, Mr. Ewing.

Mr. EWING. I vote yes.

The CLERK. Mr. Ewing votes yes.

Chairman SENSENBRENNER. Any other members who wish to cast their vote or change their vote?

If not, the clerk will report.

The CLERK. Mr. Chairman, there are 41 yes votes and no no votes.

COMMITTEE ON SCIENCE - ROLL CALL - 106th CONGRESS
DATE: 9-09-99 SUBJECT: HR 2086; Final Passage

Rm.	Phone	Member	Yes	No	Not Voting	Present	Absent
2332	55101	Mr. Sensenbrenner, R-WI	1				
2246	53665	Mr. Boehlert, R-NY	2				
2231	54236	Mr. Lamar Smith, R-TX	3				
2228	55341	Mrs. Morella, R-MD	4				
2452	52011	Mr. Curt Weldon, R-PA			✓		✓
2338	52415	Mr. Rohrabacher, R-CA	5				
2264	52002	Mr. Barton, R-TX			✓		✓
2201	51986	Mr. Calvert, R-CA	6				
306	56276	Mr. Nick Smith, R-MI	7				
2412	52721	Mr. Bartlett, R-MD	8				
1714	53831	Mr. Ehlers, R-MI	9				
332	53671	Mr. Dave Weldon, R-FL	10				
425	52472	Mr. Gutknecht, R-MN	11				
2417	52371	Mr. Ewing, R-IL	41				
118	57751	Mr. Cannon, R-UT	12				
1531	54901	Mr. Brady, R-TX	13				
1431	53011	Mr. Cook, R-UT	14				
1527	52006	Mr. Nethercutt, R-WA			✓		✓
438	55565	Mr. Lucas, R-OK	15				
1218	55665	Mr. Green, R-WI			✓		✓
512	58220	Mr. Kuykendall, R-CA	16				
1037	53201	Mr. Miller, R-CA	17				
508	53515	Mrs. Biggert, R-IL	18				
1233	53176	Mr. Sanford, R-SC			✓		✓
1510	52605	Mr. Metcalf, R-WA	19				
2221	***56673***	***Mr. Hall, D-TX***	20				
2368	***54231***	***Mr. Gordon, D-TN***	21				
2454	***55661***	***Mr. Costello, D-IL***	22				
2419	***58171***	***Mr. Barcia, D-MI***	23				
1511	***58885***	***Ms. Johnson, D-TX***	24				
439	***55161***	***Ms. Woolsey, D-CA***	25				
1724	***56261***	***Ms. Rivers, D-MI***	26				
318	***53072***	***Ms. Lofgren, D-CA***	27				
133	***52135***	***Mr. Doyle, D-PA***	28				
410	***53816***	***Ms. Jackson-Lee, D-TX***	29				
1039	***54872***	***Ms. Stabenow, D-MI***	30				
1641	***54531***	***Mr. Etheridge, D-NC***	31				
417	***56565***	***Mr. Lampson, D-TX***	32				
1419	***52265***	***Mr. Larson, D-CT***	33				
128	***52161***	***Mr. Udall, D-CO***	34				
510	***50855***	***Mr. Wu, D-OR***	35				
501	***56616***	***Mr. Weiner, D-NY***	36				
1232	***55111***	***Mr. Capuano, D-MA***	37				
1721	***53536***	***Mr. Baird, D-WA***	38				
1229	***56111***	***Mr. Hoeffel, D-PA***	39				
506	***52865***	***Mr. Moore, D-KS***	40				
		TOTAL	41	0			

Attest: Patricia Schwartz (Clerk)

Chairman SENSENBRENNER. And the motion is agreed to.

Without objection, the bill will be reported in the form of a single amendment in the nature of a substitute reflecting the amendments that are adopted today.

Without objection, members will have two days in which to file additional supplemental minority or dissenting views, and, without objection, the Chair is given permission to make whatever motions are necessary in the House of Representatives to go to conference with the other body on this bill.

○