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ADVANCING AMERICA'S NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 2013

APRIL 11, 2013.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. SMITH of Texas, from the Committee on Science, Space, and Technology, submitted the following

R E P O R T

[To accompany H.R. 967]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 967) to amend the High-Performance Computing Act of 1991 to authorize activities for support of networking and information technology research, 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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29–006

I. AMENDMENT

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Advancing America's Networking and Information Technology Research and Development Act of 2013".

SEC. 2. PROGRAM PLANNING AND COORDINATION.

(a) PERIODIC REVIEWS.—Section 101 of the High-Performance Computing Act of 1991 (15 U.S.C. 5511) is amended by adding at the end the following new subsection:

"(d) PERIODIC REVIEWS.—The agencies identified in subsection (a)(3)(B) shall—

"(1) periodically assess the contents and funding levels of the Program Component Areas and restructure the Program when warranted, taking into consideration any relevant recommendations of the advisory committee established under subsection (b); and

"(2) ensure that the Program includes large-scale, long-term, interdisciplinary research and development activities, including activities described in section 104.".

(b) DEVELOPMENT OF STRATEGIC PLAN.—Section 101 of such Act (15 U.S.C. 5511) is amended further by adding after subsection (d), as added by subsection (a) of this Act, the following new subsection:

"(e) STRATEGIC PLAN.—

"(1) IN GENERAL.—The agencies identified in subsection (a)(3)(B), working through the National Science and Technology Council and with the assistance of the National Coordination Office described under section 102, shall develop, within 12 months after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, and update every 3 years thereafter, a 5-year strategic plan to guide the activities described under subsection (a)(1).

"(2) CONTENTS.—The strategic plan shall specify near-term and long-term objectives for the Program, the anticipated time frame for achieving the near-term objectives, the metrics to be used for assessing progress toward the objectives, and how the Program will—

"(A) foster the transfer of research and development results into new technologies and applications for the benefit of society, including through cooperation and collaborations with networking and information technology research, development, and technology transition initiatives supported by the States;

"(B) encourage and support mechanisms for interdisciplinary research and development in networking and information technology, including through collaborations across agencies, across Program Component Areas, with industry, with Federal laboratories (as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703)), and with international organizations;

"(C) address long-term challenges of national importance for which solutions require large-scale, long-term, interdisciplinary research and development;

"(D) place emphasis on innovative and high-risk projects having the potential for substantial societal returns on the research investment;

"(E) strengthen all levels of networking and information technology education and training programs to ensure an adequate, well-trained workforce; and

"(F) attract more women and underrepresented minorities to pursue postsecondary degrees in networking and information technology.

"(3) NATIONAL RESEARCH INFRASTRUCTURE.—The strategic plan developed in accordance with paragraph (1) shall be accompanied by milestones and roadmaps for establishing and maintaining the national research infrastructure required to support the Program, including the roadmap required by subsection (a)(2)(E).

"(4) RECOMMENDATIONS.—The entities involved in developing the strategic plan under paragraph (1) shall take into consideration the recommendations—

"(A) of the advisory committee established under subsection (b); and

"(B) of the stakeholders whose input was solicited by the National Coordination Office, as required under section 102(b)(3).

"(5) REPORT TO CONGRESS.—The Director of the National Coordination Office shall transmit the strategic plan required under paragraph (1) to the advisory

committee, the Committee on Commerce, Science, and Transportation of the Senate, and the Committee on Science, Space, and Technology of the House of Representatives.".

(c) ADDITIONAL RESPONSIBILITIES OF DIRECTOR.—Section 101(a)(2) of such Act (15 U.S.C. 5511(a)(2)) is amended—

(1) in subparagraph (A) by inserting "education," before "and other activities";

(2) by redesignating subparagraphs (E) and (F) as subparagraphs (F) and (G), respectively; and

(3) by inserting after subparagraph (D) the following new subparagraph:

"(E) encourage and monitor the efforts of the agencies participating in the Program to allocate the level of resources and management attention necessary to ensure that the strategic plan under subsection (e) is developed and executed effectively and that the objectives of the Program are met;".

(d) ADVISORY COMMITTEE.—Section 101(b)(1) of such Act (15 U.S.C. 5511(b)(1)) is amended—

(1) after the first sentence, by inserting the following: "The co-chairs of the advisory committee shall meet the qualifications of committee membership and may be members of the President's Council of Advisors on Science and Technology."; and

(2) in subparagraph (D), by striking "high-performance" and inserting "high-end".

(e) REPORT.—Section 101(a)(3) of such Act (15 U.S.C. 5511(a)(3)) is amended—

(1) in subparagraph (B)—

(A) by redesignating clauses (vii) through (xi) as clauses (viii) through (xii), respectively; and

(B) by inserting after clause (vi) the following:

"(vii) the Department of Homeland Security;";

(2) in subparagraph (C)—

(A) by striking "is submitted," and inserting "is submitted, the levels for the previous fiscal year,"; and

(B) by striking "each Program Component Area;" and inserting "each Program Component Area and research area supported in accordance with section 104;";

(3) in subparagraph (D)—

(A) by striking "each Program Component Area," and inserting "each Program Component Area and research area supported in accordance with section 104,";

(B) by striking "is submitted," and inserting "is submitted, the levels for the previous fiscal year,"; and

(C) by striking "and" after the semicolon;

(4) by redesignating subparagraph (E) as subparagraph (G); and

(5) by inserting after subparagraph (D) the following new subparagraphs:

"(E) include a description of how the objectives for each Program Component Area, and the objectives for activities that involve multiple Program Component Areas, relate to the objectives of the Program identified in the strategic plan required under subsection (e);

"(F) include—

"(i) a description of the funding required by the National Coordination Office to perform the functions specified under section 102(b) for the next fiscal year by category of activity;

"(ii) a description of the funding required by such Office to perform the functions specified under section 102(b) for the current fiscal year by category of activity; and

"(iii) the amount of funding provided for such Office for the current fiscal year by each agency participating in the Program; and".

(f) DEFINITION.—Section 4 of such Act (15 U.S.C. 5503) is amended—

(1) by redesignating paragraphs (1) through (7) as paragraphs (2) through (8), respectively;

(2) by inserting before paragraph (2), as so redesignated, the following new paragraph:

"(1) 'cyber-physical systems' means physical or engineered systems whose networking and information technology functions and physical elements are deeply integrated and are actively connected to the physical world through sensors, actuators, or other means to perform monitoring and control functions;";

(3) in paragraph (3), as so redesignated, by striking "high-performance computing" and inserting "networking and information technology";

(4) in paragraph (4), as so redesignated—

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

(B) by striking "supercomputer" and inserting "high-end computing";

(5) in paragraph (6), as so redesignated, by striking "network referred to as" and all that follows through the semicolon and inserting "network, including advanced computer networks of Federal agencies and departments;"; and

(6) in paragraph (7), as so redesignated, by striking "National High-Performance Computing Program" and inserting "networking and information technology research and development program".

SEC. 3. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

Title I of such Act (15 U.S.C. 5511) is amended by adding at the end the following new section:

"SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

"(a) IN GENERAL.—The Program shall encourage agencies identified in section 101(a)(3)(B) to support large-scale, long-term, interdisciplinary research and development activities in networking and information technology directed toward application areas that have the potential for significant contributions to national economic competitiveness and for other significant societal benefits. Such activities, ranging from basic research to the demonstration of technical solutions, shall be designed to advance the development of research discoveries. The advisory committee established under section 101(b) shall make recommendations to the Program for candidate research and development areas for support under this section.

"(b) CHARACTERISTICS.—

"(1) IN GENERAL.—Research and development activities under this section shall—

"(A) include projects selected on the basis of applications for support through a competitive, merit-based process;

"(B) involve collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories, as appropriate;

"(C) when possible, leverage Federal investments through collaboration with related State initiatives; and

"(D) include a plan for fostering the transfer of research discoveries and the results of technology demonstration activities, including from institutions of higher education and Federal laboratories, to industry for commercial development.

"(2) COST-SHARING.—In selecting applications for support, the agencies shall give special consideration to projects that include cost sharing from non-Federal sources.

"(3) AGENCY COLLABORATION.—If 2 or more agencies identified in section 101(a)(3)(B), or other appropriate agencies, are working on large-scale research and development activities in the same area of national importance, then such agencies shall strive to collaborate through joint solicitation and selection of applications for support and subsequent funding of projects.

"(4) INTERDISCIPLINARY RESEARCH CENTERS.—Research and development activities under this section may be supported through interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities in areas described in subsection (a). Research may be carried out through existing interdisciplinary centers, including those authorized under section 7024(b)(2) of the America COMPETES Act (Public Law 110–69; 42 U.S.C. 1862o–10).".

SEC. 4. CYBER-PHYSICAL SYSTEMS.

(a) ADDITIONAL PROGRAM CHARACTERISTICS.—Section 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is amended—

(1) in subparagraph (H), by striking "and" after the semicolon;

(2) in subparagraph (I)—

(A) by striking "improving the security" and inserting "improving the security, reliability, and resilience"; and

(B) by striking the period at the end and inserting a semicolon; and

(3) by adding at the end the following new subparagraphs:

"(J) provide for increased understanding of the scientific principles of cyber-physical systems and improve the methods available for the design, development, and operation of cyber-physical systems that are characterized by high reliability, safety, and security; and

"(K) provide for research and development on human-computer interactions, visualization, and big data.".

(b) WORKSHOP.—Title I of such Act (15 U.S.C. 5511) is amended further by adding after section 104, as added by section 3 of this Act, the following new section:

"SEC. 105. UNIVERSITY/INDUSTRY WORKSHOP.

"(a) ESTABLISHMENT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall convene a workshop, with participants from institutions of higher education, Federal laboratories, and industry, to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems, including the related technologies required to enable these systems, and to develop grand challenges in cyber-physical systems research and development.

"(b) FUNCTIONS.—The workshop participants shall—

"(1) develop options for models for research and development partnerships among institutions of higher education, Federal laboratories, and industry, including mechanisms for the support of research and development carried out under these partnerships;

"(2) develop options for grand challenges in cyber-physical systems research and development that would be addressed through such partnerships;

"(3) propose guidelines for assigning intellectual property rights and for the transfer of research results to the private sector; and

"(4) make recommendations for how Federal agencies participating in the Program can help support research and development partnerships in cyber-physical systems, including through existing or new grant programs.

"(c) PARTICIPANTS.—The Director of the National Coordination Office shall ensure that participants in the workshop are individuals with knowledge and expertise in cyber-physical systems and that participants represent a broad mix of relevant stakeholders, including academic and industry researchers, cyber-physical systems and technologies manufacturers, cyber-physical systems and technologies users, and, as appropriate, Federal government regulators.

"(d) REPORT.—Not later than 18 months after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall transmit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report describing the findings and recommendations resulting from the workshop required under this section.".

SEC. 5. CLOUD COMPUTING SERVICES FOR RESEARCH.

Title I of such Act (15 U.S.C. 5511) is amended further by adding after section 105, as added by section 4(b) of this Act, the following new section:

"SEC. 106. CLOUD COMPUTING SERVICES FOR RESEARCH.

"(a) INTERAGENCY WORKING GROUP.—Not later than 180 days after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office, working through the National Science and Technology Council, shall convene an interagency working group to examine—

"(1) the research and development needed—

"(A) to enhance the effectiveness and efficiency of cloud computing environments;

"(B) to increase the trustworthiness of cloud applications and infrastructure; and

"(C) to enhance the foundations of cloud architectures, programming models, and interoperability; and

"(2) how Federal science agencies can facilitate the use of cloud computing for federally funded science and engineering research, including—

"(A) making recommendations on changes in funding mechanisms, budget models, and policies needed to remove barriers to the adoption of cloud computing services for research and for data preservation and sharing; and

"(B) providing guidance to organizations and researchers on opportunities and guidelines for using cloud computing services for federally supported research and related activities.

"(b) CONSULTATION.—In carrying out the tasks in paragraphs (1) and (2) of subsection (a), the working group shall consult with academia, industry, Federal laboratories, and other relevant organizations and institutions, as appropriate.

"(c) REPORT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report describing the findings and any recommendations of the working group.

"(d) TERMINATION.—The interagency working group shall terminate upon transmittal of the report required under subsection (c).".

SEC. 6. NATIONAL COORDINATION OFFICE.

Section 102 of such Act (15 U.S.C. 5512) is amended to read as follows:

"SEC. 102. NATIONAL COORDINATION OFFICE.

"(a) OFFICE.—The Director shall continue a National Coordination Office with a Director and full-time staff.

"(b) FUNCTIONS.—The National Coordination Office shall—

"(1) provide technical and administrative support to—

"(A) the agencies participating in planning and implementing the Program, including such support as needed in the development of the strategic plan under section 101(e); and

"(B) the advisory committee established under section 101(b);

"(2) serve as the primary point of contact on Federal networking and information technology activities for government organizations, academia, industry, professional societies, State computing and networking technology programs, interested citizen groups, and others to exchange technical and programmatic information;

"(3) solicit input and recommendations from a wide range of stakeholders during the development of each strategic plan required under section 101(e) through the convening of at least 1 workshop with invitees from academia, industry, Federal laboratories, and other relevant organizations and institutions;

"(4) conduct public outreach, including the dissemination of findings and recommendations of the advisory committee, as appropriate; and

"(5) promote access to and early application of the technologies, innovations, and expertise derived from Program activities to agency missions and systems across the Federal Government and to United States industry.

"(c) SOURCE OF FUNDING.—

"(1) IN GENERAL.—The operation of the National Coordination Office shall be supported by funds from each agency participating in the Program.

"(2) SPECIFICATIONS.—The portion of the total budget of such Office that is provided by each agency for each fiscal year shall be in the same proportion as each such agency's share of the total budget for the Program for the previous fiscal year, as specified in the report required under section 101(a)(3).".

SEC. 7. IMPROVING NETWORKING AND INFORMATION TECHNOLOGY EDUCATION.

Section 201(a) of such Act (15 U.S.C. 5521(a)) is amended—

(1) by redesignating paragraphs (2) through (4) as paragraphs (3) through (5), respectively; and

(2) by inserting after paragraph (1) the following new paragraph:

"(2) the National Science Foundation shall use its existing programs, in collaboration with other agencies, as appropriate, to improve the teaching and learning of networking and information technology at all levels of education and to increase participation in networking and information technology fields, including by women and underrepresented minorities;".

SEC. 8. CONFORMING AND TECHNICAL AMENDMENTS.

(a) SECTION 3.—Section 3 of such Act (15 U.S.C. 5502) is amended—

(1) in the matter preceding paragraph (1), by striking "high-performance computing" and inserting "networking and information technology";

(2) in paragraph (1)—

(A) in the matter preceding subparagraph (A), by striking "high-performance computing" and inserting "networking and information technology";

(B) in subparagraphs (A), (F), and (G), by striking "high-performance computing" each place it appears and inserting "networking and information technology"; and

(C) in subparagraph (H), by striking "high-performance" and inserting "high-end"; and

(3) in paragraph (2)—

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

(B) by striking "high-performance computing network" and inserting "networking and information technology".

(b) TITLE I.—The heading of title I of such Act (15 U.S.C. 5511) is amended by striking "**HIGH-PERFORMANCE COMPUTING**" and inserting "**NETWORKING AND INFORMATION TECHNOLOGY**".

(c) SECTION 101.—Section 101 of such Act (15 U.S.C. 5511) is amended—

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

(2) in subsection (a)—

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

(B) in paragraph (1) of such subsection—

(i) in the matter preceding subparagraph (A), by striking "National High-Performance Computing Program" and inserting "networking and information technology research and development program";

(ii) in subparagraph (A), by striking "high-performance computing, including networking" and inserting "networking and information technology";

(iii) in subparagraphs (B) and (G), by striking "high-performance" each place it appears and inserting "high-end"; and

(iv) in subparagraph (C), by striking "high-performance computing and networking" and inserting "high-end computing, distributed, and networking"; and

(C) in paragraph (2) of such subsection—

(i) in subparagraphs (A) and (C)—

(I) by striking "high-performance computing" each place it appears and inserting "networking and information technology"; and

(II) by striking "development, networking," each place it appears and inserting "development,"; and

(ii) in subparagraphs (F) and (G), as redesignated by section 2(c)(1) of this Act, by striking "high-performance" each place it appears and inserting "high-end";

(3) in subsection (b)—

(A) in paragraph (1), in the matter preceding subparagraph (A), by striking "high-performance computing" both places it appears and inserting "networking and information technology"; and

(B) in paragraph (2), in the second sentence, by striking "2" and inserting "3"; and

(4) in subsection (c)(1)(A), by striking "high-performance computing" and inserting "networking and information technology".

(d) SECTION 201.—Section 201(a)(1) of such Act (15 U.S.C. 5521(a)(1)) is amended by striking "high-performance computing" and all that follows through "networking;" and inserting "networking and information research and development;".

(e) SECTION 202.—Section 202(a) of such Act (15 U.S.C. 5522(a)) is amended by striking "high-performance computing" and inserting "networking and information technology".

(f) SECTION 203.—Section 203(a) of such Act (15 U.S.C. 5523(a)(1)) is amended—

(1) in paragraph (1), by striking "high-performance computing and networking" and inserting "networking and information technology"; and

(2) in paragraph (2)(A), by striking "high-performance" and inserting "high-end".

(g) SECTION 204.—Section 204 of such Act (15 U.S.C. 5524) is amended—

(1) in subsection (a)(1)—

(A) in subparagraph (A), by striking "high-performance computing systems and networks" and inserting "networking and information technology systems and capabilities";

(B) in subparagraph (B), by striking "interoperability of high-performance computing systems in networks and for common user interfaces to systems" and inserting "interoperability and usability of networking and information technology systems"; and

(C) in subparagraph (C), by striking "high-performance computing" and inserting "networking and information technology"; and

(2) in subsection (b)—

(A) in the heading, by striking "HIGH-PERFORMANCE COMPUTING AND NETWORK" and inserting "NETWORKING AND INFORMATION TECHNOLOGY"; and

(B) by striking "sensitive".

(h) SECTION 205.—Section 205(a) of such Act (15 U.S.C. 5525(a)) is amended by striking "computational" and inserting "networking and information technology".

(i) SECTION 206.—Section 206(a) of such Act (15 U.S.C. 5526(a)) is amended by striking "computational research" and inserting "networking and information technology research".

(j) SECTION 207.—Section 207(b) of such Act (15 U.S.C. 5527(b)) is amended by striking "high-performance computing" and inserting "networking and information technology".

(k) SECTION 208.—Section 208 of such Act (15 U.S.C. 5528) is amended—

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

(2) in subsection (a)—

(A) in paragraph (1), by striking "High-performance computing and associated" and inserting "Networking and information";

(B) in paragraph (2), by striking "high-performance computing" and inserting "networking and information technologies";

(C) in paragraph (3), by striking "high-performance" and inserting "high-end";

(D) in paragraph (4), by striking "high-performance computers and associated" and inserting "networking and information"; and

(E) in paragraph (5), by striking "high-performance computing and associated" and inserting "networking and information".

II. PURPOSE AND SUMMARY

The purpose of H.R. 967 is to advance America's networking and information technology research and development by updating the High-Performance Computing Act of 1991. H.R. 967 requires the development and periodic update of a strategic plan for the federal government Networking and Information Technology Research and Development (NITRD) program and codifies work currently conducted by the National Coordination Office (NCO) of the NITRD program. The bill requires the NCO Director to convene a university/industry task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems. Additionally, the bill requires the NCO Director to convene an interagency working group to examine issues around cloud computing services.

III. BACKGROUND AND NEED FOR THE LEGISLATION

Advances in networking and information technology (NIT) continue to transform the world in which we live. We increasingly rely on the systems, tools, and services of this ever-growing and ever-changing domain. It is not only as a matter of convenience in our daily lives, but critical to our future economic prosperity, health, and security.

Federal support for research and development (R&D) in NIT originally stemmed from an interest in and the challenge of developing computers capable of addressing complex problems, primarily those focused on national security and global competition. Today, NIT encompasses a broad array of technologies from smart phones to digital libraries and cloud computing.

R&D in NIT provides a greater understanding of how to protect essential systems and networks, systems and networks that support fundamental sectors of our economy, from emergency communications and power grids to air-traffic control networks and national defense systems in an effort to support a more stable and secure Nation. NIT R&D works to prevent or minimize disruptions to critical information infrastructure, to protect public and private services and to detect and respond to threats while mitigating the severity of and assisting in the recovery from those threats.

Networking and Information Technology Research and Development Program (NITRD)

Congress originally authorized the Networking and Information Technology Research and Development (NITRD) program in the High-Performance Computing Act of 1991 (P.L. 102–194), after recognizing that a number of federal agencies had ongoing high-performance computing programs without a coordinating body. The Act established that coordinating body to improve interagency coordination, cooperation, and planning among those agencies with high-performance computing programs. In addition, it authorized a multi-agency research effort, called the High-Performance Computing and Communications program, to accelerate progress in the advancement of computing and networking technologies and to support leading edge computational research in a range of science and engineering fields. The statute established a set of mechanisms and procedures to provide for the interagency planning, coordination, and budgeting of the research and development activities carried out under the program. The Act has since been amended through the Next Generation Internet Research Act of 1998 and the America COMPETES Act of 2007.

The NITRD program is the main federal R&D investment portfolio in networking, computing, software, cyber security, and related information technologies. NITRD coordinates this unclassified R&D across 14 federal agencies. Additional agencies that do not contribute funding also participate in NITRD planning activities.

The NITRD program has played a role in several important technological advances including the computational decoding of the human genome; modeling and simulation of complex physical systems (aircraft, automobiles, power grids, and pharmaceuticals); unmanned aerial vehicles, search-and-rescue robots; and computer-based education and training.

The Subcommittee on NITRD of the National Science and Technology Council (NSTC) is the internal deliberative organization for NITRD policy, program, and budget guidance.[1] NITRD research activities are organized in eight Program Component Areas (PCAs). The PCAs also align the NITRD program budget categories.[2] NITRD research areas and activities shift regularly as the NIT field creates and develops new R&D challenges.

The NITRD National Coordination Office (NCO) provides staff support for the NITRD program. The NCO provides program and financial management services, technical and subject matter expertise in facilitation, strategic planning, technical writing, networking and information technology services, and administrative staff support for the NITRD Subcommittee and other NITRD subgroups. The National Science Foundation (NSF) serves as the host agency for the NCO.[3]

In December 2010, the President's Council of Advisors on Science and Technology (PCAST) completed a legislatively required report on NITRD. The report, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Tech-*

[1] About the Subcommittee on Networking and Information Technology Research and Development (NITRD Subcommittee), http://www.nitrd.gov/subcommittee/program.aspx.

[2] NITRD Program PCA Definitions, http://www.nitrd.gov/subcommittee/pca-definitions.aspx.

[3] About the Subcommittee on Networking and Information Technology Research and Development (NITRD Subcommittee), http://www.nitrd.gov/subcommittee/program.aspx.

nology, found that "NITRD is well coordinated and that the U.S. computing research community, coupled with a vibrant Networking and Information Technology (NIT) industry, has made seminal discoveries and advanced new technologies that are helping meet many societal challenges."[4]

The 2010 report made several assessments about the role of the NIT field in answering the Nation's challenges and priorities:

- Advances in NIT are a key driver of economic competitiveness. They create new markets and increase productivity.
- Advances in NIT are crucial to achieving our major national and global priorities in energy and transportation, education and life-long learning, healthcare, and national and homeland security.
- Advances in NIT accelerate the pace of discovery in nearly all other fields.
- Advances in NIT are essential to achieving the goals of open government.[5]

Stressing the need that federal investments be in NIT basic research, since the private sector is heavily involved in the development side, the report suggests that an investment of at least $1 billion annually will be required for new, potentially transformative research. The report also recognizes that in the current economic uncertainty, repurposing and reprioritization of funding will be necessary, but does not rule out new funding and indicates a lower level of investment "could seriously jeopardize America's national security and economic competitiveness."[6]

The PCAST report includes recommendations for increased investments in long-term, multi-agency research initiatives in health, energy and transportation, and cybersecurity. It emphasizes, "Where fundamental NIT advances are needed to support these initiatives, mission agencies should invest in fundamental research in NIT, either alone or in collaboration with NSF, and should not limit their programs to application-specific research."[7]

The report also calls for exercising leadership to bring about changes in K–12 STEM education; enhancing the effectiveness of government coordination of NIT research and development; and redefining NITRD budget categories to separate NIT infrastructure for R&D in other fields from NIT R&D.

IV. Hearing Summary

In the 113th Congress, the Subcommittee on Research held a hearing on February 14, 2013, to show the practical applications and benefits of the Networking and Information Technology Research and Development (NITRD) program and its significance to U.S. competitiveness.

The Subcommittee heard from three witnesses: Dr. Kelly Gaither, Director, Visualization Lab, Texas Advanced Computing Center, University of Texas, Austin; Dr. Kathryn McKinley, Principal Researcher, Microsoft; and Dr. Ed Lazowska, Bill and

[4] President's Council of Advisors on Science and Technology, Report to the President and Congress December 2010, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology*, p. v.

[5] President's Council of Advisors on Science and Technology, Report to the President and Congress December 2010, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology*, p. vii.

[6] Ibid, p. x.

[7] Ibid, p. xiii.

Melinda Gates Chair in Computer Science and Engineering, University of Washington.

V. Committee Consideration

On March 5, 2013, H.R. 967 was introduced by Rep. Cynthia Lummis, Rep. Lamar Smith, and Rep. Eddie Bernice Johnson and referred to the Committee on Science, Space, and Technology.

On March 14, 2013, the Committee on Science, Space, and Technology met in open markup session and adopted H.R. 967, as amended, by voice vote. Further, the Committee ordered H.R. 967 favorably reported to the House, as amended, by voice vote.

VI. Committee Votes

Clause 3(b) of rule XIII of the Rules of the House of Representatives requires the Committee to list the record votes on the motion to report legislation and amendments thereto. A motion to order H.R. 967 favorably reported to the House, as amended, was agreed to by voice vote.

During Full Committee consideration of H.R. 967, the following amendments were considered:

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Full Committee Markup
March 14, 2013

AMENDMENT ROSTER

H.R. 967, "Advancing America's Networking and Information Technology Research and Development Act of 2013"

No.	Amendment	Summary	
1	Offered by Mr. McCaul (TX) (013)	Amends the National High-Performance Computing Program Report to add the Department of Homeland Security to the annual report of programs and activities.	Agreed to by voice vote
2	Offered by Mr. Grayson (FL) (055)	Amends the National High-Performance Computing Program to focus on improving security, reliability, and resilience of computing and networking systems.	Agreed to by voice vote
3	Offered by Ms. Johnson (TX) (440)	Replaces outdated text with language that reflects the existence of a cyber physical program created since the legislation was first drafted.	Agreed to by voice vote
4	Offered by Mr. Bucshon (IN) (441)	Amends the Cloud Computing Services for Research to direct the interagency working group to examine how to better use cloud computing within federal science agencies.	Agreed to by voice vote

VII. Summary of Major Provisions of the Bill

H.R. 967 updates the High Performance Computing Act of 1991 and reauthorizes the Networking and Information Technology Research and Development (NITRD) program, the federal government's central R&D investment portfolio for unclassified networking, computing, software, cybersecurity, and related information technologies. NITRD includes 15 member agencies, and more than a dozen other participating agencies.

Regarding cybersecurity, the NITRD program focuses on R&D to detect, prevent, resist, respond to, and recover from actions that compromise or threaten to compromise the availability, integrity, or confidentiality of computer- and network-based systems.

H.R. 967 implements recommendations from the President's Council of Advisors on Science and Technology (PCAST) including improving interagency coordination and planning with input from policy and technical experts. The legislation rebalances R&D portfolios to focus less on short-term goals and place more emphasis on large-scale, long-term interdisciplinary research and updates research areas to reflect new terminologies.

The legislation also directs the NCO to convene a workshop to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems with participants from universities, industry, and Federal laboratories.

Finally, H.R. 967 convenes an interagency working group to identify cloud computing research gaps and examine the potential for using the cloud for federally funded research.

VIII. Committee Views

Program planning and coordination

The Committee believes that while the NITRD program has been largely successful in coordinating networking and information R&D activities across the Federal government, the continued success and strength of the program depends on the willingness of all relevant agencies to be fully engaged in the program. While the Department of Education is listed as one of the original agencies in the 1991 statute establishing the program, its involvement in NITRD has been limited. Given the PCAST report finding that "NIT is the dominant factor in America's science and technology employment, and that the gap between the demand for NIT talent and the supply of that talent is and will remain large,"[8] the Committee encourages the Department of Education to become an active participant.

Strategic plan

The Committee expects the strategic plan to be a useful guide for setting program priorities, estimating time scales for reaching program objectives, and establishing metrics for assessing objectives. The strategic plan should include near-term and long-term objectives for the program and identify how the program will support interdisciplinary research and development, address long-term challenges of national importance, and emphasize innovative high-

[8] President's Council of Advisors on Science and Technology, Report to the President and Congress December 2010, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology*, p. 85.

risk projects. Furthermore, the Committee intends for NITRD agencies to periodically assess the NITRD program to ensure that it includes large-scale, long-term interdisciplinary research and development activities. The Committee intends for the development of the plan to be informed by the research needs of industry and academia and expects the NCO to actively solicit stakeholder input through meetings, requests for information, and other appropriate means.

Research in areas of national importance

The Committee encourages the NITRD agencies to continue to identify a few focused research and development areas for which large-scale, multi-agency projects or activities would be appropriate and have the potential to provide significant contributions to national economic competitiveness. These areas may be more speculative and high-risk basic research opportunities that have the potential to offer substantial payoff and therefore justify the investment and risk.

The NITRD agencies are responsible for selecting the research areas to pursue, with advice from the NITRD Advisory Committee. The Committee recognizes that these research needs can change. The Committee intends that the areas selected have relevance to the mission responsibilities of more than one agency so that the level of resources provided will enable multiple projects and a variety of modes of research to be supported, including multiple investigator awards and interdisciplinary research centers. The Committee intends that the agencies treat planning and reporting on research areas under this section in a similar manner to the program component areas.

Cyber-physical systems

Computer-driven systems connected with the physical world—also called embedded, engineered, or cyber-physical systems (CPS)—are already in widespread use, but growing demand for new capabilities and applications continue to require significant technical advances. Such systems can be difficult and costly to design, build, test, and maintain. The Committee encourages continued investment in CPS.

Big data

Information management, or big data, continues to be a challenge. The Committee encourages big data science and engineering research that would focus on advancing the management, analysis, visualization, and extraction of useful information from large, diverse, distributed, and heterogeneous data sets.

Cloud computing

The Committee recognizes there is a growing need for researchers to be able to use, analyze, and store large data sets for scientific purposes. Cloud computing technologies may hold potential for providing broader analysis, collaboration, sharing, and storing of these ever-increasing data sets. The Committee expects the interagency working group established under section 5 to examine further cloud computing research needs, including cybersecurity implications, as well as the potential for using the cloud for federally funded research and the funding issues surrounding the use of

the cloud for such research. These somewhat distinct tasks may be addressed separately as appropriate.

NITRD Advisory Committee

The NITRD Advisory Committee was originally established by P.L. 102–194 to review, assess, and make recommendations regarding the administration, priorities, and content of the program. This function is currently assigned by the President to PCAST. The Committee recognizes the benefits of having a straightforward pathway for providing advice to the President on national technology issues, scientific research priorities, and math and science education. Consequently, the Committee has specified that the NITRD Advisory Committee co-chairs must meet the same expertise criteria as the Advisory Committee membership and may also be members of PCAST. The Committee expects the co-chairs to come from different sectors of the NIT community. The Committee further expects the Advisory Committee to have an open line of communication with PCAST to ensure full sharing of concerns and questions in both directions.

The Committee expects the Advisory Committee to provide recommendations on the content of the strategic plan and to make recommendations for areas of research to be pursued by the NITRD agencies in accordance with section 3 of the bill. The Committee has changed the reporting requirements of the Advisory Committee from two years to three years and expects the NITRD NSTC Committee to stagger the strategic plan updates with the Advisory Committee reports such that the Advisory Committee recommendations inform the strategic plans in a timely manner. In addition, the Committee encourages the Advisory Committee to consult with subject matter experts in instances when sufficient expertise does not exist on the Advisory Committee and to convene public meetings to gather information from all communities of interest regarding NIT R&D in order to assist it in its assessments of the priorities and content of the program.

NIT workforce needs

The Committee recognizes that the demand for new and existing NIT jobs in the United States will continue to grow and, as such, encourages efforts to increase the number of American NIT graduates at all degree levels.

IX. Committee Oversight Findings

Pursuant to clause 3(c)(1) of rule XIII of the Rules of the House of Representatives, the Committee held an oversight hearing and made findings that are reflected in the descriptive portions of this report.

X. Statement on General Performance Goals and Objectives

In accordance with clause 3(c)(4) of rule XIII of the Rules of the House of Representatives, the performance goals and objectives of the Committee are reflected in the descriptive portions of this report, including the goal to improve networking and information technology research and development in the Federal, private, and public sectors.

XI. New Budget Authority, Entitlement Authority, and Tax Expenditures

In compliance with clause 3(c)(2) of rule XIII of the Rules of the House of Representatives, the Committee adopts as its own the estimate of new budget authority, entitlement authority, or tax expenditures or revenues contained in the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

XII. Advisory on Earmarks

In compliance with clause 9(e), 9(f), and 9(g) of rule XXI, the Committee finds that H.R. 967, the "Advancing America's Networking and Information Technology Research and Development Act of 2013", contains no earmarks.

XIII. Committee Cost Estimate

The Committee adopts as its own the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

XIV. Congressional Budget Office Cost Estimate

Pursuant to clause 3(c)(3) of rule XIII of the Rules of the House of Representatives, the following is the cost estimate provided by the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

U.S. Congress,
Congressional Budget Office,
Washington, DC, March 25, 2013.

Hon. Lamar Smith,
Chairman, Committee on Science, Space, and Technology,
House of Representatives, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 967, the Advancing America's Networking and Information Technology Research and Development Act of 2013.

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

Sincerely,

Robert A. Sunshine
(For Douglas W. Elmendorf, Director).

Enclosure.

H.R. 967—Advancing America's Networking and Information Technology Research and Development Act of 2013

H.R. 967 would expand the activities of the Networking and Information Technology Research and Development (NITRD) program, which coordinates the federal government's goals for developing advanced computing, networking, and software activities. The bill would codify the activities of the program's existing national coordination office. Activities currently include creating a strategic plan, soliciting input from various stakeholders, and coordinating periodic reviews of agencies' information technology activities. H.R. 967 also would establish an interagency working group to examine potential uses of cloud computing. Finally, the legislation would require the coordination office to convene a work-

shop of industry and academic experts to develop recommendations related to information technology systems.

Based on information from the NITRD program office, CBO estimates that implementing H.R. 967 would cost about $1 million over the 2014–2018 period, subject to the availability of appropriated funds. That amount includes the costs to support the examination of cloud computing and the stakeholder workshop. Enacting H.R. 967 would not affect direct spending or revenues; therefore, pay-as-you-go procedures do not apply.

H.R. 967 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act and would not affect the budgets of state, local, or tribal governments.

The CBO staff contact for this estimate is Martin von Gnechten. The estimate was approved by Theresa Gullo, Deputy Assistant Director for Budget Analysis.

XV. Federal Mandates Statement

The Committee adopts as its own the estimate of Federal mandates prepared by the Director of the Congressional Budget Office pursuant to section 423 of the Unfunded Mandates Reform Act.

XVI. Compliance With H. Res. 5

A. Directed Rule Making. The Committee does not believe that this bill directs any executive branch official to conduct any specific rule-making proceedings

B. Duplication of Existing Programs. The Committee is not aware of another established or authorized program of the Federal government which duplicates the program in the bill. Such program was not included in any report from the Government Accountability Office to Congress pursuant to section 21 of Public Law 111–139. Because of the interdisciplinary nature of NSF, the Catalog of Federal Domestic Assistance identifies all programs at NSF at the directorate level and views such programs as related; however, specific activities at NSF, such as those included in H.R. 967, are not identified in the CFDA. H.R. 967 reauthorizes the National Coordination Office to coordinate networking and information activities across Federal agencies to prevent duplication.

XVII. Federal Advisory Committee Statement

No advisory committees within the meaning of section 5(b) of the Federal Advisory Committee Act were created by this legislation.

XVIII. Applicability to Legislative Branch

The Committee finds that the legislation 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.

XIX. Section-by-Section Analysis

Sec. 1. Short title

This section sets forth the short title as Advancing America's Networking and Information Technology Research and Development Act of 2012.

Sec. 2. Program planning and coordination

Requires the Networking and Information Technology Research and Development Program (NITRD) agencies to periodically assess the program contents and funding levels and to update the program accordingly.

Requires the NITRD agencies to develop and periodically update (at 3-year intervals) a strategic plan for the program. Describes the characteristics and content of the strategic plan, including how the program will foster technology transfer; encourage innovative, large-scale, and interdisciplinary research; address long-term challenges of national importance; emphasize innovative and high-risk projects; and strengthen NIT education and the workforce.

Encourages a more active role for the Office of Science and Technology Policy (OSTP) in ensuring that the strategic plan is developed and executed effectively and that the objectives of the program are met.

Provides for the Director to establish goals and priorities for Federal NIT education.

Ensures that the advisory committee for NITRD retains the necessary breadth and depth of expertise in NIT fields, provides guidance on the committee's co-chairs, and allows that it may be linked to the President's Council of Advisors on Science and Technology.

Specifies that the annual report now required for the NITRD program explicitly describes how the program activities planned and underway relate to the objectives specified in the strategic plan.

Specifies that the annual report now required for the NITRD program include a description of research areas supported in accordance with section 3, including the same budget information as is required for the Program Component Areas.

Adds a definition for cyber-physical systems and amends existing definitions to incorporate networking and information technology terminology.

Sec. 3. Large-scale research in areas of national importance

Authorizes NITRD agencies to support large-scale, long-term, interdisciplinary research with the potential to make significant contributions to society and U.S. economic competitiveness and to encourage collaboration between at least two agencies as well as cost-sharing from non-federal sources. Characteristics of the projects supported include: collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories; leveraging of federal investments through collaboration with related State initiatives, when possible; and plans for fostering technology transfer.

Authorizes support of activities under this section through existing interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities.

Sec. 4. Cyber-physical systems

Requires the program to support research and development in cyber-physical systems; human-computer interactions, visualization, and big data.

Directs the National Coordination Office to convene a workshop, not later than one year after the date of enactment, with representatives of higher education, Federal laboratories, and industry to ex-

plore mechanisms for carrying out collaborative research and development activities for cyber-physical systems, including the related technologies required to enable these systems, and to develop grand challenges in cyber-physical systems research and development.

Requires workshop participants to develop options for models of research and development partnerships among institutions of higher education, Federal laboratories, and industry, including mechanisms for the support of research carried out under these partnerships; develop options for grand challenges in cyber-physical systems research and development that would be addressed through such partnerships; propose guidelines for assigning intellectual property rights and for the transfer of research results to the private sector; and make recommendations for how Federal agencies participating in the Program can help support research and development partnerships in cyber-physical systems, including through existing or new grant programs.

The Director of the NCO shall ensure that participants in the workshop are individuals with knowledge and expertise in cyber-physical systems and that participants represent a broad mix of relevant stakeholders, including academic and industry researchers, cyber-physical systems and technologies manufacturers, cyber-physical systems and technologies users, and, as appropriate, Federal government regulators.

Requires a report to Congress on any findings and recommendations from the workshop on models for collaborative research and development. The workshop would terminate upon transmittal of the report.

Sec. 5. Cloud computing services for research

Provides for an interagency working group to examine research and development needed for cloud computing and how Federal science agencies can facilitate the use of cloud computing for federally funded science and engineering research. The working group would consult with academia, industry, federal laboratories and other relevant organizations and institutions. Within one year the working group would be required to report to Congress on its findings and any recommendations for guidelines. The working group would terminate upon transmittal of the report.

Sec. 6. National Coordination Office

Formally codifies the existing National Coordination Office (NCO); delineates the office's roles and responsibilities; and specifies the source of funding for the office, consistent with current practice.

Sec. 7. Improving networking and information technology

Requires NSF to use existing programs to improve the teaching and learning of networking and information technology.

Sec. 8. Conforming and technical amendments

Strikes and replaces instances of outdated "high-performance computing" language with "networking and information technology" and "high-end computing" as appropriate.

Provides for the Advisory Committee to report not less frequently than once every three years, versus two years.

XX. 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

* * * * * * *

SEC. 3. PURPOSES.

The purposes of this Act are to help ensure the continued leadership of the United States in [high-performance computing] *networking and information technology* and its applications by—

(1) expanding Federal support for research, development, and application of [high-performance computing] *networking and information technology* in order to—

(A) expand the number of researchers, educators, and students with training in [high-performance computing] *networking and information technology* and access to [high-performance computing] *networking and information technology* resources;

* * * * * * *

(F) provide for the application of [high-performance computing] *networking and information technology* to Grand Challenges;

(G) invest in basic research and education, and promote the inclusion of [high-performance computing] *networking and information technology* into educational institutions at all levels; and

(H) promote greater collaboration among government, Federal laboratories, industry, high-end computing centers, and universities;

(2) improving the interagency planning and coordination of Federal research and development on [high-performance computing and] *networking and information technology and* maximizing the effectiveness of the Federal Government's [high-performance computing network] *networking and information technology* research and development programs;

* * * * * * *

SEC. 4. DEFINITIONS.

As used in this Act, the term—

(1) "cyber-physical systems" means physical or engineered systems whose networking and information technology functions and physical elements are deeply integrated and are actively connected to the physical world through sensors, actuators, or other means to perform monitoring and control functions;

[(1)] *(2)* "Director" means the Director of the Office of Science and Technology Policy;

[(2)] *(3)* "Grand Challenge" means a fundamental problem in science or engineering, with broad economic and scientific impact, whose solution will require the application of [high-performance computing] *networking and information technology* resources and multidisciplinary teams of researchers;

[(3)] *(4)* "[high-performance computing] *networking and information technology*" means advanced computing, communications, and information technologies, including [supercomputer] *high-end computing* systems, high-capacity and high-speed networks, special purpose and experimental systems, applications and systems software, and the management of large data sets;

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

[(5)] *(6)* "Network" means a computer [network referred to as the National Research and Education Network established under section 102;] *network, including advanced computer networks of Federal agencies and departments;*

[(6)] *(7)* "Program" means the [National High-Performance Computing Program] *networking and information technology research and development program* described in section 101; and

[(7)] *(8)* "Program Component Areas" means the major subject areas under which related individual projects and activities carried out under the Program are grouped.

TITLE I—[HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY* RESEARCH AND DEVELOPMENT

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

(a) [NATIONAL HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT* PROGRAM.—(1) The President shall implement a [National High-Performance Computing Program] *networking and information technology research and development program*, which shall—

(A) provide for long-term basic and applied research on [high-performance computing, including networking] *networking and information technology*;

(B) provide for research and development on, and demonstration of, technologies to advance the capacity and capabilities of [high-performance] *high-end* computing and networking systems, and related software;

(C) provide for sustained access by the research community throughout the United States to [high-performance computing and networking] *high-end computing, distributed, and networking* systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems, including provision for technical support for users of such systems;

* * * * * * *

(G) provide for the technical support of, and research and development on, [high-performance] *high-end* computing systems and software required to address Grand Challenges;

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

(I) provide for [improving the security] *improving the security, reliability, and resilience* of computing and networking systems, including Federal systems, including providing for research required to establish security standards and practices for these systems[.]*;*

(J) provide for increased understanding of the scientific principles of cyber-physical systems and improve the methods available for the design, development, and operation of cyber-physical systems that are characterized by high reliability, safety, and security; and

(K) provide for research and development on human-computer interactions, visualization, and big data.

(2) The Director shall—

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

* * * * * * *

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

* * * * * * *

(E) encourage and monitor the efforts of the agencies participating in the Program to allocate the level of resources and management attention necessary to ensure that the strategic plan under subsection (e) is developed and executed effectively and that the objectives of the Program are met;

[(E)] *(F)* develop and maintain a research, development, and deployment roadmap covering all States and regions for the provision of [high-performance] *high-end* computing and networking systems under paragraph (1)(C); and

[(F)] *(G)* consult with academic, State, industry, and other appropriate groups conducting research on and using [high-performance] *high-end* computing.

(3) The annual report submitted under paragraph (2)(D) shall—

(A) * * *

(B) set forth the relevant programs and activities, for the fiscal year with respect to which the budget submission applies, of each Federal agency and department, including—

(i) * * *

* * * * * * *

(vii) the Department of Homeland Security;

[(vii)] *(viii)* the Department of the Interior;

[(viii)] *(ix)* the Environmental Protection Agency;

[(ix)] *(x)* the National Aeronautics and Space Administration;

[(x)] *(xi)* the National Science Foundation; and

[(xi)] *(xii)* such other agencies and departments as the President or the Director considers appropriate;

(C) describe the levels of Federal funding for the fiscal year during which such report [is submitted,] *is submitted, the levels for the previous fiscal year,* and the levels proposed for the fiscal year with respect to which the budget submission ap-

plies, for [each Program Component Area;] *each Program Component Area and research area supported in accordance with section 104;*

(D) describe the levels of Federal funding for each agency and department participating in the Program, and for [each Program Component Area,] *each Program Component Area and research area supported in accordance with section 104,* for the fiscal year during which such report [is submitted,] *is submitted, the levels for the previous fiscal year,* and the levels proposed for the fiscal year with respect to which the budget submission applies; [and]

(E) include a description of how the objectives for each Program Component Area, and the objectives for activities that involve multiple Program Component Areas, relate to the objectives of the Program identified in the strategic plan required under subsection (e);

(F) include—

(i) a description of the funding required by the National Coordination Office to perform the functions specified under section 102(b) for the next fiscal year by category of activity;

(ii) a description of the funding required by such Office to perform the functions specified under section 102(b) for the current fiscal year by category of activity; and

(iii) the amount of funding provided for such Office for the current fiscal year by each agency participating in the Program; and

[(E)] *(G)* include an analysis of the progress made toward achieving the goals and priorities established for the Program and the extent to which the Program incorporates the recommendations of the advisory committee established under subsection (b).

(b) ADVISORY COMMITTEE.—(1) The President shall establish an advisory committee on [high-performance computing] *networking and information technology*, consisting of geographically dispersed non-Federal members, including representatives of the research, education, and library communities, network and related software providers, and industry representatives in the Program Component Areas, who are specially qualified to provide the Director with advice and information on [high-performance computing] *networking and information technology*. *The co-chairs of the advisory committee shall meet the qualifications of committee membership and may be members of the President's Council of Advisors on Science and Technology.* 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—

(A) * * *

* * * * * * *

(D) whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in [high-performance] *high-end* computing, networking technology, and related software; and

* * * * * * *

(2) In addition to the duties outlined in paragraph (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program. The advisory committee shall report not less frequently than once every [2] *3* fiscal years to the Committee on Science and Technology 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 enactment of the America COMPETES 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] *networking and information technology* activities which contributes directly to the Program Component Areas or benefits from the Program; and

* * * * * * *

(d) PERIODIC REVIEWS.—The agencies identified in subsection (a)(3)(B) shall—

(1) periodically assess the contents and funding levels of the Program Component Areas and restructure the Program when warranted, taking into consideration any relevant recommendations of the advisory committee established under subsection (b); and

(2) ensure that the Program includes large-scale, long-term, interdisciplinary research and development activities, including activities described in section 104.

(e) STRATEGIC PLAN.—

(1) IN GENERAL.—The agencies identified in subsection (a)(3)(B), working through the National Science and Technology Council and with the assistance of the National Coordination Office described under section 102, shall develop, within 12 months after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, and update every 3 years thereafter, a 5-year strategic plan to guide the activities described under subsection (a)(1).

(2) CONTENTS.—The strategic plan shall specify near-term and long-term objectives for the Program, the anticipated time frame for achieving the near-term objectives, the metrics to be used for assessing progress toward the objectives, and how the Program will—

(A) foster the transfer of research and development results into new technologies and applications for the benefit of society, including through cooperation and collaborations with networking and information technology research, development, and technology transition initiatives supported by the States;

(B) encourage and support mechanisms for interdisciplinary research and development in networking and information technology, including through collaborations across

agencies, across Program Component Areas, with industry, with Federal laboratories (as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703)), and with international organizations;

(C) address long-term challenges of national importance for which solutions require large-scale, long-term, interdisciplinary research and development;

(D) place emphasis on innovative and high-risk projects having the potential for substantial societal returns on the research investment;

(E) strengthen all levels of networking and information technology education and training programs to ensure an adequate, well-trained workforce; and

(F) attract more women and underrepresented minorities to pursue postsecondary degrees in networking and information technology.

(3) NATIONAL RESEARCH INFRASTRUCTURE.—The strategic plan developed in accordance with paragraph (1) shall be accompanied by milestones and roadmaps for establishing and maintaining the national research infrastructure required to support the Program, including the roadmap required by subsection (a)(2)(E).

(4) RECOMMENDATIONS.—The entities involved in developing the strategic plan under paragraph (1) shall take into consideration the recommendations—

(A) of the advisory committee established under subsection (b); and

(B) of the stakeholders whose input was solicited by the National Coordination Office, as required under section 102(b)(3).

(5) REPORT TO CONGRESS.—The Director of the National Coordination Office shall transmit the strategic plan required under paragraph (1) to the advisory committee, the Committee on Commerce, Science, and Transportation of the Senate, and the Committee on Science, Space, and Technology of the House of Representatives.

[SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK.

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

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

the extent practicable, to electronic information resources maintained by libraries, research facilities, publishers, and affiliated organizations.

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

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

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

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

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

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

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

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

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

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

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

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

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

searchers and educators around the Nation to share information and instrumentation.

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

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

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

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

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

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

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

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

SEC. 102. NATIONAL COORDINATION OFFICE.

(a) OFFICE.—The Director shall continue a National Coordination Office with a Director and full-time staff.

(b) FUNCTIONS.—The National Coordination Office shall—

(1) provide technical and administrative support to—

(A) the agencies participating in planning and implementing the Program, including such support as needed in the development of the strategic plan under section 101(e); and

(B) the advisory committee established under section 101(b);

(2) serve as the primary point of contact on Federal networking and information technology activities for government organizations, academia, industry, professional societies, State computing and networking technology programs, interested citizen groups, and others to exchange technical and programmatic information;

(3) solicit input and recommendations from a wide range of stakeholders during the development of each strategic plan required under section 101(e) through the convening of at least 1 workshop with invitees from academia, industry, Federal laboratories, and other relevant organizations and institutions;

(4) conduct public outreach, including the dissemination of findings and recommendations of the advisory committee, as appropriate; and

(5) promote access to and early application of the technologies, innovations, and expertise derived from Program activities to agency missions and systems across the Federal Government and to United States industry.

(c) SOURCE OF FUNDING.—

(1) IN GENERAL.—The operation of the National Coordination Office shall be supported by funds from each agency participating in the Program.

(2) SPECIFICATIONS.—The portion of the total budget of such Office that is provided by each agency for each fiscal year shall be in the same proportion as each such agency's share of the total budget for the Program for the previous fiscal year, as specified in the report required under section 101(a)(3).

* * * * * * *

SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

(a) IN GENERAL.—The Program shall encourage agencies identified in section 101(a)(3)(B) to support large-scale, long-term, interdisciplinary research and development activities in networking and information technology directed toward application areas that have the potential for significant contributions to national economic competitiveness and for other significant societal benefits. Such activities, ranging from basic research to the demonstration of technical solutions, shall be designed to advance the development of research discoveries. The advisory committee established under section 101(b) shall make recommendations to the Program for candidate research and development areas for support under this section.

(b) CHARACTERISTICS.—

(1) IN GENERAL.—Research and development activities under this section shall—

(A) include projects selected on the basis of applications for support through a competitive, merit-based process;

(B) involve collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories, as appropriate;

(C) when possible, leverage Federal investments through collaboration with related State initiatives; and

(D) include a plan for fostering the transfer of research discoveries and the results of technology demonstration activities, including from institutions of higher education and Federal laboratories, to industry for commercial development.

(2) COST-SHARING.—In selecting applications for support, the agencies shall give special consideration to projects that include cost sharing from non-Federal sources.

(3) AGENCY COLLABORATION.—If 2 or more agencies identified in section 101(a)(3)(B), or other appropriate agencies, are working on large-scale research and development activities in the same area of national importance, then such agencies shall strive to collaborate through joint solicitation and selection of applications for support and subsequent funding of projects.

(4) INTERDISCIPLINARY RESEARCH CENTERS.—Research and development activities under this section may be supported through interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities in areas described in subsection (a). Research may be carried out through existing interdisciplinary centers, including those authorized under section 7024(b)(2) of the America COMPETES Act (Public Law 110–69; 42 U.S.C. 1862o–10).

SEC. 105. UNIVERSITY/INDUSTRY WORKSHOP.

(a) ESTABLISHMENT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall convene a workshop, with participants from institutions of higher education, Federal laboratories, and industry, to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems, including the related technologies required to enable these systems, and to develop grand challenges in cyber-physical systems research and development.

(b) FUNCTIONS.—The workshop participants shall—

(1) develop options for models for research and development partnerships among institutions of higher education, Federal laboratories, and industry, including mechanisms for the support of research and development carried out under these partnerships;

(2) develop options for grand challenges in cyber-physical systems research and development that would be addressed through such partnerships;

(3) propose guidelines for assigning intellectual property rights and for the transfer of research results to the private sector; and

(4) make recommendations for how Federal agencies participating in the Program can help support research and development partnerships in cyber-physical systems, including through existing or new grant programs.

(c) PARTICIPANTS.—The Director of the National Coordination Office shall ensure that participants in the workshop are individuals with knowledge and expertise in cyber-physical systems and that participants represent a broad mix of relevant stakeholders, including academic and industry researchers, cyber-physical systems and technologies manufacturers, cyber-physical systems and technologies users, and, as appropriate, Federal government regulators.

(d) REPORT.—Not later than 18 months after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall transmit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report describing the findings and recommendations resulting from the workshop required under this section.

SEC. 106. CLOUD COMPUTING SERVICES FOR RESEARCH.

(a) INTERAGENCY WORKING GROUP.—Not later than 180 days after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office, working through the National Science and Technology Council, shall convene an interagency working group to examine—

(1) the research and development needed—

(A) to enhance the effectiveness and efficiency of cloud computing environments;

(B) to increase the trustworthiness of cloud applications and infrastructure; and

(C) to enhance the foundations of cloud architectures, programming models, and interoperability; and

(2) how Federal science agencies can facilitate the use of cloud computing for federally funded science and engineering research, including—

(A) making recommendations on changes in funding mechanisms, budget models, and policies needed to remove barriers to the adoption of cloud computing services for research and for data preservation and sharing; and

(B) providing guidance to organizations and researchers on opportunities and guidelines for using cloud computing services for federally supported research and related activities.

(b) CONSULTATION.—In carrying out the tasks in paragraphs (1) and (2) of subsection (a), the working group shall consult with academia, industry, Federal laboratories, and other relevant organizations and institutions, as appropriate.

(c) REPORT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report describing the findings and any recommendations of the working group.

(d) TERMINATION.—The interagency working group shall terminate upon transmittal of the report required under subsection (c).

TITLE II—AGENCY ACTIVITIES

SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

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

(1) the National Science Foundation shall provide computing and networking infrastructure support for all science and engineering disciplines, and support basic research and human resource development in all aspects of [high-performance computing and advanced high-speed computer networking;] *networking and information research and development;*

(2) the National Science Foundation shall use its existing programs, in collaboration with other agencies, as appropriate, to improve the teaching and learning of networking and information technology at all levels of education and to increase participation in networking and information technology fields, including by women and underrepresented minorities;

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

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

[(4)] *(5)* the National Science Foundation shall upgrade the National Science Foundation funded network, assist regional networks to upgrade their capabilities, and provide other Fed-

eral departments and agencies the opportunity to connect to the National Science Foundation funded network.

* * * * * * *

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] *networking and information technology*, particularly in the field of computational science, with emphasis on aerospace sciences, earth and space sciences, and remote exploration and experimentation.

* * * * * * *

SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.

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

(1) conduct and support basic and applied research in [high-performance computing and networking] *networking and information technology* to support fundamental research in science and engineering disciplines related to energy applications; and

(2) provide computing and networking infrastructure support, including—

(A) the provision of [high-performance] *high-end* computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems; and

* * * * * * *

SEC. 204. DEPARTMENT OF COMMERCE ACTIVITIES.

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

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

(A) conduct basic and applied measurement research needed to support various [high-performance computing systems and networks] *networking and information technology systems and capabilities*;

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

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

* * * * * * *

(b) [HIGH-PERFORMANCE COMPUTING AND NETWORK] *NETWORKING AND INFORMATION TECHNOLOGY* SECURITY.—Pursuant to the Computer Security Act of 1987 (Public Law 100–235; 101 Stat. 1724), the National Institute of Standards and Technology shall be responsible for developing and proposing standards and guidelines

needed to assure the cost-effective security and privacy of [sensitive] information in Federal computer systems.

* * * * * * *

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] *networking and information technology* techniques and software tools which form the core of ecosystem, atmospheric chemistry, and atmospheric dynamics models.

* * * * * * *

SEC. 206. ROLE OF THE DEPARTMENT OF EDUCATION.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Education is authorized to conduct basic and applied research in [computational research] *networking and information technology research* with an emphasis on the coordination of activities with libraries, school facilities, and education research groups with respect to the advancement and dissemination of computational science and the development, evaluation and application of software capabilities.

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SEC. 207. MISCELLANEOUS PROVISIONS.

(a) * * *

(b) ACQUISITION OF PROTOTYPE AND EARLY PRODUCTION MODELS.—In accordance with Federal contracting law, Federal agencies and departments participating in the Program may acquire prototype or early production models of new [high-performance computing] *networking and information technology* systems and subsystems to stimulate hardware and software development. Items of computing equipment acquired under this subsection shall be considered research computers for purposes of applicable acquisition regulations.

SEC. 208. FOSTERING UNITED STATES COMPETITIVENESS IN [HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY* AND RELATED ACTIVITIES.

(a) FINDINGS.—The Congress finds the following:

(1) [High-performance computing and associated] *Networking and information* technologies are critical to the United States economy.

(2) While the United States has led the development of [high-performance computing] *networking and information technologies*, United States industry is facing increasing global competition.

(3) Despite existing international agreements on fair competition and nondiscrimination in government procurements, there is increasing concern that such agreements are not being honored, that more aggressive enforcement of such agreements is needed, and that additional steps may be required to ensure fair global competition, particularly in high-technology fields such as [high-performance] *high-end* computing and associated technologies.

(4) It is appropriate for Federal agencies and departments to use the funds authorized for the Program in a manner which

most effectively fosters the maintenance and development of United States leadership in [high-performance computers and associated] *networking and information* technologies in and for the benefit of the United States.

(5) It is appropriate for Federal agencies and departments to use the funds authorized for the Program in a manner, consistent with the Trade Agreements Act of 1979 (19 U.S.C. 2501 et seq.), which most effectively fosters reciprocal competitive procurement treatment by foreign governments for United States [high-performance computing and associated] *networking and information* technology products and suppliers.

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XXI. PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 967, ADVANCING AMERICA'S NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 2013

THURSDAY, MARCH 14, 2012

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

I am pleased to call up for consideration H.R. 967, the *Advancing America's Networking and Information Technology Research and Development Act of 2013*. I want to thank Ms. Lummis, the gentlewoman from Wyoming, for her work on this bill, and I am an original cosponsor along with Ranking Member Eddie Bernice Johnson. This bill had broad bipartisan support in the last Congress, and I hope it will receive that same support today.

In the digital age, protecting our Nation's computer networking systems is more important than ever. This bill provides the coordinated R&D efforts necessary to improve cyber and data security nationwide, and better network security promotes U.S. competitiveness, enhances national security and creates high-tech jobs.

The NITRD program is an extension of the *High Performance Computing Act of 1991*. It represents the Federal Government's main R&D investment portfolio for unclassified networking, computing, software, cybersecurity and related information technologies. Currently, 15 federal agencies are contributing Members of NITRD, with an additional 20 or so participating in the program. This bill serves as the mechanism for interagency coordination of R&D to ensure no duplication of research efforts among federal agencies or the private sector. It rebalances R&D portfolios to focus less on short-term goals and more on large-scale, long-term interdisciplinary research.

While this bill does not authorize specific funding amounts, NITRD spending totals over $3.7 billion annually. Over $1.1 billion of this is from the National Science Foundation and over $550 million is from the Department of Energy. The bill updates the underlying high-performance computing statute and codifies work undertaken by the National Coordination Office, housed within NSF, to oversee the 15 different agencies.

The NITRD program has eight strategic priorities for its research: cybersecurity, autonomous robotic systems, high-end computing and applications, exascale computing, human-computer interaction, large-scale networking, workforce development, and

software design and productivity. Technologies that come from these research priorities are applied by the commercial sector and the government to protect and enhance emergency communications, the power grid, air-traffic control networks, and national defense systems. Networking and information technology supports and boosts American competitiveness, enhances national security, and helps strengthen the economy. American job creators also recognize the importance of networking and information technology research and development.

Many industry partners and stakeholders have written letters in support of this bill. They include the National Association of Manufacturers, TechAmerica, Computing Research Association, Institute of Electrical and Electronic Engineers-USA, Society for Industrial and Applied Mathematics, and the U.S. Public Policy Council of the Association for Computing Machinery.

Cybersecurity provisions in the bill include research necessary to detect, prevent, and recover from actions that comprise or threaten—that compromise or threaten computer-based systems. This will be the second cybersecurity-related legislation this Committee is reporting today, and I again thank Ms. Lummis for her interest in this issue and urge my colleagues to support the bill.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF CHAIRMAN LAMAR SMITH

I am pleased to call up for consideration H.R. 967, the Advancing America's Networking and Information Technology Research and Development Act of 2013. I thank Ms. Lummis, the gentlewoman from Wyoming, for her work on this bill and am an original cosponsor along with Ranking Member Eddie Bernice Johnson.

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Chairman SMITH. Are there any amendments to the bill? The gentleman from Texas, Mr. McCaul, is recognized.

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

Chairman SMITH. The Clerk will report the amendment.

The CLERK. Amendment number 013, amendment to H.R. 967, offered by Mr. McCaul of Texas.

[The amendment of Mr. McCaul appears in the Appendix]

Chairman SMITH. Without objection, the amendment will be considered as read, and the gentleman from Texas is recognized to explain his amendment.

Mr. MCCAUL. Mr. Chairman, my amendment would simply add the Department of Homeland Security to the list of agencies in Section 101 of the *High Performance Computing Act of 1991*. The underlying Act was written before DHS existed, and my amendment would ensure that the Department of Homeland Security, which plays a key role in securing the Federal Government's civilian cyber networks, is included with the other listed agencies as part of the ongoing consensus efforts carried out under the authority of this Act.

I urge my colleagues to support this, and I yield back.

Chairman SMITH. Thank you, Mr. McCaul. I support the amendment as well. Is there any other Member who wishes to be heard on the amendment?

If not, all in favor say aye.

All opposed, no.

In the opinion of the Chair, the ayes have it and the amendment is agreed to.

The gentleman from Florida, Mr. Grayson, is recognized for the purpose of offering an amendment.

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

Chairman SMITH. The Clerk will report the amendment.

The CLERK. Amendment number 055, amendment to H.R. 967, offered by Mr. Grayson of Florida.

[The amendment of Mr. Grayson appears in the Appendix]

Chairman SMITH. Without objection, the amendment will be considered as read, and the gentleman from Florida is recognized to explain his amendment.

Mr. GRAYSON. Thank you, Mr. Chairman.

This amendment amends the National High Performance Computing Program to add a focus on improving the security, reliability and resilience of computing and networking systems. Our cybersecurity infrastructure isn't just software; it is also rooted in the real

world with physical vulnerabilities to terrorism and natural disasters like hurricanes and even just power outages.

Late last year, an Amazon.com server problem in Virginia took down Netflix, which was a terrible problem for my five children, Reddit, Pinterest, Fast Company, Airbnb and others, and this is just the most recent high-profile incident of this type. Given that our various power grids, telecommunication systems, server farms and so on are all interconnected and physically connected, we need research on how to make these systems more resilient and reliable. That is what this amendment does. I yield back.

Chairman SMITH. Thank you, Mr. Grayson. I support the amendment as well. Are there any other Members who wish to be heard on the amendment?

If not, all in favor say aye.

Opposed, nay.

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

We will go now to the amendment to be offered by the Ranking Member, Ms. Johnson, and she is recognized for that purpose.

Ms. JOHNSON. Thank you very much, Mr. Chairman. I do have an amendment at the desk.

Chairman SMITH. And the Clerk will report the amendment.

The CLERK. Amendment number 440, amendment to H.R. 967, offered by Ms. Johnson of Texas.

[The amendment of Ms. Johnson appears in the Appendix]

Chairman SMITH. Without objection, the amendment will be considered as read, and the gentlewoman from Texas is recognized to explain her amendment.

Ms. JOHNSON. Thank you, Mr. Chairman.

My amendment would simply update Section 4 of the bill to reflect activities that have already been carried out under the NITRD program since the language was first introduced by Chairman Gordon in 2009. At that time, experts from both academia and industry testified before the Committee that the program take an active role in convening industry, university researchers, and experts from national laboratories around the topic of cyber physical systems, and in a 2007 review of the program, the PCAST also recommended that cyber physical systems get a disproportionately larger increase in R&D funding under NITRD. Cyber physical systems play an increasingly important role in such diverse fields as health care, transportation and manufacturing. For example, a diabetic doesn't have to remember to take her insulin because an implantable device monitoring her glucose level is taking care of it for her, or the pilot flying your plane doesn't have to take a manual control when the plane hits turbulence because the autopilot reads the conditions and responds in the safest way every time.

Partnerships between industry and universities in this area of research are no less important than they were in 2009. Fortunately, OSTP and NITRD program also recognized the need and responded to the PCAST and other expert input accordingly. They have taken significant steps since 2009 to address many of the needs identified in Section 4. However, it was premature to do away with the provision altogether because all of the problems are not yet solved, and PCAST continues to list it as a priority.

So we updated this section to reflect what it has done but also to make sure that this continues as a priority focus. In particular, there is still a need to continue to develop new models for public-private partnerships and to focus more on transferring new ideas out of the lab and into the commercial marketplace.

In changing this provision from a fairly prescriptive task force to a less prescriptive workshop, we gave OSTP the flexibility to design the workshop to meet current needs and also to work within that current mechanism for convening stakeholders. It also saves them a lot of money, and I hope Mr. Broun is listening. In this budget environment, even a million dollars makes a big difference.

This is a common sense, good-government amendment, and I urge my colleagues to support it. I yield back.

[The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF REPRESENTATIVE EDDIE BERNICE JOHNSON

Thank you Chairman Smith.

Today, we are marking up two bipartisan pieces of legislation:

- H.R. 756, the Cybersecurity Enhancement Act of 2013, and
- H.R. 967, Advancing America's Networking and Information Technology R&D Act.

Advances in networking and information technology, or NIT, are a key driver of our economy, increasing productivity in existing industries and opening the door for the formation of new ones. Small businesses use NIT to connect to a wider consumer base, allowing them to grow. The military uses NIT to improve intelligence gathering and sharing as well as to support many of its worldwide operations. NIT is improving health care by creating better treatment options through electronic health recordkeeping, advanced surgical tools, and the facilitation of medical research.

And of course, internet companies such as Google and Facebook are now worth billions of dollars and show how quickly NIT R&D can translate into real world products. NIT has truly revolutionized our modern way of life.

However, our growing reliance on NIT to fuel our society leaves us vulnerable to cyber attacks. As the stakes have grown higher, individual hackers have given way to organized criminal groups and even foreign governments.

It is not an overstatement to say that the increasing threat of cyber attack puts both our NIT-based economy and our national security at risk.

Today we consider bills to address both the good and bad aspects of our hi-tech society's growing reliance on information technology.

The first bill, H.R. 756, addresses the growing threat of cyber attack. I want to commend Mr. Lipinski and Mr. McCaul for their longstanding, bipartisan leadership on this critical topic of cybersecurity research and development.

The bill they have reintroduced is identical to legislation we moved through this Committee and passed overwhelmingly on the House floor last Congress.

This bipartisan bill is overall a very good bill that contributes in essential ways to any comprehensive effort to keep our nation, our businesses, and our citizens safe from malicious cyber attacks.

While H.R. 756 is a good bill, I think it is important that we consider the fact that the research accounts of both NSF and NIST would be flat-funded under this proposal, and were cut under sequestration. The federal government is already suffering from a lack of adequately trained cybersecurity professionals and the impact of sequestration on these key agencies will further erode the human capital we need to build up our cybersecurity capabilities. It will also slow down much needed advances in research and development on potentially game-changing technologies.

Next we will consider H.R. 967, which is another good bipartisan bill. It continues to strengthen and build upon the interagency initiative launched more than 20 years ago with the High Performance Computing Act of 1991.

H.R. 967 is an updated version of a bipartisan bill that former Chairman Bart Gordon first introduced and the House passed in 2009.

The bill was developed by Chairman Gordon to ensure that the federal government creates a coherent vision and strategy for federal investments in NIT R&D, including all of the applications made possible by NIT. The bill also contained provisions that would help facilitate and strengthen public-private partnerships for the benefit of our economy, national security, and overall quality of life.

I was proud to work closely with Chairman Hall last year to update that legislation to appropriately reflect changes both to the NITR-D program and to the networking and information technology landscape since 2009.

While it was not possible to get the NITR-D legislation enacted into law in the 112th Congress, I want to thank Mrs. Lummis for re-introducing our bipartisan bill once again in the new Congress, and I'm happy to again be an original cosponsor of this measure. With that, I will close by saying that I'm looking forward to a productive markup today, and I yield back.

Chairman SMITH. Thank you, Ms. Johnson. I will recognize myself in support of the amendment.

Since the bill was originally introduced, the Office of Science and Technology Policy has created a coordinating group specifically for cyber physical programs. This bill replaces text that would have caused duplication of work already being done, so I support the amendment's inclusion and appreciate the gentlewoman's offering it.

Are there any other Members who wish to be heard on the amendment?

If not, all in favor say aye.

Opposed, nay.

The ayes have it and the gentlewoman's amendment is agreed to.

We will now go to what I understand is the last amendment of the day, and that will be offered by the gentleman from Indiana, Mr. Bucshon.

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

Chairman SMITH. The Clerk will report the amendment.

The CLERK. Amendment number 441, amendment to H.R. 967, offered by Mr. Bucshon of Indiana.

[The amendment of Mr. Bucshon appears in the Appendix]

Chairman SMITH. And without objection, the amendment will be considered as read, and the gentleman from Indiana is recognized to explain his amendment.

Mr. BUCSHON. Thank you Mr. Chairman.

This is a very simple amendment. In the years since the bill was originally drafted the use of cloud computing has become a more common way to store and share information of all kinds. This amendment directs federal science agencies to examine how they can facilitate the use of cloud computing for federally funded science and engineering research. I yield back.

Chairman SMITH. Thank you, Mr. Bucshon. Are there any other Members who wish to be heard on the amendment?

If not, all in favor say aye.

Opposed, nay.

The ayes have it and the gentleman's amendment is agreed to.

If there are no further amendments and a reporting quorum is present, the question is on reporting the bill as amended favorably to the House.

Those in favor, say aye.

Opposed, nay.

The ayes have it, and the bill as amended is ordered reported favorably.

Without objection, the motion to reconsider is laid upon the table.

Before we adjourn, I just want to thank all Members for being here today. This is a really good turnout. I appreciate the fact that we have now marked up two bipartisan bills. We have gotten off

to a good start, and I thank all Members on both sides of the podium here for their support today.

If there is no further discussion, that completes our business and completes the full Committee markup, and the Committee stands adjourned.

[Whereupon, at 11:22 a.m., the Committee was adjourned.]

Appendix:

H.R. 967: ADVANCING AMERICA'S NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 2013,

Section–by–Section Analysis, Amendments, Amendment Roster

U.S. GOVERNMENT INFORMATION GPO

I

113TH CONGRESS
1ST SESSION

H. R. 967

To amend the High-Performance Computing Act of 1991 to authorize activities for support of networking and information technology research, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MARCH 5, 2013

Mrs. LUMMIS (for herself, Mr. SMITH of Texas, and Ms. EDDIE BERNICE JOHNSON of Texas) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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A BILL

To amend the High-Performance Computing Act of 1991 to authorize activities for support of networking and information technology research, 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 "Advancing America's Networking and Information Technology Research and Development Act of 2013".

SEC. 2. PROGRAM PLANNING AND COORDINATION.

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

is amended by adding at the end the following new subsection:

"(d) PERIODIC REVIEWS.—The agencies identified in subsection (a)(3)(B) shall—

"(1) periodically assess the contents and funding levels of the Program Component Areas and restructure the Program when warranted, taking into consideration any relevant recommendations of the advisory committee established under subsection (b); and

"(2) ensure that the Program includes large-scale, long-term, interdisciplinary research and development activities, including activities described in section 104.".

(b) DEVELOPMENT OF STRATEGIC PLAN.—Section 101 of such Act (15 U.S.C. 5511) is amended further by adding after subsection (d), as added by subsection (a) of this Act, the following new subsection:

"(e) STRATEGIC PLAN.—

"(1) IN GENERAL.—The agencies identified in subsection (a)(3)(B), working through the National Science and Technology Council and with the assistance of the National Coordination Office described under section 102, shall develop, within 12 months after the date of enactment of the Advancing Amer-

ica's Networking and Information Technology Research and Development Act of 2013, and update every 3 years thereafter, a 5-year strategic plan to guide the activities described under subsection (a)(1).

"(2) CONTENTS.—The strategic plan shall specify near-term and long-term objectives for the Program, the anticipated time frame for achieving the near-term objectives, the metrics to be used for assessing progress toward the objectives, and how the Program will—

"(A) foster the transfer of research and development results into new technologies and applications for the benefit of society, including through cooperation and collaborations with networking and information technology research, development, and technology transition initiatives supported by the States;

"(B) encourage and support mechanisms for interdisciplinary research and development in networking and information technology, including through collaborations across agencies, across Program Component Areas, with industry, with Federal laboratories (as defined in section 4 of the Stevenson-Wydler Technology

Innovation Act of 1980 (15 U.S.C. 3703)), and with international organizations;

"(C) address long-term challenges of national importance for which solutions require large-scale, long-term, interdisciplinary research and development;

"(D) place emphasis on innovative and high-risk projects having the potential for substantial societal returns on the research investment;

"(E) strengthen all levels of networking and information technology education and training programs to ensure an adequate, well-trained workforce; and

"(F) attract more women and underrepresented minorities to pursue postsecondary degrees in networking and information technology.

"(3) NATIONAL RESEARCH INFRASTRUCTURE.—The strategic plan developed in accordance with paragraph (1) shall be accompanied by milestones and roadmaps for establishing and maintaining the national research infrastructure required to support the Program, including the roadmap required by subsection (a)(2)(E).

"(4) RECOMMENDATIONS.—The entities involved in developing the strategic plan under paragraph (1) shall take into consideration the recommendations—

"(A) of the advisory committee established under subsection (b); and

"(B) of the stakeholders whose input was solicited by the National Coordination Office, as required under section 102(b)(3).

"(5) REPORT TO CONGRESS.—The Director of the National Coordination Office shall transmit the strategic plan required under paragraph (1) to the advisory committee, the Committee on Commerce, Science, and Transportation of the Senate, and the Committee on Science, Space, and Technology of the House of Representatives.".

(c) ADDITIONAL RESPONSIBILITIES OF DIRECTOR.—Section 101(a)(2) of such Act (15 U.S.C. 5511(a)(2)) is amended—

(1) in subparagraph (A) by inserting "education," before "and other activities";

(2) by redesignating subparagraphs (E) and (F) as subparagraphs (F) and (G), respectively; and

(3) by inserting after subparagraph (D) the following new subparagraph:

"(E) encourage and monitor the efforts of the agencies participating in the Program to allocate the level of resources and management attention necessary to ensure that the strategic plan under subsection (e) is developed and executed effectively and that the objectives of the Program are met;".

(d) ADVISORY COMMITTEE.—Section 101(b)(1) of such Act (15 U.S.C. 5511(b)(1)) is amended—

(1) after the first sentence, by inserting the following: "The co-chairs of the advisory committee shall meet the qualifications of committee membership and may be members of the President's Council of Advisors on Science and Technology."; and

(2) in subparagraph (D), by striking "high-performance" and inserting "high-end".

(c) REPORT.—Section 101(a)(3) of such Act (15 U.S.C. 5511(a)(3)) is amended—

(1) in subparagraph (C)—

(A) by striking "is submitted," and inserting "is submitted, the levels for the previous fiscal year,"; and

(B) by striking "each Program Component Area;" and inserting "each Program Component Area and research area supported in accordance with section 104;";

(2) in subparagraph (D)—

(A) by striking "each Program Component Area," and inserting "each Program Component Area and research area supported in accordance with section 104,";

(B) by striking "is submitted," and inserting "is submitted, the levels for the previous fiscal year,"; and

(C) by striking "and" after the semicolon;

(3) by redesignating subparagraph (E) as subparagraph (G); and

(4) by inserting after subparagraph (D) the following new subparagraphs:

"(E) include a description of how the objectives for each Program Component Area, and the objectives for activities that involve multiple Program Component Areas, relate to the objectives of the Program identified in the strategic plan required under subsection (c);

"(F) include—

"(i) a description of the funding required by the National Coordination Office to perform the functions specified under section 102(b) for the next fiscal year by category of activity;

"(ii) a description of the funding required by such Office to perform the functions specified under section 102(b) for the current fiscal year by category of activity; and

"(iii) the amount of funding provided for such Office for the current fiscal year by each agency participating in the Program; and".

(f) DEFINITION.—Section 4 of such Act (15 U.S.C. 5503) is amended—

(1) by redesignating paragraphs (1) through (7) as paragraphs (2) through (8), respectively;

(2) by inserting before paragraph (2), as so redesignated, the following new paragraph:

"(1) 'cyber-physical systems' means physical or engineered systems whose networking and information technology functions and physical elements are deeply integrated and are actively connected to the physical world through sensors, actuators, or other means to perform monitoring and control functions;";

(3) in paragraph (3), as so redesignated, by striking "high-performance computing" and inserting "networking and information technology";

(4) in paragraph (4), as so redesignated—

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

(B) by striking "supercomputer" and inserting "high-end computing";

(5) in paragraph (6), as so redesignated, by striking "network referred to as" and all that follows through the semicolon and inserting "network, including advanced computer networks of Federal agencies and departments;"; and

(6) in paragraph (7), as so redesignated, by striking "National High-Performance Computing Program" and inserting "networking and information technology research and development program".

SEC. 3. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

Title I of such Act (15 U.S.C. 5511) is amended by adding at the end the following new section:

"SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

"(a) IN GENERAL.—The Program shall encourage agencies identified in section 101(a)(3)(B) to support large-scale, long-term, interdisciplinary research and development activities in networking and information technology directed toward application areas that have the po-

tential for significant contributions to national economic competitiveness and for other significant societal benefits. Such activities, ranging from basic research to the demonstration of technical solutions, shall be designed to advance the development of research discoveries. The advisory committee established under section 101(b) shall make recommendations to the Program for candidate research and development areas for support under this section.

"(b) CHARACTERISTICS.—

"(1) IN GENERAL.—Research and development activities under this section shall—

"(A) include projects selected on the basis of applications for support through a competitive, merit-based process;

"(B) involve collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories, as appropriate;

"(C) when possible, leverage Federal investments through collaboration with related State initiatives; and

"(D) include a plan for fostering the transfer of research discoveries and the results of

technology demonstration activities, including from institutions of higher education and Federal laboratories, to industry for commercial development.

"(2) COST-SHARING.—In selecting applications for support, the agencies shall give special consideration to projects that include cost sharing from non-Federal sources.

"(3) AGENCY COLLABORATION.—If 2 or more agencies identified in section 101(a)(3)(B), or other appropriate agencies, are working on large-scale research and development activities in the same area of national importance, then such agencies shall strive to collaborate through joint solicitation and selection of applications for support and subsequent funding of projects.

"(4) INTERDISCIPLINARY RESEARCH CENTERS.—Research and development activities under this section may be supported through interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities in areas described in subsection (a). Research may be carried out through existing interdisciplinary centers, including those authorized under section 7024(b)(2) of the America

COMPETES Act (Public Law 110–69; 42 U.S.C. 1862o–10).".

SEC. 4. CYBER-PHYSICAL SYSTEMS.

(a) ADDITIONAL PROGRAM CHARACTERISTICS.—Section 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is amended—

(1) in subparagraph (H), by striking "and" after the semicolon;

(2) in subparagraph (I), by striking the period at the end and inserting a semicolon; and

(3) by adding at the end the following new subparagraphs:

"(J) provide for increased understanding of the scientific principles of cyber-physical systems and improve the methods available for the design, development, and operation of cyber-physical systems that are characterized by high reliability, safety, and security; and

"(K) provide for research and development on human-computer interactions, visualization, and big data.".

(b) TASK FORCE.—Title I of such Act (15 U.S.C. 5511) is amended further by adding after section 104, as added by section 3 of this Act, the following new section:

"SEC. 105. UNIVERSITY/INDUSTRY TASK FORCE.

"(a) ESTABLISHMENT.—Not later than 180 days after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall convene a task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems, including the related technologies required to enable these systems, through a consortium or other appropriate entity with participants from institutions of higher education, Federal laboratories, and industry.

"(b) FUNCTIONS.—The task force shall—

"(1) develop options for a collaborative model and an organizational structure for such entity under which the joint research and development activities could be planned, managed, and conducted effectively, including mechanisms for the allocation of resources among the participants in such entity for support of such activities;

"(2) propose a process for developing a research and development agenda for such entity, including guidelines to ensure an appropriate scope of work focused on nationally significant challenges and requiring collaboration and to ensure the develop-

ment of related scientific and technological milestones;

"(3) define the roles and responsibilities for the participants from institutions of higher education, Federal laboratories, and industry in such entity;

"(4) propose guidelines for assigning intellectual property rights and for the transfer of research results to the private sector; and

"(5) make recommendations for how such entity could be funded from Federal, State, and nongovernmental sources.

"(c) COMPOSITION.—In establishing the task force under subsection (a), the Director of the National Coordination Office—

"(1) shall appoint an equal number of individuals with knowledge and expertise in cyber-physical systems from—

"(A) institutions of higher education, including minority-serving institutions and community colleges; and

"(B) industry; and

"(2) may appoint not more than 2 individuals from Federal laboratories.

"(d) REPORT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and

Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall transmit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report describing the findings and recommendations of the task force.

"(e) TERMINATION.—The task force shall terminate upon transmittal of the report required under subsection (d).

"(f) COMPENSATION.—Members of the task force shall serve without compensation.".

SEC. 5. CLOUD COMPUTING SERVICES FOR RESEARCH.

Title I of such Act (15 U.S.C. 5511) is amended further by adding after section 105, as added by section 4(b) of this Act, the following new section:

"SEC. 106. CLOUD COMPUTING SERVICES FOR RESEARCH.

"(a) INTERAGENCY WORKING GROUP.—Not later than 180 days after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office, working through the National Science and Technology Council, shall convene an interagency working group to examine—

"(1) the research and development needed—

"(A) to enhance the effectiveness and efficiency of cloud computing environments;

"(B) to increase the trustworthiness of cloud applications and infrastructure; and

"(C) to enhance the foundations of cloud architectures, programming models, and interoperability; and

"(2) the potential use of cloud computing for federally funded science and engineering research, including issues around funding mechanisms and policies for the use of cloud computing services for such research.

"(b) CONSULTATION.—In carrying out the tasks in paragraphs (1) and (2) of subsection (a), the working group shall consult with academia, industry, Federal laboratories, and other relevant organizations and institutions, as appropriate.

"(c) REPORT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the

Senate a report describing the findings and any recommendations of the working group.

"(d) TERMINATION.—The interagency working group shall terminate upon transmittal of the report required under subsection (c).".

SEC. 6. NATIONAL COORDINATION OFFICE.

Section 102 of such Act (15 U.S.C. 5512) is amended to read as follows:

"SEC. 102. NATIONAL COORDINATION OFFICE.

"(a) OFFICE.—The Director shall continue a National Coordination Office with a Director and full-time staff.

"(b) FUNCTIONS.—The National Coordination Office shall—

"(1) provide technical and administrative support to—

"(A) the agencies participating in planning and implementing the Program, including such support as needed in the development of the strategic plan under section 101(c); and

"(B) the advisory committee established under section 101(b);

"(2) serve as the primary point of contact on Federal networking and information technology activities for government organizations, academia, in-

dustry, professional societies, State computing and networking technology programs, interested citizen groups, and others to exchange technical and programmatic information;

"(3) solicit input and recommendations from a wide range of stakeholders during the development of each strategic plan required under section 101(e) through the convening of at least 1 workshop with invitees from academia, industry, Federal laboratories, and other relevant organizations and institutions;

"(4) conduct public outreach, including the dissemination of findings and recommendations of the advisory committee, as appropriate; and

"(5) promote access to and early application of the technologies, innovations, and expertise derived from Program activities to agency missions and systems across the Federal Government and to United States industry.

"(c) SOURCE OF FUNDING.—

"(1) IN GENERAL.—The operation of the National Coordination Office shall be supported by funds from each agency participating in the Program.

"(2) SPECIFICATIONS.—The portion of the total budget of such Office that is provided by each agency for each fiscal year shall be in the same proportion as each such agency's share of the total budget for the Program for the previous fiscal year, as specified in the report required under section 101(a)(3).".

SEC. 7. IMPROVING NETWORKING AND INFORMATION TECHNOLOGY EDUCATION.

Section 201(a) of such Act (15 U.S.C. 5521(a)) is amended—

(1) by redesignating paragraphs (2) through (4) as paragraphs (3) through (5), respectively; and

(2) by inserting after paragraph (1) the following new paragraph:

"(2) the National Science Foundation shall use its existing programs, in collaboration with other agencies, as appropriate, to improve the teaching and learning of networking and information technology at all levels of education and to increase participation in networking and information technology fields, including by women and underrepresented minorities;".

SEC. 8. CONFORMING AND TECHNICAL AMENDMENTS.

(a) SECTION 3.—Section 3 of such Act (15 U.S.C. 5502) is amended—

(1) in the matter preceding paragraph (1), by striking "high-performance computing" and inserting "networking and information technology";

(2) in paragraph (1)—

(A) in the matter preceding subparagraph (A), by striking "high-performance computing" and inserting "networking and information technology";

(B) in subparagraphs (A), (F), and (G), by striking "high-performance computing" each place it appears and inserting "networking and information technology"; and

(C) in subparagraph (H), by striking "high-performance" and inserting "high-end"; and

(3) in paragraph (2)—

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

(B) by striking "high-performance computing network" and inserting "networking and information technology".

(b) TITLE I.—The heading of title I of such Act (15 U.S.C. 5511) is amended by striking "**HIGH-PERFORMANCE COMPUTING**" and inserting "**NETWORKING AND INFORMATION TECHNOLOGY**".

(c) SECTION 101.—Section 101 of such Act (15 U.S.C. 5511) is amended—

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

(2) in subsection (a)—

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

(B) in paragraph (1) of such subsection—

(i) in the matter preceding subparagraph (A), by striking "National High-Performance Computing Program" and inserting "networking and information technology research and development program";

(ii) in subparagraph (A), by striking "high-performance computing, including networking" and inserting "networking and information technology";

(iii) in subparagraphs (B) and (G), by striking "high-performance" each place it appears and inserting "high-end"; and

(iv) in subparagraph (C), by striking "high-performance computing and networking" and inserting "high-end computing, distributed, and networking"; and

(C) in paragraph (2) of such subsection—

(i) in subparagraphs (A) and (C)—

(I) by striking "high-performance computing" each place it appears and inserting "networking and information technology"; and

(II) by striking "development, networking," each place it appears and inserting "development,"; and

(ii) in subparagraphs (F) and (G), as redesignated by section 2(c)(1) of this Act, by striking "high-performance" each place it appears and inserting "high-end";

(3) in subsection (b)—

(A) in paragraph (1), in the matter preceding subparagraph (A), by striking "high-performance computing" both places it appears and inserting "networking and information technology"; and

(B) in paragraph (2), in the second sentence, by striking "2" and inserting "3"; and

(4) in subsection (c)(1)(A), by striking "high-performance computing" and inserting "networking and information technology".

(d) SECTION 201.—Section 201(a)(1) of such Act (15 U.S.C. 5521(a)(1)) is amended by striking "high-performance computing" and all that follows through "networking;" and inserting "networking and information research and development;".

(e) SECTION 202.—Section 202(a) of such Act (15 U.S.C. 5522(a)) is amended by striking "high-performance computing" and inserting "networking and information technology".

(f) SECTION 203.—Section 203(a) of such Act (15 U.S.C. 5523(a)(1)) is amended—

(1) in paragraph (1), by striking "high-performance computing and networking" and inserting "networking and information technology"; and

(2) in paragraph (2)(A), by striking "high-performance" and inserting "high-end".

(g) SECTION 204.—Section 204 of such Act (15 U.S.C. 5524) is amended—

(1) in subsection (a)(1)—

(A) in subparagraph (A), by striking "high-performance computing systems and networks" and inserting "networking and information technology systems and capabilities";

(B) in subparagraph (B), by striking "interoperability of high-performance computing systems in networks and for common user interfaces to systems" and inserting "interoperability and usability of networking and information technology systems"; and

(C) in subparagraph (C), by striking "high-performance computing" and inserting "networking and information technology"; and

(2) in subsection (b)—

(A) in the heading, by striking "HIGH-PERFORMANCE COMPUTING AND NETWORK" and inserting "NETWORKING AND INFORMATION TECHNOLOGY"; and

(B) by striking "sensitive".

(h) SECTION 205.—Section 205(a) of such Act (15 U.S.C. 5525(a)) is amended by striking "computational" and inserting "networking and information technology".

(i) SECTION 206.—Section 206(a) of such Act (15 U.S.C. 5526(a)) is amended by striking "computational research" and inserting "networking and information technology research".

(j) SECTION 207.—Section 207(b) of such Act (15 U.S.C. 5527(b)) is amended by striking "high-performance computing" and inserting "networking and information technology".

(k) SECTION 208.—Section 208 of such Act (15 U.S.C. 5528) is amended—

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

(2) in subsection (a)—

(A) in paragraph (1), by striking "High-performance computing and associated" and inserting "Networking and information";

(B) in paragraph (2), by striking "high-performance computing" and inserting "networking and information technologies";

(C) in paragraph (3), by striking "high-performance" and inserting "high-end";

(D) in paragraph (4), by striking "high-performance computers and associated" and inserting "networking and information"; and

(E) in paragraph (5), by striking "high-performance computing and associated" and inserting "networking and information".

○

SECTION–BY–SECTION ANALYSIS OF

H.R. 967, ADVANCING AMERICA'S NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 2013

SECTION 1. SHORT TITLE.

This section sets for the short title as Advancing America's Networking and Information Technology Research and Development Act of 2013.

SECTION 2. PROGRAM PLANNING AND COORDINATION.

Requires the Networking and Information Technology Research and Development Program (NITRD) agencies to periodically assess the program contents and funding levels and to update the program accordingly.

Requires the NITRD agencies to develop and periodically update (at 3-year intervals) a strategic plan for the program. Describes the characteristics and content of the strategic plan, including how the program will foster technology transfer; encourage innovative, large-scale, and interdisciplinary research; address long-term challenges of national importance; emphasize innovative and high-risk projects; and strengthen NIT education and the workforce.

Encourages a more active role for the Office of Science and Technology Policy (OSTP) in ensuring that the strategic plan is developed and executed effectively and that the objectives of the program are met.

Ensures that the advisory committee for NITRD retains the necessary breadth and depth of expertise in NIT fields, provides guidance on the committee's co-chairs, and allows that it may be linked to the President's Council of Advisors on Science and Technology.

Specifies that the annual report now required for the NITRD program explicitly describes how the program activities planned and underway relate to the objectives specified in the strategic plan.

Specifies that the annual report now required for the NITRD program include a description of research areas supported in accordance with section 3, including the same budget information as is required for the Program Component Areas.

Adds a definition for cyber-physical systems and amends existing definitions to incorporate networking and information technology terminology.

SECTION 3. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

Authorizes NITRD agencies to support large-scale, long-term, interdisciplinary research with the potential to make significant contributions to society and U.S. economic competitiveness and to encourage collaboration between at least two agencies as well as cost-sharing from non-federal sources.

Characteristics of the projects supported include: collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories; leveraging of federal investments through collaboration with related State initiatives, when possible; and plans for fostering technology transfer.

Authorizes support of activities under this section through existing interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities.

SECTION 4. CYBER-PHYSICAL SYSTEMS.

Requires the program to support research and development in cyber-physical systems; human-computer interactions, visualization, and big data.

Convenes a university/industry task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems with participants from universities, industry, and Federal laboratories.

Requires the task force to develop options for an entity to plan, manage and conduct cyber-physical systems research and development activities; propose a process for developing a research and development agenda for the entity which would include guidelines to ensure work focused on nationally significant challenges and which would require collaboration on the development of scientific and technological milestones; define roles and responsibilities for participants; propose guidelines for assigning intellectual property rights; and make recommendations for funding the entity from federal, state and non-government sources.

Requires a report to Congress on any findings and recommendations from the task force on models for collaborative research and development. The task force

would terminate upon transmittal of the report, and members of the task force would not be compensated for participation.

SECTION 5. CLOUD COMPUTING SERVICES FOR RESEARCH.

Provides for an interagency working group to examine issues around funding mechanisms and policies for the use of cloud computing in federally-funded science and engineering research and to recommend guidelines, as needed, to agencies on those policies. The working group would consult with academia, industry, federal laboratories and other relevant organizations and institutions. Within one year the working group would be required to report to Congress on its findings and any recommendations for guidelines. The working group would terminate upon transmittal of the report.

SECTION 6. NATIONAL COORDINATION OFFICE.

Formally codifies the existing National Coordination Office (NCO); delineates the office's roles and responsibilities; and specifies the source of funding for the office (consistent with current practice).

SECTION 7. IMPROVING NETWORKING AND INFORMATION TECHNOLOGY.

Requires NSF to use existing programs to improve the teaching and learning of networking and information technology.

SECTION 8. CONFORMING AND TECHNICAL AMENDMENTS

Strikes and replaces instances of out-dated "high-performance computing" language with "networking and information technology" and "high-end computing" as appropriate.

AMENDMENT TO H.R. 967

OFFERED BY MR. MCCAUL OF TEXAS

Page 6, after line 17, insert the following (and redesignate subsequent provisions accordingly):

(1) in subparagraph (B)—

(A) by redesignating clauses (vii) through (xi) as clauses (viii) through (xii), respectively; and

(B) by inserting after clause (vi) the following:

"(vii) the Department of Homeland Security;";

☒

AMENDMENT TO H.R. 967

OFFERED BY MR. GRAYSON OF FLORIDA

Page 12, strike lines 9 and 10 and insert the following:

(2) in subparagraph (I)—

(A) by striking "improving the security" and inserting "improving the security, reliability, and resilience"; and

(B) by striking the period at the end and inserting a semicolon; and

☒

AMENDMENT TO H.R. 967
OFFERED BY M.S. JOHNSON of TEXAS

Page 12, line 22, strike "TASK FORCE" and insert "WORKSHOP".

Page 13, strike line 1 and all that follows through line 12 on page 15 and insert the following:

"SEC. 105. UNIVERSITY/INDUSTRY WORKSHOP.

"(a) ESTABLISHMENT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall convene a workshop, with participants from institutions of higher education, Federal laboratories, and industry, to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems, including the related technologies required to enable these systems, and to develop grand challenges in cyber-physical systems research and development.

"(b) FUNCTIONS.—The workshop participants shall—

"(1) develop options for models for research and development partnerships among institutions of higher education, Federal laboratories, and industry, including mechanisms for the support of research and development carried out under these partnerships;

"(2) develop options for grand challenges in cyber-physical systems research and development that would be addressed through such partnerships;

"(3) propose guidelines for assigning intellectual property rights and for the transfer of research results to the private sector; and

"(4) make recommendations for how Federal agencies participating in the Program can help support research and development partnerships in cyber-physical systems, including through existing or new grant programs.

"(c) PARTICIPANTS.—The Director of the National Coordination Office shall ensure that participants in the workshop are individuals with knowledge and expertise in cyber-physical systems and that participants represent a broad mix of relevant stakeholders, including academic and industry researchers, cyber-physical systems and technologies manufacturers, cyber-physical systems and tech-

nologies users, and, as appropriate, Federal government regulators.

"(d) REPORT.—Not later than 18 months after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2013, the Director of the National Coordination Office shall transmit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report describing the findings and recommendations resulting from the workshop required under this section.".



AMENDMENT TO H.R. 967

OFFERED BY Mr. Bucshon of Indiana

Page 16, strike lines 8 through 12 and insert the following:

"(2) how Federal science agencies can facilitate the use of cloud computing for federally funded science and engineering research, including—

"(A) making recommendations on changes in funding mechanisms, budget models, and policies needed to remove barriers to the adoption of cloud computing services for research and for data preservation and sharing; and

"(B) providing guidance to organizations and researchers on opportunities and guidelines for using cloud computing services for federally supported research and related activities.

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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Full Committee Markup
March 14, 2013

AMENDMENT ROSTER

H.R. 967, "Advancing America's Networking and Information Technology Research and Development Act of 2013"

No.	Amendment	Summary	
1	Offered by Mr. McCaul (TX) (013)	Amends the National High-Performance Computing Program Report to add the Department of Homeland Security to the annual report of programs and activities.	Agreed to by voice vote
2	Offered by Mr. Grayson (FL) (055)	Amends the National High-Performance Computing Program to focus on improving security, reliability, and resilience of computing and networking systems.	Agreed to by voice vote
3	Offered by Ms. Johnson (TX) (440)	Replaces outdated text with language that reflects the existence of a cyber physical program created since the legislation was first drafted.	Agreed to by voice vote
4	Offered by Mr. Bucshon (IN) (441)	Amends the Cloud Computing Services for Research to direct the interagency working group to examine how to better use cloud computing within federal science agencies.	Agreed to by voice vote

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