

107<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

# S. 2182

To authorize funding for computer and network security research and development and research fellowship programs, and for other purposes.

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IN THE SENATE OF THE UNITED STATES

APRIL 17, 2002

Mr. WYDEN introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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## A BILL

To authorize funding for computer and network security research and development and research fellowship programs, and for other purposes.

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

3        **SECTION 1. SHORT TITLE.**

4        This Act may be cited as the “Cyber Security Re-  
5        search and Development Act”.

6        **SEC. 2. FINDINGS.**

7        The Congress finds the following:

8            (1) Revolutionary advancements in computing  
9            and communications technology have interconnected  
10          government, commercial, scientific, and educational

1 infrastructures—including critical infrastructures for  
2 electric power, natural gas and petroleum production  
3 and distribution, telecommunications, transportation,  
4 water supply, banking and finance, and emergency  
5 and government services—in a vast, interdependent  
6 physical and electronic network.

7 (2) Exponential increases in interconnectivity  
8 have facilitated enhanced communications, economic  
9 growth, and the delivery of services critical to the  
10 public welfare, but have also increased the con-  
11 sequences of temporary or prolonged failure.

12 (3) A Department of Defense Joint Task Force  
13 concluded after a 1997 United States information  
14 warfare exercise that the results “clearly dem-  
15 onstrated our lack of preparation for a coordinated  
16 cyber and physical attack on our critical military  
17 and civilian infrastructure”.

18 (4) Computer security technology and systems  
19 implementation lack—

20 (A) sufficient long term research funding;

21 (B) adequate coordination across Federal  
22 and State government agencies and among gov-  
23 ernment, academia, and industry; and

24 (C) sufficient numbers of outstanding re-  
25 searchers in the field.

1 (5) Accordingly, Federal investment in com-  
2 puter and network security research and develop-  
3 ment must be significantly increased to—

4 (A) improve vulnerability assessment and  
5 technological and systems solutions;

6 (B) expand and improve the pool of infor-  
7 mation security professionals, including re-  
8 searchers, in the United States workforce; and

9 (C) better coordinate information sharing  
10 and collaboration among industry, government,  
11 and academic research projects.

12 **SEC. 3. DEFINITIONS.**

13 For purposes of this Act—

14 (1) the term “Director” means the Director of  
15 the National Science Foundation; and

16 (2) the term “institution of higher education”  
17 has the meaning given that term in section 101 of  
18 the Higher Education Act of 1965 (20 U.S.C.  
19 1001).

20 **SEC. 4. NATIONAL SCIENCE FOUNDATION RESEARCH.**

21 (a) COMPUTER AND NETWORK SECURITY RESEARCH  
22 GRANTS.—

23 (1) IN GENERAL.—The Director shall award  
24 grants for basic research on innovative approaches  
25 to the structure of computer and network hardware

1 and software that are aimed at enhancing computer  
2 security. Research areas may include—

3 (A) authentication and cryptography;

4 (B) computer forensics and intrusion de-  
5 tection;

6 (C) reliability of computer and network ap-  
7 plications, middleware, operating systems, and  
8 communications infrastructure;

9 (D) privacy and confidentiality;

10 (E) firewall technology;

11 (F) emerging threats, including malicious  
12 such as viruses and worms;

13 (G) vulnerability assessments;

14 (H) operations and control systems man-  
15 agement; and

16 (I) management of interoperable digital  
17 certificates or digital watermarking.

18 (2) MERIT REVIEW; COMPETITION.—Grants  
19 shall be awarded under this section on a merit-re-  
20 viewed competitive basis.

21 (3) AUTHORIZATION OF APPROPRIATIONS.—  
22 There are authorized to be appropriated to the Na-  
23 tional Science Foundation to carry out this  
24 subsection—

25 (A) \$35,000,000 for fiscal year 2003;

- 1 (B) \$40,000,000 for fiscal year 2004;  
2 (C) \$46,000,000 for fiscal year 2005;  
3 (D) \$52,000,000 for fiscal year 2006; and  
4 (E) \$60,000,000 for fiscal year 2007.

5 (b) COMPUTER AND NETWORK SECURITY RESEARCH  
6 CENTERS.—

7 (1) IN GENERAL.—The Director shall award  
8 multiyear grants, subject to the availability of appro-  
9 priations, to institutions of higher education (or con-  
10 sortia thereof) to establish multidisciplinary Centers  
11 for Computer and Network Security Research. Insti-  
12 tutions of higher education (or consortia thereof) re-  
13 ceiving such grants may partner with one or more  
14 government laboratories or for-profit institutions.

15 (2) MERIT REVIEW; COMPETITION.—Grants  
16 shall be awarded under this subsection on a merit-  
17 reviewed competitive basis.

18 (3) PURPOSE.—The purpose of the Centers  
19 shall be to generate innovative approaches to com-  
20 puter and network security by conducting cutting-  
21 edge, multidisciplinary research in computer and  
22 network security, including the research areas de-  
23 scribed in subsection (a)(1).

24 (4) APPLICATIONS.—An institution of higher  
25 education (or a consortium of such institutions)

1 seeking funding under this subsection shall submit  
2 an application to the Director at such time, in such  
3 manner, and containing such information as the Di-  
4 rector may require. The application shall include, at  
5 a minimum, a description of—

6 (A) the research projects that will be un-  
7 dertaken by the Center and the contributions of  
8 each of the participating entities;

9 (B) how the Center will promote active col-  
10 laboration among scientists and engineers from  
11 different disciplines, such as computer sci-  
12 entists, engineers, mathematicians, and social  
13 science researchers;

14 (C) how the Center will contribute to in-  
15 creasing the number of computer and network  
16 security researchers and other professionals;  
17 and

18 (D) how the center will disseminate re-  
19 search results quickly and widely to improve  
20 cybersecurity in information technology net-  
21 works, products, and services.

22 (5) CRITERIA.—In evaluating the applications  
23 submitted under paragraph (4), the Director shall  
24 consider, at a minimum—

1 (A) the ability of the applicant to generate  
2 innovative approaches to computer and network  
3 security and effectively carry out the research  
4 program;

5 (B) the experience of the applicant in con-  
6 ducting research on computer and network se-  
7 curity and the capacity of the applicant to fos-  
8 ter new multidisciplinary collaborations;

9 (C) the capacity of the applicant to attract  
10 and provide adequate support for under-  
11 graduate and graduate students and  
12 postdoctoral fellows to pursue computer and  
13 network security research; and

14 (D) the extent to which the applicant will  
15 partner with government laboratories or for-  
16 profit entities, and the role the government lab-  
17 oratories or for-profit entities will play in the  
18 research undertaken by the Center.

19 (6) ANNUAL MEETING.—The Director shall  
20 convene an annual meeting of the Centers in order  
21 to foster collaboration and communication between  
22 Center participants.

23 (7) AUTHORIZATION OF APPROPRIATIONS.—  
24 There are authorized to be appropriated for the Na-

1 tional Science Foundation to carry out this  
2 subsection—

3 (A) \$12,000,000 for fiscal year 2003;

4 (B) \$24,000,000 for fiscal year 2004;

5 (C) \$36,000,000 for fiscal year 2005;

6 (D) \$36,000,000 for fiscal year 2006; and

7 (E) \$36,000,000 for fiscal year 2007.

8 **SEC. 5. NATIONAL SCIENCE FOUNDATION COMPUTER AND**  
9 **NETWORK SECURITY PROGRAMS.**

10 (a) **COMPUTER AND NETWORK SECURITY CAPACITY**  
11 **BUILDING GRANTS.—**

12 (1) **IN GENERAL.—**The Director shall establish  
13 a program to award grants to institutions of higher  
14 education (or consortia thereof) to establish or im-  
15 prove undergraduate and master’s degree programs  
16 in computer and network security, to increase the  
17 number of students who pursue undergraduate or  
18 master’s degrees in fields related to computer and  
19 network security, and to provide students with expe-  
20 rience in government or industry related to their  
21 computer and network security studies.

22 (2) **MERIT REVIEW.—**Grants shall be awarded  
23 under this subsection on a merit-reviewed competi-  
24 tive basis.



1           (3) USE OF FUNDS.—Grants awarded under  
2 this subsection shall be used for activities that en-  
3 hance the ability of an institution of higher edu-  
4 cation (or consortium thereof) to provide high-qual-  
5 ity undergraduate and master’s degree programs in  
6 computer and network security and to recruit and  
7 retain increased numbers of students to such pro-  
8 grams. Activities may include—

9                   (A) revising curriculum to better prepare  
10 undergraduate and master’s degree students for  
11 careers in computer and network security;

12                   (B) establishing degree and certificate pro-  
13 grams in computer and network security;

14                   (C) creating opportunities for under-  
15 graduate students to participate in computer  
16 and network security research projects;

17                   (D) acquiring equipment necessary for stu-  
18 dent instruction in computer and network secu-  
19 rity, including the installation of testbed net-  
20 works for student use;

21                   (E) providing opportunities for faculty to  
22 work with local or Federal Government agen-  
23 cies, private industry, or other academic institu-  
24 tions to develop new expertise or to formulate

1 new research directions in computer and net-  
2 work security;

3 (F) establishing collaborations with other  
4 academic institutions or departments that seek  
5 to establish, expand, or enhance programs in  
6 computer and network security;

7 (G) establishing student internships in  
8 computer and network security at government  
9 agencies or in private industry;

10 (H) establishing or enhancing bridge pro-  
11 grams in computer and network security be-  
12 tween community colleges and universities; and

13 (I) any other activities the Director deter-  
14 mines will accomplish the goals of this sub-  
15 section.

16 (4) SELECTION PROCESS.—

17 (A) APPLICATION.—An institution of high-  
18 er education (or a consortium thereof) seeking  
19 funding under this subsection shall submit an  
20 application to the Director at such time, in such  
21 manner, and containing such information as the  
22 Director may require. The application shall in-  
23 clude, at a minimum—

24 (i) a description of the applicant's  
25 computer and network security research

1 and instructional capacity, and in the case  
2 of an application from a consortium of in-  
3 stitutions of higher education, a descrip-  
4 tion of the role that each member will play  
5 in implementing the proposal;

6 (ii) a comprehensive plan by which the  
7 institution or consortium will build instruc-  
8 tional capacity in computer and informa-  
9 tion security;

10 (iii) a description of relevant collabo-  
11 rations with government agencies or pri-  
12 vate industry that inform the instructional  
13 program in computer and network secu-  
14 rity;

15 (iv) a survey of the applicant's his-  
16 toric student enrollment and placement  
17 data in fields related to computer and net-  
18 work security and a study of potential en-  
19 rollment and placement for students en-  
20 rolled in the proposed computer and net-  
21 work security program; and

22 (v) a plan to evaluate the success of  
23 the proposed computer and network secu-  
24 rity program, including post-graduation as-  
25 sessment of graduate school and job place-

1                   ment and retention rates as well as the rel-  
2                   evance of the instructional program to  
3                   graduate study and to the workplace.

4                   (B) AWARDS.—(i) The Director shall en-  
5                   sure, to the extent practicable, that grants are  
6                   awarded under this subsection in a wide range  
7                   of geographic areas and categories of institu-  
8                   tions of higher education.

9                   (ii) The Director shall award grants under  
10                  this subsection for a period not to exceed 5  
11                  years.

12                  (5) ASSESSMENT REQUIRED.—The Director  
13                  shall evaluate the program established under this  
14                  subsection no later than 6 years after the establish-  
15                  ment of the program. At a minimum, the Director  
16                  shall evaluate the extent to which the grants  
17                  achieved their objectives of increasing the quality  
18                  and quantity of students pursuing undergraduate or  
19                  master’s degrees in computer and network security.

20                  (6) AUTHORIZATION OF APPROPRIATIONS.—  
21                  There are authorized to be appropriated to the Na-  
22                  tional Science Foundation to carry out this  
23                  subsection—

24                               (A) \$15,000,000 for fiscal year 2003;

25                               (B) \$20,000,000 for fiscal year 2004;

- 1 (C) \$20,000,000 for fiscal year 2005;  
2 (D) \$20,000,000 for fiscal year 2006; and  
3 (E) \$20,000,000 for fiscal year 2007.

4 (b) SCIENTIFIC AND ADVANCED TECHNOLOGY ACT  
5 OF 1992.—

6 (1) GRANTS.—The Director shall provide  
7 grants under the Scientific and Advanced Tech-  
8 nology Act of 1992 for the purposes of section 3(a)  
9 and (b) of that Act, except that the activities sup-  
10 ported pursuant to this subsection shall be limited to  
11 improving education in fields related to computer  
12 and network security.

13 (2) AUTHORIZATION OF APPROPRIATIONS.—  
14 There are authorized to be appropriated to the Na-  
15 tional Science Foundation to carry out this  
16 subsection—

- 17 (A) \$1,000,000 for fiscal year 2003;  
18 (B) \$1,250,000 for fiscal year 2004;  
19 (C) \$1,250,000 for fiscal year 2005;  
20 (D) \$1,250,000 for fiscal year 2006; and  
21 (E) \$1,250,000 for fiscal year 2007.

22 (c) GRADUATE TRAINEESHIPS IN COMPUTER AND  
23 NETWORK SECURITY RESEARCH.—

24 (1) IN GENERAL.—The Director shall establish  
25 a program to award grants to institutions of higher

1 education to establish traineeship programs for  
2 graduate students who pursue computer and net-  
3 work security research leading to a doctorate degree  
4 by providing funding and other assistance, and by  
5 providing graduate students with research experience  
6 in government or industry related to the students'  
7 computer and network security studies.

8 (2) MERIT REVIEW.—Grants shall be provided  
9 under this subsection on a merit-reviewed competi-  
10 tive basis.

11 (3) USE OF FUNDS.—An institution of higher  
12 education shall use grant funds for the purposes  
13 of—

14 (A) providing fellowships to students who  
15 are citizens, nationals, or lawfully admitted per-  
16 manent resident aliens of the United States and  
17 are pursuing research in computer or network  
18 security leading to a doctorate degree;

19 (B) paying tuition and fees for students  
20 receiving fellowships under subparagraph (A);

21 (C) establishing scientific internship pro-  
22 grams for students receiving fellowships under  
23 subparagraph (A) in computer and network se-  
24 curity at for-profit institutions or government  
25 laboratories; and

1 (D) other costs associated with the admin-  
2 istration of the program.

3 (4) FELLOWSHIP AMOUNT.—Fellowships pro-  
4 vided under paragraph (3)(A) shall be in the amount  
5 of \$25,000 per year, or the level of the National  
6 Science Foundation Graduate Research Fellowships,  
7 whichever is greater, for up to 3 years.

8 (5) SELECTION PROCESS.—An institution of  
9 higher education seeking funding under this sub-  
10 section shall submit an application to the Director at  
11 such time, in such manner, and containing such in-  
12 formation as the Director may require. The applica-  
13 tion shall include, at a minimum, a description of—

14 (A) the instructional program and research  
15 opportunities in computer and network security  
16 available to graduate students at the applicant's  
17 institution; and

18 (B) the internship program to be estab-  
19 lished, including the opportunities that will be  
20 made available to students for internships at  
21 for-profit institutions and government labora-  
22 tories.

23 (6) REVIEW OF APPLICATIONS.—In evaluating  
24 the applications submitted under paragraph (5), the  
25 Director shall consider—

1 (A) the ability of the applicant to effec-  
2 tively carry out the proposed program;

3 (B) the quality of the applicant's existing  
4 research and education programs;

5 (C) the likelihood that the program will re-  
6 cruit increased numbers of students to pursue  
7 and earn doctorate degrees in computer and  
8 network security;

9 (D) the nature and quality of the intern-  
10 ship program established through collaborations  
11 with government laboratories and for-profit in-  
12 stitutions;

13 (E) the integration of internship opportu-  
14 nities into graduate students' research; and

15 (F) the relevance of the proposed program  
16 to current and future computer and network se-  
17 curity needs.

18 (7) AUTHORIZATION OF APPROPRIATIONS.—  
19 There are authorized to be appropriated to the Na-  
20 tional Science Foundation to carry out this  
21 subsection—

22 (A) \$10,000,000 for fiscal year 2003;

23 (B) \$20,000,000 for fiscal year 2004;

24 (C) \$20,000,000 for fiscal year 2005;

25 (D) \$20,000,000 for fiscal year 2006; and



1 (E) \$20,000,000 for fiscal year 2007.

2 (d) GRADUATE RESEARCH FELLOWSHIPS PROGRAM  
3 SUPPORT.—Computer and network security shall be in-  
4 cluded among the fields of specialization supported by the  
5 National Science Foundation’s Graduate Research Fellow-  
6 ships program under section 10 of the National Science  
7 Foundation Act of 1950 (42 U.S.C. 1869).

8 **SEC. 6. CONSULTATION.**

9 In carrying out sections 4 and 5, the Director shall  
10 consult with other Federal agencies.

11 **SEC. 7. FOSTERING RESEARCH AND EDUCATION IN COM-  
12 PUTER AND NETWORK SECURITY.**

13 Section 3(a) of the National Science Foundation Act  
14 of 1950 (42 U.S.C. 1862(a)) is amended—

15 (1) by striking “and” at the end of paragraph  
16 (6);

17 (2) by striking the period at the end of para-  
18 graph (7) and inserting “; and”; and

19 (3) by adding at the end the following new  
20 paragraph:

21 “(8) to take a leading role in fostering and sup-  
22 porting research and education activities to improve  
23 the security of networked information systems.”.

1 **SEC. 8. NATIONAL INSTITUTE OF STANDARDS AND TECH-**  
2 **NOLOGY RESEARCH PROGRAM.**

3 The National Institute of Standards and Technology  
4 Act is amended—

5 (1) by moving section 22 to the end of the Act  
6 and redesignating it as section 32;

7 (2) by inserting after section 21 the following  
8 new section:

9 “RESEARCH PROGRAM ON SECURITY OF COMPUTER  
10 SYSTEMS

11 “SEC. 22. (a) ESTABLISHMENT.—The Director shall  
12 establish a program of assistance to institutions of higher  
13 education that enter into partnerships with for-profit enti-  
14 ties to support research to improve the security of com-  
15 puter systems. The partnerships may also include govern-  
16 ment laboratories. The program shall—

17 “(1) include multidisciplinary, long-term, high-  
18 risk research;

19 “(2) include research directed toward address-  
20 ing needs identified through the activities of the  
21 Computer System Security and Privacy Advisory  
22 Board under section 20(f); and

23 “(3) promote the development of a robust re-  
24 search community working at the leading edge of  
25 knowledge in subject areas relevant to the security  
26 of computer systems by providing support for grad-

1 uate students, post-doctoral researchers, and senior  
2 researchers.

3 “(b) FELLOWSHIPS.—(1) The Director is authorized  
4 to establish a program to award post-doctoral research fel-  
5 lowships to individuals who are citizens, nationals, or law-  
6 fully admitted permanent resident aliens of the United  
7 States and are seeking research positions at institutions,  
8 including the Institute, engaged in research activities re-  
9 lated to the security of computer systems, including the  
10 research areas described in section 4(a)(1) of the Cyber  
11 Security Research and Development Act.

12 “(2) The Director is authorized to establish a pro-  
13 gram to award senior research fellowships to individuals  
14 seeking research positions at institutions, including the In-  
15 stitute, engaged in research activities related to the secu-  
16 rity of computer systems, including the research areas de-  
17 scribed in section 4(a)(1) of the Cyber Security Research  
18 and Development Act. Senior research fellowships shall be  
19 made available for established researchers at institutions  
20 of higher education who seek to change research fields and  
21 pursue studies related to the security of computer systems.

22 “(3)(A) To be eligible for an award under this sub-  
23 section, an individual shall submit an application to the  
24 Director at such time, in such manner, and containing  
25 such information as the Director may require.

1       “(B) Under this subsection, the Director is author-  
2 ized to provide stipends for post-doctoral research fellow-  
3 ships at the level of the Institute’s Post Doctoral Research  
4 Fellowship Program and senior research fellowships at lev-  
5 els consistent with support for a faculty member in a sab-  
6 batical position.

7       “(c) AWARDS; APPLICATIONS.—The Director is au-  
8 thorized to award grants or cooperative agreements to in-  
9 stitutions of higher education to carry out the program  
10 established under subsection (a). To be eligible for an  
11 award under this section, an institution of higher edu-  
12 cation shall submit an application to the Director at such  
13 time, in such manner, and containing such information as  
14 the Director may require. The application shall include,  
15 at a minimum, a description of—

16           “(1) the number of graduate students antici-  
17 pated to participate in the research project and the  
18 level of support to be provided to each;

19           “(2) the number of post-doctoral research posi-  
20 tions included under the research project and the  
21 level of support to be provided to each;

22           “(3) the number of individuals, if any, intend-  
23 ing to change research fields and pursue studies re-  
24 lated to the security of computer systems to be in-

1       cluded under the research project and the level of  
2       support to be provided to each; and

3               “(4) how the for-profit entities and any other  
4       partners will participate in developing and carrying  
5       out the research and education agenda of the part-  
6       nership.

7       “(d) PROGRAM OPERATION.—(1) The program es-  
8       tablished under subsection (a) shall be managed by indi-  
9       viduals who shall have both expertise in research related  
10      to the security of computer systems and knowledge of the  
11      vulnerabilities of existing computer systems. The Director  
12      shall designate such individuals as program managers.

13              “(2) Program managers designated under paragraph  
14      (1) may be new or existing employees of the Institute or  
15      individuals on assignment at the Institute under the Inter-  
16      governmental Personnel Act of 1970.

17              “(3) Program managers designated under paragraph  
18      (1) shall be responsible for—

19                      “(A) establishing and publicizing the broad re-  
20      search goals for the program;

21                      “(B) soliciting applications for specific research  
22      projects to address the goals developed under sub-  
23      paragraph (A);

1           “(C) selecting research projects for support  
2 under the program from among applications sub-  
3 mitted to the Institute, following consideration of—

4                   “(i) the novelty and scientific and technical  
5 merit of the proposed projects;

6                   “(ii) the demonstrated capabilities of the  
7 individual or individuals submitting the applica-  
8 tions to successfully carry out the proposed re-  
9 search;

10                   “(iii) the impact the proposed projects will  
11 have on increasing the number of computer se-  
12 curity researchers;

13                   “(iv) the nature of the participation by for-  
14 profit entities and the extent to which the pro-  
15 posed projects address the concerns of industry;  
16 and

17                   “(v) other criteria determined by the Di-  
18 rector, based on information specified for inclu-  
19 sion in applications under subsection (c); and

20           “(D) monitoring the progress of research  
21 projects supported under the program.

22           “(e) REVIEW OF PROGRAM.—(1) The Director shall  
23 periodically review the portfolio of research awards mon-  
24 itored by each program manager designated in accordance  
25 with subsection (d). In conducting those reviews, the Di-

1 rector shall seek the advice of the Computer System Secu-  
2 rity and Privacy Advisory Board, established under section  
3 21, on the appropriateness of the research goals and on  
4 the quality and utility of research projects managed by  
5 program managers in accordance with subsection (d).

6 “(2) The Director shall also contract with the Na-  
7 tional Research Council for a comprehensive review of the  
8 program established under subsection (a) during the 5th  
9 year of the program. Such review shall include an assess-  
10 ment of the scientific quality of the research conducted,  
11 the relevance of the research results obtained to the goals  
12 of the program established under subsection (d)(3)(A),  
13 and the progress of the program in promoting the develop-  
14 ment of a substantial academic research community work-  
15 ing at the leading edge of knowledge in the field. The Di-  
16 rector shall submit to Congress a report on the results  
17 of the review under this paragraph no later than six years  
18 after the initiation of the program.

19 “(f) DEFINITIONS.—For purposes of this section—

20 “(1) the term ‘computer system’ has the mean-  
21 ing given that term in section 20(d)(1); and

22 “(2) the term ‘institution of higher education’  
23 has the meaning given that term in section 101 of  
24 the Higher Education Act of 1965 (20 U.S.C.  
25 1001).”; and

1           (3) in section 20(d)(1)(B)(i) (15 U.S.C. 278g–  
2           3(d)(1)(B)(i)), by inserting “and computer net-  
3           works” after “computers”.

4 **SEC. 9. COMPUTER SECURITY REVIEW, PUBLIC MEETINGS,**  
5 **AND INFORMATION.**

6           Section 20 of the National Institute of Standards and  
7 Technology Act (15 U.S.C. 278g–3) is amended by adding  
8 at the end the following new subsection:

9           “(f) There are authorized to be appropriated to the  
10 Secretary \$1,060,000 for fiscal year 2003 and \$1,090,000  
11 for fiscal year 2004 to enable the Computer System Secu-  
12 rity and Privacy Advisory Board, established by section  
13 21, to identify emerging issues, including research needs,  
14 related to computer security, privacy, and cryptography  
15 and, as appropriate, to convene public meetings on those  
16 subjects, receive presentations, and publish reports, di-  
17 gests, and summaries for public distribution on those sub-  
18 jects.”.

19 **SEC. 10. INTRAMUTAL SECURITY RESEARCH.**

20           Section 20 of the National Institute of Standards and  
21 Technology Act (15 U.S.C. 278g–3) is further amended—

22           (1) by redesignating subsection (d) as sub-  
23           section (e); and

24           (2) by inserting after subsection (c) the fol-  
25           lowing new subsection:



1 “(d) As part of the research activities conducted in  
2 accordance with subsection (b)(4), the Institute shall—

3 “(1) conduct a research program to address  
4 emerging technologies associated with assembling a  
5 networked computer system from components while  
6 ensuring it maintains desired security properties;

7 “(2) carry out research associated with improv-  
8 ing the security of real-time computing and commu-  
9 nications systems for use in process control; and

10 “(3) carry out multidisciplinary, long-term,  
11 high-risk research on ways to improve the security  
12 of computer systems.”.

13 **SEC. 11. AUTHORIZATION OF APPROPRIATIONS.**

14 There are authorized to be appropriated to the Sec-  
15 retary of Commerce for the National Institute of Stand-  
16 ards and Technology—

17 (1) for activities under section 22 of the Na-  
18 tional Institute of Standards and Technology Act, as  
19 added by section 8 of this Act—

20 (A) \$25,000,000 for fiscal year 2003;

21 (B) \$40,000,000 for fiscal year 2004;

22 (C) \$55,000,000 for fiscal year 2005;

23 (D) \$70,000,000 for fiscal year 2006;

24 (E) \$85,000,000 for fiscal year 2007; and

1 (F) such sums as may be necessary for fis-  
2 cal years 2008 through 2012; and

3 (2) for activities under section 20(d) of the Na-  
4 tional Institute of Standards and Technology Act, as  
5 added by section 10 of this Act—

6 (A) \$6,000,000 for fiscal year 2003;

7 (B) \$6,200,000 for fiscal year 2004;

8 (C) \$6,400,000 for fiscal year 2005;

9 (D) \$6,600,000 for fiscal year 2006; and

10 (E) \$6,800,000 for fiscal year 2007.

11 **SEC. 12. NATIONAL ACADEMY OF SCIENCES STUDY ON**  
12 **COMPUTER AND NETWORK SECURITY IN**  
13 **CRITICAL INFRASTRUCTURES.**

14 (a) STUDY.—Not later than 3 months after the date  
15 of the enactment of this Act, the Director of the National  
16 Institute of Standards and Technology shall enter into an  
17 arrangement with the National Research Council of the  
18 National Academy of Sciences to conduct a study of the  
19 vulnerabilities of the Nation’s network infrastructure and  
20 make recommendations for appropriate improvements.  
21 The National Research Council shall—

22 (1) review existing studies and associated data  
23 on the architectural, hardware, and software  
24 vulnerabilities and interdependencies in United  
25 States critical infrastructure networks;

1           (2) identify and assess gaps in technical capa-  
2           bility for robust critical infrastructure network secu-  
3           rity, and make recommendations for research prior-  
4           ities and resource requirements; and

5           (3) review any and all other essential elements  
6           of computer and network security, including security  
7           of industrial process controls, to be determined in  
8           the conduct of the study.

9           (b) REPORT.—The Director of the National Institute  
10          of Standards and Technology shall transmit a report con-  
11          taining the results of the study and recommendations re-  
12          quired by subsection (a) to the Congress not later than  
13          21 months after the date of enactment of this Act.

14          (c) SECURITY.—The Director of the National Insti-  
15          tute of Standards and Technology shall ensure that no in-  
16          formation that is classified is included in any publicly re-  
17          leased version of the report required by this section.

18          (d) AUTHORIZATION OF APPROPRIATIONS.—There  
19          are authorized to be appropriated to the Secretary of Com-  
20          merce for the National Institute of Standards and Tech-  
21          nology for the purposes of carrying out this section,  
22          \$700,000.

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