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S. 2217

IN THE HOUSE OF REPRESENTATIVES

OCTOBER 21, 1998

Referred to the Committee on Science, and in addition to the Committees on Commerce, National Security, Resources, and Agriculture, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

AN ACT

To provide for continuation of the Federal research investment in a fiscally sustainable way, 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 “Federal Research In-
5 vestment Act”.

1 **SEC. 2. GENERAL FINDINGS REGARDING FEDERAL INVEST-**
2 **MENT IN RESEARCH.**

3 (a) VALUE OF RESEARCH AND DEVELOPMENT.—The
4 Congress makes the following findings with respect to the
5 value of research and development to the United States:

6 (1) Federal investment in research has resulted
7 in the development of technology that saved lives in
8 the United States and around the world.

9 (2) Research and development investment
10 across all Federal agencies has been effective in cre-
11 ating technology that has enhanced the American
12 quality of life.

13 (3) The Federal investment in research and de-
14 velopment conducted or underwritten by both mili-
15 tary and civilian agencies has produced benefits that
16 have been felt in both the private and public sector.

17 (4) Discoveries across the spectrum of scientific
18 inquiry have the potential to raise the standard of
19 living and the quality of life for all Americans.

20 (5) Science, engineering, and technology play a
21 critical role in shaping the modern world.

22 (6) Studies show that about half of all United
23 States post-World War II economic growth is a di-
24 rect result of technical innovation; and science, engi-
25 neering, and technology contribute to the creation of
26 new goods and services, new jobs and new capital.

1 (7) Technical innovation is the principal driving
2 force behind the long-term economic growth and in-
3 creased standards of living of the world's modern in-
4 dustrial societies. Other nations are well aware of
5 the pivotal role of science, engineering, and tech-
6 nology, and they are seeking to exploit it wherever
7 possible to advance their own global competitiveness.

8 (8) Federal programs for investment in re-
9 search, which lead to technological innovation and
10 result in economic growth, should be structured to
11 address current funding disparities and develop en-
12 hanced capability in States and regions that cur-
13 rently underparticipate in the national science and
14 technology enterprise.

15 (b) STATUS OF THE FEDERAL INVESTMENT.—The
16 Congress makes the following findings with respect to the
17 status of the Federal Investment in research and develop-
18 ment activities:

19 (1) Federal investment of approximately 13 to
20 14 percent of the Federal discretionary budget in re-
21 search and development over the past 11 years has
22 resulted in a doubling of the nominal amount of
23 Federal funding.

24 (2) Fiscal realities now challenge Congress to
25 steer the Federal government's role in science, engi-

1 neering, and technology in a manner that ensures a
2 prudent use of limited public resources. There is
3 both a long-term problem—addressing the ever-in-
4 creasing level of mandatory spending—and a near-
5 term challenge—apportioning a dwindling amount of
6 discretionary funding to an increasing range of tar-
7 gets in science, engineering, and technology. This
8 confluence of increased national dependency on tech-
9 nology, increased targets of opportunity, and de-
10 creased fiscal flexibility has created a problem of na-
11 tional urgency. Many indicators show that more
12 funding for science, engineering, and technology is
13 needed but, even with increased funding, priorities
14 must be established among different programs. The
15 United States cannot afford the luxury of fully fund-
16 ing all deserving programs.

17 (3) Current projections of Federal research
18 funding show a downward trend.

19 **SEC. 3. ADDITIONAL FINDINGS REGARDING THE LINK BE-**
20 **TWEEN THE RESEARCH PROCESS AND USE-**
21 **FUL TECHNOLOGY.**

22 The Congress makes the following findings:

23 (1) **FLOW OF SCIENCE, ENGINEERING, AND**
24 **TECHNOLOGY.**—The process of science, engineering,
25 and technology involves many steps. The present

1 Federal science, engineering, and technology struc-
2 ture reinforces the increasingly artificial distinctions
3 between basic and applied activities. The result too
4 often is a set of discrete programs that each support
5 a narrow phase of research or development and are
6 not coordinated with one another. The government
7 should maximize its investment by encouraging the
8 progression of science, engineering, and technology
9 from the earliest stages of research up to a pre-com-
10 mercialization stage, through funding agencies and
11 vehicles appropriate for each stage. This creates a
12 flow of technology, subject to merit review at each
13 stage, so that promising technology is not lost in a
14 bureaucratic maze.

15 (2) EXCELLENCE IN THE AMERICAN RESEARCH
16 INFRASTRUCTURE.—Federal investment in science,
17 engineering, and technology programs must foster a
18 close relationship between research and education.
19 Investment in research at the university level creates
20 more than simply world-class research. It creates
21 world-class researchers as well. The Federal strategy
22 must continue to reflect this commitment to a strong
23 geographically-diverse research infrastructure. Fur-
24 thermore, the United States must find ways to ex-
25 tend the excellence of its university system to pri-

1 mary and secondary educational institutions and to
2 better utilize the community college system to pre-
3 pare many students for vocational opportunities in
4 an increasingly technical workplace.

5 (3) COMMITMENT TO A BROAD RANGE OF RE-
6 SEARCH INITIATIVES.—An increasingly common
7 theme in many recent technical breakthroughs has
8 been the importance of revolutionary innovations
9 that were sparked by overlapping of research dis-
10 ciplines. The United States must continue to encour-
11 age this trend by providing and encouraging oppor-
12 tunities for interdisciplinary projects that foster col-
13 laboration among fields of research.

14 (4) PARTNERSHIPS AMONG INDUSTRY, UNIVER-
15 SITIES, AND FEDERAL LABORATORIES.—Each of
16 these contributors to the national science and tech-
17 nology delivery system has special talents and abili-
18 ties that complement the others. In addition, each
19 has a central mission that must provide their focus
20 and each has limited resources. The nation's invest-
21 ment in science, engineering, and technology can be
22 optimized by seeking opportunities for leveraging the
23 resources and talents of these three major players
24 through partnerships that do not distort the mis-

1 sions of each partner. For that reason, Federal dol-
2 lars are wisely spent forming such partnerships.

3 **SEC. 4. MAINTENANCE OF FEDERAL RESEARCH EFFORT;**
4 **GUIDING PRINCIPLES.**

5 (a) MAINTAINING UNITED STATES LEADERSHIP IN
6 SCIENCE, ENGINEERING, AND TECHNOLOGY.—It is im-
7 perative for the United States to nurture its superb re-
8 sources in science, engineering, and technology carefully
9 in order to maintain its own globally competitive position.

10 (b) GUIDING PRINCIPLES.—Federal research and de-
11 velopment programs should be conducted in accordance
12 with the following guiding principles:

13 (1) GOOD SCIENCE.—Federal science, engineer-
14 ing, and technology programs include both knowl-
15 edge-driven science together with its applications,
16 and mission-driven, science-based requirements. In
17 general, both types of programs must be focused,
18 peer- and merit-reviewed, and not unnecessarily du-
19 plicative, although the details of these attributes
20 must vary with different program objectives.

21 (2) FISCAL ACCOUNTABILITY.—The Congress
22 must exercise oversight to ensure that programs
23 funded with scarce Federal dollars are well man-
24 aged. The United States cannot tolerate waste of
25 money through inefficient management techniques,

1 whether by government agencies, by contractors, or
2 by Congress itself. Fiscal resources would be better
3 utilized if program and project funding levels were
4 predictable across several years to enable better
5 project planning; a benefit of such predictability
6 would be that agencies and Congress can better ex-
7 ercise oversight responsibilities through comparisons
8 of a project's and program's progress against care-
9 fully planned milestones.

10 (3) PROGRAM EFFECTIVENESS.—The United
11 States needs to make sure that government pro-
12 grams achieve their goals. As the Congress crafts
13 science, engineering, and technology legislation, it
14 must include a process for gauging program effec-
15 tiveness, selecting criteria based on sound scientific
16 judgment and avoiding unnecessary bureaucracy.
17 The Congress should also avoid the trap of measur-
18 ing the effectiveness of a broad science, engineering,
19 and technology program by passing judgment on in-
20 dividual projects. Lastly, the Congress must recog-
21 nize that a negative result in a well-conceived and
22 executed project or program may still be critically
23 important to the funding agency.

24 (4) CRITERIA FOR GOVERNMENT FUNDING.—
25 Program selection for Federal funding should con-

1 tinue to reflect the nation's 2 traditional research
2 and development priorities: (A) basic, scientific, and
3 technological research that represents investments in
4 the nation's long-term future scientific and techno-
5 logical capacity, for which government has tradition-
6 ally served as the principle resource; and (B) mis-
7 sion research investments, that is, investments in re-
8 search that derive from necessary public functions,
9 such as defense, health, education, environmental
10 protection, and raising the standard of living, which
11 may include pre-commercial, pre-competitive engi-
12 neering research and technology development. Addi-
13 tionally, government funding should not compete
14 with or displace the short-term, market-driven, and
15 typically more specific nature of private-sector fund-
16 ing. Government funding should be restricted to pre-
17 competitive activities, leaving competitive activities
18 solely for the private sector. As a rule, the govern-
19 ment should not invest in commercial technology
20 that is in the product development stage, very close
21 to the broad commercial marketplace, except to meet
22 a specific agency goal. When the government pro-
23 vides funding for any science, engineering, and tech-
24 nology investment program, it must take reasonable

1 steps to ensure that the potential benefits derived
2 from the program will accrue broadly.

3 **SEC. 5. POLICY STATEMENT.**

4 (a) POLICY.—This Act is intended—

5 (1) to encourage, as an overall goal, the dou-
6 bling of the annual authorized amount of Federal
7 funding for basic scientific, medical, and pre-com-
8 petitive engineering research over the 12-year period
9 following the date of enactment of this Act;

10 (2) to invest in the future of the United States
11 and the people of the United States by expanding
12 the research activities referred to in paragraph (1);

13 (3) to enhance the quality of life for all people
14 of the United States;

15 (4) to guarantee the leadership of the United
16 States in science, engineering, medicine, and tech-
17 nology; and

18 (5) to ensure that the opportunity and the sup-
19 port for undertaking good science is widely available
20 throughout the States by supporting a geographi-
21 cally-diverse research and development enterprise.

22 (b) AGENCIES COVERED.—The agencies intended to
23 be covered to the extent that they are engaged in science,
24 engineering, and technology activities for basic scientific,

1 medical, or pre-competitive engineering research by this
2 Act are—

3 (1) the National Institutes of Health, within the
4 Department of Health and Human Services;

5 (2) the National Science Foundation;

6 (3) the National Institute for Standards and
7 Technology, within the Department of Commerce;

8 (4) the National Aeronautics and Space Admin-
9 istration;

10 (5) the National Oceanic and Atmospheric Ad-
11 ministration, within the Department of Commerce;

12 (6) the Centers for Disease Control, within the
13 Department of Health and Human Services;

14 (7) the Department of Energy (to the extent
15 that it is not engaged in defense-related activities);

16 (8) the Department of Agriculture;

17 (9) the Department of Transportation;

18 (10) the Department of the Interior;

19 (11) the Department of Veterans Affairs;

20 (12) the Smithsonian Institution;

21 (13) the Department of Education; and

22 (14) the Environmental Protection Agency.

23 (c) CURRENT INVESTMENT.—The investment in civil-
24 ian research and development efforts for fiscal year 1998
25 is 2.1 percent of the overall Federal budget.

1 (d) DAMAGE TO RESEARCH INFRASTRUCTURE.—A
2 continued trend of funding appropriations equal to or
3 lower than current budgetary levels will lead to permanent
4 damage to the United States research infrastructure. This
5 could threaten American dominance of high-technology in-
6 dustrial leadership.

7 (e) INCREASE FUNDING.—In order to maintain and
8 enhance the economic strength of the United States in the
9 world market, funding levels for fundamental, scientific,
10 and pre-competitive engineering research should be in-
11 creased to equal approximately 2.6 percent of the total an-
12 nual budget.

13 (f) FUTURE FISCAL YEAR ALLOCATIONS.—

14 (1) GOALS.—The long-term strategy for re-
15 search and development funding under this section
16 would be achieved by a steady 2.5 percent annual in-
17 crease above the rate of inflation throughout a 12-
18 year period.

19 (2) INFLATION ASSUMPTION.—The authoriza-
20 tions contained in paragraph (3) assume that the
21 rate of inflation for each year will be 3 percent.

22 (3) AUTHORIZATION.—There are authorized to
23 be appropriated for civilian research and develop-
24 ment in the agencies listed in subsection (b)—

25 (A) \$37,720,000,000 for fiscal year 1999;

- 1 (B) \$39,790,000,000 for fiscal year 2000;
2 (C) \$41,980,000,000 for fiscal year 2001;
3 (D) \$42,290,000,000 for fiscal year 2002;
4 (E) \$46,720,000,000 for fiscal year 2003;
5 (F) \$49,290,000,000 for fiscal year 2004;
6 (G) \$52,000,000,000 for fiscal year 2005;
7 (H) \$54,870,000,000 for fiscal year 2006;
8 (I) \$57,880,000,000 for fiscal year 2007;
9 (J) \$61,070,000,000 for fiscal year 2008;
10 (K) \$64,420,000,000 for fiscal year 2009;
11 and
12 (L) \$67,970,000,000 for fiscal year 2010.

13 (g) CONFORMANCE WITH BUDGETARY CAPS.—Not-
14 withstanding any other provision of law, no funds may be
15 made available under this Act in a manner that does not
16 conform with the discretionary spending caps provided in
17 the most recently adopted concurrent resolution on the
18 budget or threatens the economic stability of the annual
19 budget.

20 (h) BALANCED RESEARCH PORTFOLIO.—Because of
21 the interdependent nature of the scientific and engineering
22 disciplines, the aggregate funding levels authorized by the
23 section assume that the Federal research portfolio will be
24 well-balanced among the various scientific and engineering

1 disciplines, and geographically dispersed throughout the
2 States.

3 **SEC. 6. PRESIDENT'S ANNUAL BUDGET REQUEST.**

4 The President of the United States shall, in coordina-
5 tion with the President's annual budget request, include
6 a report that parallels Congress' commitment to support
7 Federally-funded research and development by
8 providing—

9 (1) a detailed summary of the total level of
10 funding for research and development programs
11 throughout all civilian agencies;

12 (2) a focused strategy that reflects the funding
13 projections of this Act for each future fiscal year
14 until 2010, including specific targets for each agency
15 that funds civilian research and development;

16 (3) an analysis which details funding levels
17 across Federal agencies by methodology of funding,
18 including grant agreements, procurement contracts,
19 and cooperative agreements (within the meaning
20 given those terms in chapter 63 of title 31, United
21 States Code); and

22 (4) specific proposals for infrastructure develop-
23 ment and research and development capacity build-
24 ing in States with less concentrated research and de-

1 velopment resources in order to create a nationwide
2 research and development community.

3 **SEC. 7. COMPREHENSIVE ACCOUNTABILITY STUDY FOR**
4 **FEDERALLY-FUNDED RESEARCH.**

5 (a) STUDY.—The Director of the Office of Science
6 and Technology Policy, in consultation with the Director
7 of the Office of Management and Budget, shall enter into
8 agreement with the National Academy of Sciences for the
9 Academy to conduct a comprehensive study to develop
10 methods for evaluating Federally-funded research and de-
11 velopment programs. This study shall—

12 (1) recommend processes to determine an ac-
13 ceptable level of success for Federally-funded re-
14 search and development programs by—

15 (A) describing the research process in the
16 various scientific and engineering disciplines;

17 (B) describing in the different sciences
18 what measures and what criteria each commu-
19 nity uses to evaluate the success or failure of a
20 program, and on what time scales these meas-
21 ures are considered reliable—both for explor-
22 atory long-range work and for short-range
23 goals; and

24 (C) recommending how these measures
25 may be adapted for use by the Federal govern-

1 ment to evaluate Federally-funded research and
2 development programs;

3 (2) assess the extent to which agencies incor-
4 porate independent merit-based review into the for-
5 mulation of the strategic plans of funding agencies
6 and if the quantity or quality of this type of input
7 is unsatisfactory;

8 (3) recommend mechanisms for identifying Fed-
9 erally-funded research and development programs
10 which are unsuccessful or unproductive;

11 (4) evaluate the extent to which independent,
12 merit-based evaluation of Federally-funded research
13 and development programs and projects achieves the
14 goal of eliminating unsuccessful or unproductive pro-
15 grams and projects; and

16 (5) investigate and report on the validity of
17 using quantitative performance goals for aspects of
18 programs which relate to administrative manage-
19 ment of the program and for which such goals would
20 be appropriate, including aspects related to—

21 (A) administrative burden on contractors
22 and recipients of financial assistance awards;

23 (B) administrative burdens on external
24 participants in independent, merit-based evalua-
25 tions;

1 (C) cost and schedule control for construc-
2 tion projects funded by the program;

3 (D) the ratio of overhead costs of the pro-
4 gram relative to the amounts expended through
5 the program for equipment and direct funding
6 of research; and

7 (E) the timeliness of program responses to
8 requests for funding, participation, or equip-
9 ment use.

10 (6) examine the extent to which program selec-
11 tion for Federal funding across all agencies exempli-
12 fies our nation's historical research and development
13 priorities—

14 (A) basic, scientific, and technological re-
15 search in the long-term future scientific and
16 technological capacity of the nation; and

17 (B) mission research derived from a high-
18 priority public function.

19 (b) ALTERNATIVE FORMS FOR PERFORMANCE
20 GOALS.—Not later than 6 months after transmitting the
21 report under subsection (a) to Congress, the Director of
22 the Office of Management and Budget, after public notice,
23 public comment, and approval by the Director of the Of-
24 fice of Science and Technology Policy and in consultation
25 with the National Science and Technology Council shall

1 promulgate one or more alternative forms for performance
2 goals under section 1115(b)(10)(B) of title 31, United
3 States Code, based on the recommendations of the study
4 under subsection (a) of this section. The head of each
5 agency containing a program activity that is a research
6 and development program may apply an alternative form
7 promulgated under this section for a performance goal to
8 such a program activity without further authorization by
9 the Director of the Office of Management and Budget.

10 (c) STRATEGIC PLANS.—Not later than one year
11 after promulgation of the alternative performance goals in
12 subsection (b) of this section, the head of each agency car-
13 rying out research and development activities, upon updat-
14 ing or revising a strategic plan under subsection 306(b)
15 of title 5, United States Code, shall describe the current
16 and future use of methods for determining an acceptable
17 level of success as recommended by the study under sub-
18 section (a).

19 (d) DEFINITIONS.—In this section:

20 (1) DIRECTOR.—The term “Director” means
21 the Director of the Office of Science and Technology
22 Policy.

23 (2) PROGRAM ACTIVITY.— The term “program
24 activity” has the meaning given that term by section
25 1115(f)(6) of title 31, United States Code.

1 (3) INDEPENDENT MERIT-BASED EVALUA-
 2 TION.—The term “independent merit-based evalua-
 3 tion” means review of the scientific or technical
 4 quality of research or development, conducted by ex-
 5 perts who are chosen for their knowledge of sci-
 6 entific and technical fields relevant to the evaluation
 7 and who—

8 (A) in the case of the review of a program
 9 activity, do not derive long-term support from
 10 the program activity; or

11 (B) in the case of the review of a project
 12 proposal, are not seeking funds in competition
 13 with the proposal.

14 (e) AUTHORIZATION OF APPROPRIATIONS.—There
 15 are authorized to be appropriated to carry out the study
 16 required by subsection (a) \$600,000 for the 18-month pe-
 17 riod beginning October 1, 1998.

18 **SEC. 8. EFFECTIVE PERFORMANCE ASSESSMENT PROGRAM**

19 **FOR FEDERALLY-FUNDED RESEARCH.**

20 (a) IN GENERAL.—Chapter 11 of title 31, United
 21 States Code, is amended by adding at the end thereof the
 22 following:

23 **“§ 1120. Accountability for research and development programs**

24 “(a) IDENTIFICATION OF UNSUCCESSFUL PRO-
 25 GRAMS.—Based upon program performance reports for

1 each fiscal year submitted to the President under section
2 1116, the Director of the Office of Management and
3 Budget shall identify the civilian research and develop-
4 ment program activities, or components thereof, which do
5 not meet an acceptable level of success as defined in sec-
6 tion 1115(b)(1)(B). Not later than 30 days after the sub-
7 mission of the reports under section 1116, the Director
8 shall furnish a copy of a report listing the program activi-
9 ties or component identified under this subsection to the
10 President and the Congress.

11 “(b) ACCOUNTABILITY IF NO IMPROVEMENT
12 SHOWN.—For each program activity or component that
13 is identified by the Director under subsection (a) as being
14 below the acceptable level of success for 2 fiscal years in
15 a row, the head of the agency shall no later than 30 days
16 after the Director submits the second report so identifying
17 the program, submit to the appropriate congressional com-
18 mittees of jurisdiction:

19 “(1) a concise statement of the steps that will
20 be taken—

21 “(A) to bring such program into compli-
22 ance with performance goals; or

23 “(B) to terminate such program should
24 compliance efforts have failed; and

1 “(2) any legislative changes needed to put the
2 steps contained in such statement into effect.”.

3 (b) CONFORMING AMENDMENTS.—

4 (1) The chapter analysis for chapter 11 of title
5 31, United States Code, is amended by adding at
6 the end thereof the following:

“1120. Accountability for research and development programs”.

7 (2) Section 1115(f) of title 31, United States
8 Code, is amended by striking “through 1119,” and
9 inserting “through 1120”.

Passed the Senate October 8 (legislative day, Octo-
ber 2), 1998.

Attest:

GARY SISCO,
Secretary.