

Final FY 2000 Appropriations:

Large Increases for FY 2000 Defense R&D; DOD S&T Up 11.0 Percent

(The complete series of AAAS R&D Funding Updates is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/R&D>) in the "FY 2000 R&D" or the "What's New" sections.)

On October 25, President Clinton signed the FY 2000 Defense appropriations bill (HR 2561) for the Department of Defense (DOD) into law. The final Defense bill provides substantial increases for most DOD R&D programs, even after Congress and the President agreed to a retroactive across-the-board cut of 0.38 percent to all discretionary programs in November. DOD's R&D in FY 2000 totals \$39.1 billion, \$4.0 billion more than the President's request and \$1.1 billion or 3.0 percent more than FY 1999 (see Tables A and B; all figures adjusted to reflect the 0.38 percent cut). **The bill boosts DOD funding of basic and applied research above both the President's request and the FY 1999 funding level.** DOD's basic research ("6.1") totals \$1.2 billion, 5.4 percent above FY 1999, while applied research ("6.2") totals \$3.4 billion, 7.5 percent above the current year funding level. Including DOD's medical research programs, **DOD S&T** ("6.1" through "6.3" programs, representing DOD's investment in basic and applied research and technology development) increases by 11.0 percent to \$8.7 billion.

The final Defense bill contains substantial increases for the overall DOD budget as well as for R&D programs, after a decade-long post-Cold War decline. The \$268 billion total for the Defense bill is nearly \$5 billion more than the request, which itself was a substantial increase over FY 1999 funding levels. In addition to the Defense bill, Congress has already provided more than \$2 billion in FY 2000 funds in April's emergency supplemental bill (Public Law 106-31).

The Defense bill provides large increases for most **basic research ("6.1")** accounts. Although DOD requested only a 0.5 percent increase, the House and Senate both appropriated more than the request, and the final bill provides even more, for a total of \$1.2 billion, \$59 million or 5.4 percent more than FY 1999 (see Table A). In recent years, the House has proposed cuts to basic research, the Senate has proposed increases, and the final appropriations have split the difference, but this year there was broad agreement that the basic research accounts of all the services needed increases. The Army's support of basic research rises 11 percent to \$206 million because of a \$12 million supplement to its budget for basic research in counterterrorism. The Defense bill matches the Navy's requested 4 percent increase for its basic research, provides a 3 percent increase for Air Force basic research, and provides \$378 million (an increase of 7 percent) for basic research in the Defense Agencies.

The **applied research ("6.2")** accounts total \$3.4 billion, an increase of \$237 million or 7.5 percent. This total is \$429 million more than the request. As a result, total DOD support of research (basic plus applied) is \$4.6 billion, 7.0 percent more than FY 1999.

The "6.1" and "6.2" research accounts provide a significant share of federal support for several **key scientific and engineering disciplines**. DOD provides nearly a third of all federal support for engineering research, and a majority of federal support for some key engineering subfields. DOD also provides more than 40 percent of total federal support for computer sciences research, and

plays a strong funding role in other disciplines such as mathematics, oceanography, medical sciences, chemistry, physics, and environmental sciences.

As Figure 1 shows, DOD allocates its support of basic and applied research among many disciplines, but predominantly engineering, with significant amounts of support for mathematics, computer sciences, environmental sciences (mainly oceanography), physical sciences, and life sciences.

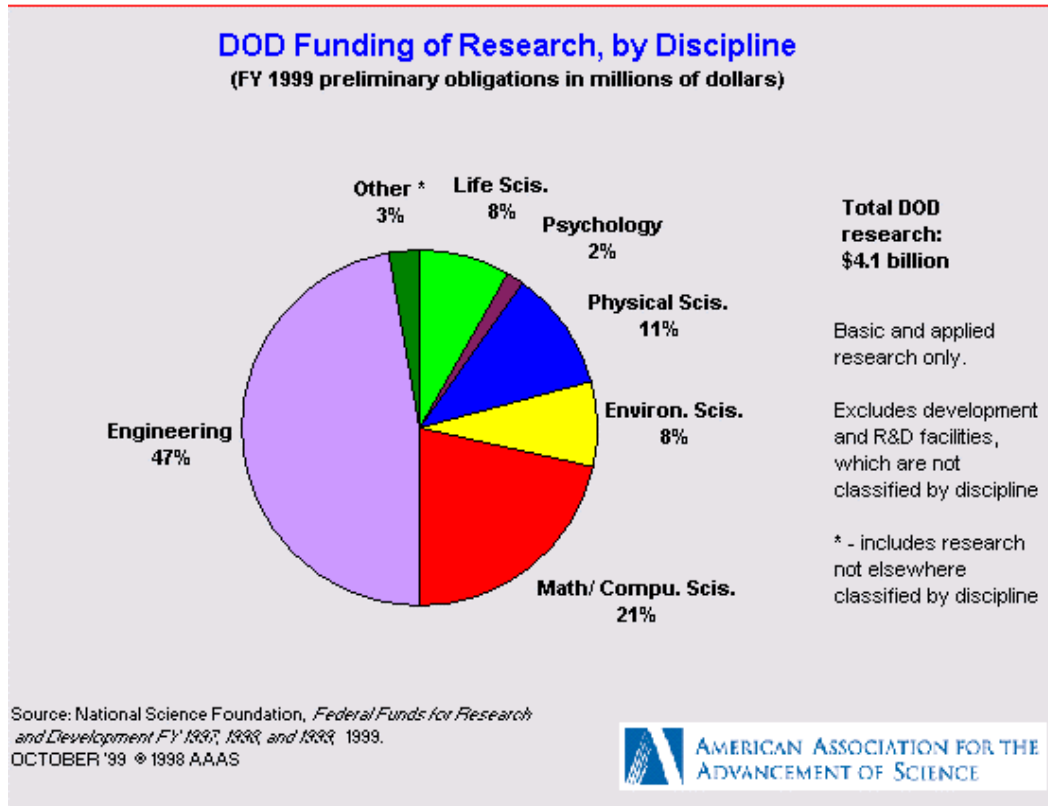


Figure 1.

In recent years, cuts in DOD's "6.1" and "6.2" accounts have resulted in **shrinking DOD support for many of these disciplines, especially engineering research**. Figure 2 shows that **DOD support of engineering research has declined by nearly a third in real terms** over the past six years, not surprising considering how important engineering is in DOD's research portfolio. There have also been cuts in DOD support of the physical sciences and a downward trend in the life sciences. Only in mathematics and computer sciences has DOD support increased over the past several years. The FY 2000 increases for DOD research should help to reverse the downward trends, but will still leave support for these disciplines well below mid-1990s levels. Even with a 5.4 percent increase in FY 2000, for example, DOD's "6.1" funding remains more than 20 percent below the FY 1993 level in inflation-adjusted terms.

The "6.1" and "6.2" accounts are especially important for the nation's **colleges and universities**, which perform more than half of "6.1" research and roughly 20 percent of "6.2" research. DOD is the third largest sponsor of federal R&D at colleges and universities, behind only the National Institutes of Health and the National Science Foundation. DOD's impact, however, is concentrated in the few key fields listed above. DOD provides a tenth of federal support for academic R&D, but more than half of all federal support for mechanical engineering and electrical engineering at universities, and nearly half of all federal support for computer sciences and materials engineering.

Although it is uncertain how DOD will allocate its FY 2000 funds among performers and disciplines, the totals suggest that DOD support for research at colleges and universities will increase in FY 2000.

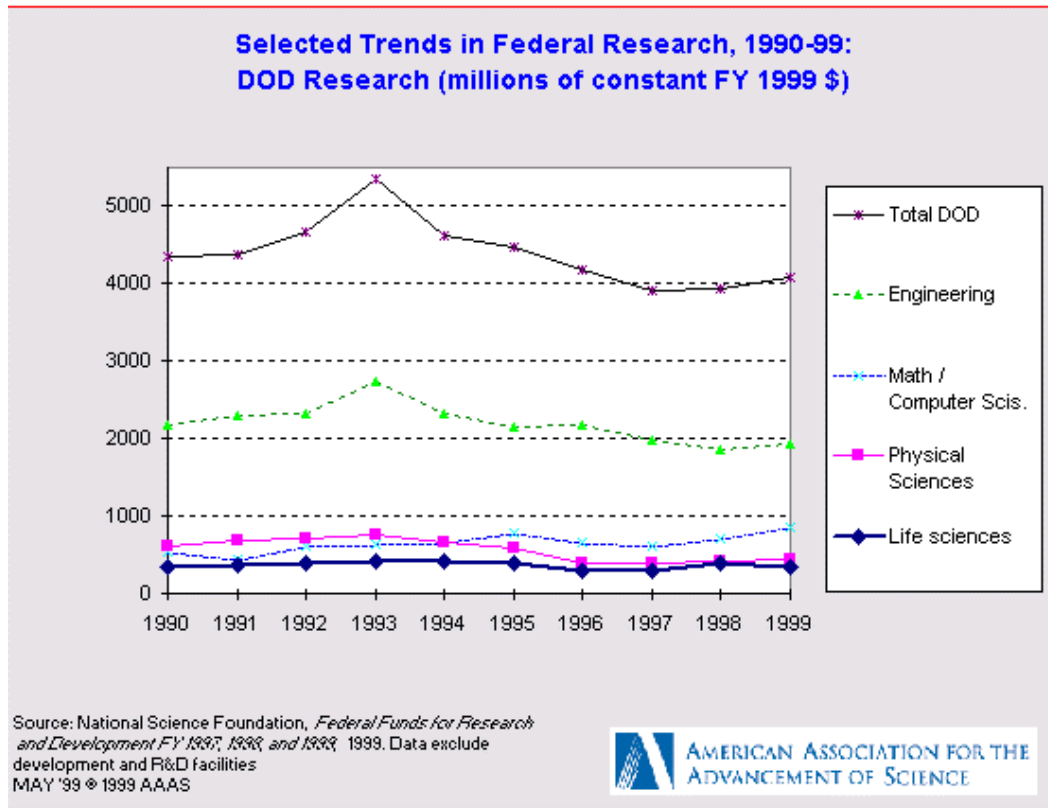


Figure 2.

The final Defense bill contains a separate \$274 million appropriation, outside the regular R&D accounts, for **medical R&D** (see Table A). In past years, Congress has appropriated these unrequested funds for medical research in the Army's "6.3" accounts. This appropriation for peer-reviewed, competitively awarded research grants continues the recent expansion of DOD's effort in medical research. The \$274 million total is divided into \$175 million for breast cancer research (up from \$135 million in the Army in FY 1999) and \$75 million for prostate cancer research (up from \$58 million), with an additional \$24 million for peer reviewed research on other topics. There are also appropriations for medical research in DOD's regular accounts, including \$12 million for ovarian cancer in the Army, and R&D on HIV, alcoholism, bone marrow disease, and Gulf War illness in the other services.

The "6.1," "6.2," and "6.3" categories are often grouped together as "**Science and Technology**" (**S&T**). This category encompasses basic research, applied research, and generic technology development, which contribute to a broad knowledge base with potential applications to a wide variety of military as well as civilian uses. S&T is separate from the "6.4" and higher categories, which are focused on the development and testing of specific weapons systems. DOD S&T has declined steeply in recent years. In FY 2000, however, **DOD S&T**, including the medical research appropriations formerly appropriated within the "6.3" category, **totals \$8.7 billion, 11.0 percent more than FY 1999** and by far the largest increase in more than a decade.

Among the Defense Agencies, the Defense bill cuts the budget of the **Defense Advanced Research Projects Agency (DARPA)** by \$82 million or 4.2 percent for a total of \$1.8 billion (see Table B). The bill provides \$36 million for the **Next Generation Internet** (down from \$50 million in FY 1999) and \$30 million for the first year of Extensible Information Systems (down from a first-time request of \$70 million). The latter is a key part of DOD's contribution to the multi-agency Information Technology for the 21st Century (**IT²**) initiative. Although final allocation levels are uncertain, it appears that DOD received \$60 million of a requested \$100 million for IT². DOD's role in IT² is described as "basic long-range research and related equipment necessary to facilitate advances in IT." DARPA is expected to play a key part in DOD's effort through focused research in a number of topics, including research on software; human-computer interaction; information management; scalable networks; and high-end computing.

The final Defense bill trims the \$146 million request for DARPA's Biological Warfare Defense research program down to \$132 million, but this is still significantly more than the \$85 million FY 1999 funding level. The House bill language expresses concern that the requested expansion of the program is too rapid, and advises DARPA to more closely collaborate with the Army's existing biological warfare research units, which receives significant increases through the Chemical and Biological Defense program.

The **Ballistic Missile Defense Organization's (BMDO)** budget falls 10.8 percent to \$3.4 billion, but this is primarily because the FY 1999 total contains \$770 million in last-minute emergency appropriations. The BMDO appropriation funds continued development and testing of national and theater missile defense systems, including nearly \$1 billion (\$953 million) for development of a national missile defense system.

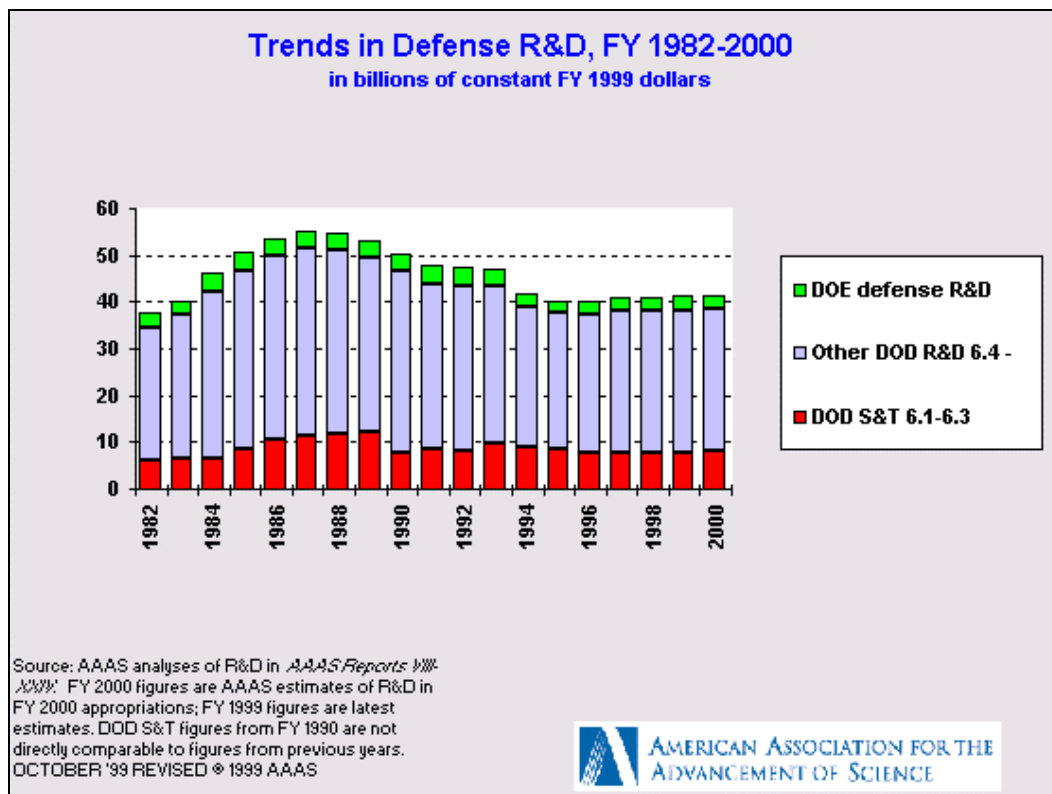


Figure 3.

On the House floor, the most controversial part of the bill was its proposed deletion of procurement funds for the **F-22** fighter for a savings of \$1.8 billion. The House bill would have funded \$1.2 billion for continued R&D on prototypes for the F-22, while the Senate bill would have funded both procurement and R&D. The final Defense bill keeps the F-22 program alive, but delays procurement and provides extra funds for continued development and prototype testing in a special transfer account. The bill provides nearly \$2 billion in development funds for the F-22.

Total defense-related R&D, including defense-related R&D in the Department of Energy (DOE) as well as DOD's R&D, is on the upswing after a decade of post-Cold War cuts. As shown in Table C, DOE's atomic weapons R&D received a generous 4.8 percent increase for a total of \$3.4 billion. **Total defense R&D is \$42.5 billion in FY 2000, an increase of \$1.3 billion or 3.1 percent** above the FY 1999 level. In recent years, because of small increases in DOD's development accounts and large percentage increases in DOE's defense R&D, total defense R&D has increased slightly in real terms after bottoming out in FY 1996 from a steep post-Cold War drop (see Figure 3). In FY 2000, the increase extends to the DOD S&T accounts, which have languished in recent years.

President Clinton signed the Defense bill into law on October 25. Congress and the President later agreed to a 0.38 percent across-the-board reduction in discretionary spending even for bills already signed into law, which retroactively reduced the funding totals.

- November 24, 1999

AAAS R&D Budget and Policy Program
American Association for the Advancement of Science
1200 New York Ave, NW
Washington, DC 20005
(202) 326-6607; -6600
science_policy@aaas.org
www.aaas.org/spp/R&D

**Table A. Department of Defense by Program
Congressional Action on R&D in the FY 2000 Budget (FINAL)
(budget authority in millions of dollars)**

| | FY 1999 Estimate | FY 2000 Request | Action by Congress | | | | |
|--|---------------------|--------------------|--------------------|-----------------------------|--------------|-----------------------------|-------------|
| | | | FY 2000 FINAL | Chg. from Request Amount | Percent | Chg. from FY 1999 Amount | Percent |
| Research, Development, Test, and Evaluation: | | | | | | | |
| Basic Research ("6.1") | 1,108 | 1,113 | 1,167 | 54 | 4.9% | 59 | 5.4% |
| Applied Research ("6.2") | 3,151 | 2,959 | 3,388 | 429 | 14.5% | 237 | 7.5% |
| Total Research, or Tech. Base | 4,259 | 4,072 | 4,555 | 483 | 11.9% | 297 | 7.0% |
| Advanced Tech. Dev. ("6.3") | 3,532 | 3,314 | 3,822 | 508 | 15.3% | 290 | 8.2% |
| Total Science and Technology | 7,791 | 7,386 | 8,378 | 991 | 13.4% | 587 | 7.5% |
| Demonstration/Validation ("6.4") | 7,237 | 5,580 | 6,536 | 955 | 17.1% | -701 | -9.7% |
| Engineering and Manuf. Dev. ("6.5") | 7,931 | 7,538 | 8,623 | 1,085 | 14.4% | 692 | 8.7% |
| RDT&E Management Support ("6.6") | 2,930 | 2,406 | 2,550 | 144 | 6.0% | -380 | -13.0% |
| Operational Systems Dev. ("6.7") | 11,554 | 11,465 | 12,101 | 636 | 5.5% | 547 | 4.7% |
| BA Adjustment | -38 | 0 | 0 | -- | -- | -- | -- |
| TOTAL RDT&E | 37,405 | 34,375 | 38,187 | 3,812 | 11.1% | 783 | 2.1% |
| Other appropriations ¹ | 570 | 690 | 648 | -42 | -6.2% | 78 | 13.6% |
| Medical research ² | 0 | 0 | 274 | 274 | -- | 274 | -- |
| Total DOD R&D | 37,975 | 35,065 | 39,109 | 4,044 | 11.5% | 1,134 | 3.0% |

AAAS estimates. Includes conduct of R&D and R&D facilities. Includes across-the-board reduction.

Adjusted to reflect general reductions, rescissions, supplementals, and emergency appropriations.

All figures are rounded to the nearest million. Changes calculated from unrounded figures.

FY 2000 FINAL figures adjusted to reflect general reductions to RDT&E accounts.

¹ R&D support in military personnel, military construction, and other DOD appropriations.

Includes chemical agents and munitions destruction R&D funded outside RDT&E.

² The final Defense bill appropriates some medical research and development in a separate account. In FY 1999, these programs are funded in the Army ("6.3").

Nov. 24, 1999 - FINAL

**Table B. Department of Defense by Agency
Congressional Action on R&D in the FY 2000 Budget (FINAL)
(budget authority in millions of dollars)**

| | FY 1999 Estimate | FY 2000 Request | Action by Congress | | | | |
|--|---------------------|--------------------|--------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|
| | | | FY 2000 FINAL | Chg. from Request Amount | Chg. from Request Percent | Chg. from FY 1999 Amount | Chg. from FY 1999 Percent |
| Research, development, test, and evaluation: | | | | | | | |
| Army | 5,032 | 4,426 | 5,227 | 801 | 18.1% | 195 | 3.9% |
| Navy | 8,640 | 7,984 | 9,020 | 1,036 | 13.0% | 380 | 4.4% |
| Air Force | 13,683 | 13,078 | 14,250 | 1,172 | 9.0% | 567 | 4.1% |
| Defense Agencies | 9,757 | 8,609 | 9,394 | 784 | 9.1% | -363 | -3.7% |
| <i>Defense Adv. Res. Projects Agcy.</i> | 1,930 | 2,003 | 1,849 | -154 | -7.7% | -82 | -4.2% |
| <i>Ballistic Missile Defense Org.</i> | 3,845 | 2,944 | 3,429 | 484 | 16.5% | -416 | -10.8% |
| <i>Other</i> | 3,982 | 3,662 | 4,116 | 454 | 12.4% | 134 | 3.4% |
| Director of Test and Evaluation | 259 | 253 | 265 | 11 | 4.5% | 6 | 2.5% |
| Director of Operational Test & Eval. | 34 | 24 | 31 | 7 | 28.2% | -3 | -8.6% |
| TOTAL RDT&E | 37,405 | 34,375 | 38,187 | 3,812 | 11.1% | 783 | 2.1% |
| Other appropriations ¹ | 570 | 690 | 648 | -42 | -6.2% | 78 | 13.6% |
| Medical research ² | 0 | 0 | 274 | 274 | -- | 274 | -- |
| Total DOD R&D | 37,975 | 35,065 | 39,109 | 4,044 | 11.5% | 1,134 | 3.0% |

AAAS estimates. Includes conduct of R&D and R&D facilities. Includes across-the-board reduction.

Adjusted to reflect general reductions, rescissions, supplementals, and emergency appropriations.

All figures are rounded to the nearest million. Changes calculated from unrounded figures.

FY 2000 FINAL figures adjusted to reflect general reductions to RDT&E accounts.

¹ R&D support in military personnel, military construction, and other DOD appropriations.

Includes chemical agents and munitions destruction R&D funded outside RDT&E.

² The final Defense bill appropriates some medical research and development in a separate account. In FY 1999, these programs are funded in the Army ("6.3").

Nov. 24, 1999 - FINAL

Table C. DOE Atomic Energy Defense Activities

| | FY 1999 Estimate | FY 2000 Request | Action by Congress | | | | |
|--|---------------------|--------------------|--------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|
| | | | FY 2000 FINAL | Chg. from Request Amount | Chg. from Request Percent | Chg. from FY 1999 Amount | Chg. from FY 1999 Percent |
| Naval Reactors | 650 | 644 | 655 | 10 | 1.6% | 4 | 0.7% |
| Weapons Activities | 2,180 | 2,390 | 2,341 | -49 | -2.0% | 161 | 7.4% |
| <i>(Stockpile Stewardship)</i> | 2,116 | 2,286 | 2,242 | -44 | -1.9% | 126 | 5.9% |
| - <i>ASCI 3</i> | 301 | 341 | 315 | -26 | -7.7% | 14 | 4.6% |
| - <i>Inertial Confinement Fusion</i> | 219 | 218 | 227 | 9 | 4.2% | 8 | 3.4% |
| - <i>National Ignition Facility</i> | 284 | 248 | 247 | -1 | -0.4% | -37 | -13.0% |
| - <i>All Other Stockpile Steward.</i> | 1,312 | 1,480 | 1,453 | -26 | -1.8% | 141 | 10.8% |
| Nuclear Safeguards & Security | 24 | 27 | 37 | 10 | 35.9% | 14 | 58.0% |
| Intelligence | 4 | 4 | 4 | 0 | 0.0% | 0 | 0.0% |
| Nonproliferation & Verification R&D | 187 | 191 | 190 | -1 | -0.4% | 3 | 1.5% |
| Fissile Materials Disposition | 54 | 53 | 53 | 0 | -0.4% | -1 | -2.2% |
| Environmental Management | 135 | 108 | 107 | 0 | -0.4% | -27 | -20.3% |
| TOTAL Atomic Defense | 3,234 | 3,417 | 3,388 | -30 | -0.9% | 154 | 4.8% |
| Total Defense R&D (DOD+DOE) | 41,208 | 38,483 | 42,497 | 4,014 | 10.4% | 1,288 | 3.1% |

AAAS estimates. Includes conduct of R&D and R&D facilities.

¹ Accelerated Strategic Computing Initiative.