

BMD and the Military R&D Budget

Funding Levels

Military research and development currently constitutes about two-thirds of all Federal spending on R&D. In fiscal year 1985, \$34.7 billion of the \$52.0 billion total appropriated by Congress for R&D went to defense-related activities in the Departments of Defense and Energy.¹

Ballistic missile defense technologies have been investigated with Department of Defense R&D funds since the 1950s. BMD funding (including deployment costs) reached its highest level (in real dollars) in fiscal year 1972. After the ABM Treaty was signed, overall BMD funding dropped.

In the fiscal year 1984 budget, the most recent one submitted before the Strategic Defense Initiative Organization was formed, just under \$1 billion was appropriated for BMD research. According to Defense Department funding projections at that time, BMD programs within DOD would have been allocated about \$12 billion for fiscal years 1984 through 1989 had the SD I not been formed, with about \$2 billion more to have been spent by the Department of Energy. Under the SDI funding profile, DOD projections for the same period totaled \$26 billion.² A more recent projection, which included an estimate for fiscal year 1990 and also accounted for congressional action on the fiscal year 1985 request, gave a \$33 billion total for SD I for the seven fiscal years between fiscal years 1984 and 1990, inclusive.³

¹Aggregate figures from table I of Willis Shapley, Albert Teich, and Jill Pace, *Congressional Action on R&D in the FY 1985 Budget* (Washington, DC: R&D Budget and Policy Project of the American Association for the Advancement of Science in cooperation with the Intersociety Working Group, November 1984). The R&D budget as requested by the President, before being acted on by Congress, is analyzed in *AAAS Report IX: Research and Development, FY 1985 Budget*, by the Intersociety Working Group, 1984. Data for this publication is drawn from *Special Analysis K*, prepared by the Office of Management and Budget, and from *Federal Funds*, prepared by the National Science Foundation.

²"Analysis of the Costs of the Administration's Strategic Defense Initiative, 1985-1989," Congressional Budget Office, May 1984. For planning purposes, the Department of Defense annually prepares Five-Year Defense Plans which project future spending levels. However, the CBO report based its projections beyond fiscal year 1986 on press reports, since DOD typically does not provide its "out-year" projections to Congress.

³Departing from usual practice, in 1985 the Office of the Secretary of Defense (Comptroller) released out-year SD I budget projections to Congress. The Strategic Defense Initiative Organization has also compiled a corresponding breakdown of what would have been requested

However, the periods covered by the above estimates are artifacts of the Pentagon's planning process. The budget for each fiscal year includes projections for the four subsequent years as well, but provides no information beyond that. Ambassador Paul Nitze, special advisor to the President and Secretary of State on arms control, has estimated that it will take "at least 10 years" (e.g., not before 1995) to determine whether a ballistic missile defense can meet the tests of survivability and cost-effectiveness.⁴ The program would take even longer if slowed by unanticipated difficulties or congressional budget cuts. The total 10-year SD I cost from fiscal year 1984 through 1993 has been estimated to be \$70 billion in nominal (uncorrected for inflation) dollars if it were to proceed on budget and on schedule; delays and overruns would further increase this totals

Defense Department R&D Budget Categories

The Department of Defense places R&D programs in five categories ranging from basic research to engineering and operational development. *Basic research*, category 6.1, is scientific

over that time period had the SD I not been formed. The two budget requests for fiscal years 1984 through 1990, in millions of dollars, are:

Fiscal Year	Pre-SDI		
	SDI (DOD)	(DOD)	(DOE)
1984	991	991	NA
1985	1,397	1,527	210
1986	3,722	1,802	295
1987	4,908	2,181	365
1988	6,165	2,699	439
1989	7,300	2,982	505
1990	8,634	NA	NA
Total	33,122	12,182	1,814

NA = not available. Note that the aggregate SDI figure is a 6-year sum whereas the aggregate pre-SDI figure is only over 5 years. Fiscal year 1984 and 1985 figures for the SD I budget represent appropriated, not requested, funds.

⁴Quoted by Walter Pincus in "Decade of Study Seen for 'Star Wars'," *The Washington Post*, Apr. 27, 1985.

⁵John Pike, *The Strategic Defense Initiative: Budget and Program* (Washington, DC: Federation of American Scientists, Feb. 10, 1985), pp. 81-83. The FAS projection of \$69 billion fell in between a \$66 billion estimate by the Electronic Industries Association and an \$80 billion estimate by DMS, a private market research firm. Budget estimates given in constant fiscal year 1986 dollars are 86 percent of the those cited here, which are in current-year (nominal) dollars.

FAS cites Norman Augustine, President of Martin Marietta Denver Aerospace, as having frequently noted that defense development projects typically take one-third longer and cost one-third more than initially estimated. This factor moves the FAS research and technology development estimate of \$70 billion closer to \$100 billion.

study and experimentation directed toward acquiring knowledge in those fields relating to long-term national security needs. Category 6.2, exploratory development, refers to research directed towards solving specific military problems, short of major development projects. It includes development of "brass-board" level hardware, intended to validate design concepts, which need not be to scale and which do not meet operational specifications.

Advanced development, category 6.3, consists of projects which have moved into the development of prototypes in field configuration for technical or operational testing. Projects at this stage are evaluated for their suitability for military use. Category 6.4 is *engineering development*, and refers to systems meeting all military specifications for operational use which are destined for production in the very near term. (If approved for production, weapons systems leave the R&D budget.) The fifth category, 6.5, is for management support, and it funds installations required for general R&D use (i.e., testing ranges). Operational systems development, or development conducted on systems which have already been deployed, does not appear as a "6" category but is funded by line items elsewhere in the budget.

The five program elements constituting the Strategic Defense Initiative were created by consolidating portions of 27 previous program elements spanning the range from 6.1 to 6.5.⁶ The resulting aggregates are therefore difficult to categorize, and they have been placed by DOD more or less arbitrarily in category 6.3, advanced development.

For the Department of Defense as a whole, only a small fraction of R&D funds (2.5 percent in the fiscal year 1985 request) was requested for basic

research programs in category 6.1. Another 6.5 percent was requested for applied research, which is considered to be category 6.2 plus a portion "6.3A" of category 6.3 programs in the early stages of advanced development. The overwhelming majority of DOD R&D funds, 90 percent in fiscal year 1985, were requested for development activities in category 6.4 and the remainder of category 6.3, with the final 1 percent being requested for R&D facilities.⁷

Department of Energy

Within the Department of Energy, \$2.2 billion was allocated for defense-related R&D programs in fiscal year 1985. These programs include all development of nuclear weapons, along with other items such as naval nuclear reactor development.⁸ (Dual military/civilian nuclear power programs, such as nuclear power for space systems, are funded elsewhere in the DOE budget and are not included in this total.) While the Department of Energy conducts research relevant to strategic defense, those programs are not formally part of the Strategic Defense Initiative.

⁷AAAS Report IX, note 1 above, table II-4. These figures are for the budget requested by the President; similar breakdowns for the budget as enacted by Congress were not available but would differ only marginally.

⁸DOE does not use the 6.1 to 6.5 budget categories used by the Department of Defense, and a breakdown of DOE R&D funds equivalent to the one above for DOD is not available. However, comparing table I-7 (total defense expenditures of AAAS Report IX (*supra*, note 1 above) with table I-4 (Department of Defense expenditures) yields a somewhat comparable analysis. These figures are for the fiscal year 1985 budget as submitted by the President; no such figures were compiled for the budget as enacted by Congress:

Basic Research	\$0
Applied Research	0.7 billion
Development	1.3 billion
Facilities	0.5 billion

Although this analysis shows that no DOE funds were attributed for basic research in defense-related programs, \$0.9 billion was allocated for basic research elsewhere within DOE (table I-9 of the AAAS Report).

⁶"Analysis of the Costs of the Administration's Strategic Defense Initiative, 1985 -1989," Congressional Budget Office, May 1984