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SYSTEM PLANNING CORPORATION

1500 Wilson Boulevard • Suite 1500 • Arlington, Virginia 22209 • (703) 841-2800

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ARMY SCIENCE AND TECHNOLOGY PROGRAM SUPPORT AND EVALUATION

November 1978

~~DRAFT~~

Approved Final Summary Report
H. Connell
COL, GS

R. F. Daly
H. F. Grimm
C. J. Landry



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DRAFT FINAL SUMMARY REPORT
ARMY SCIENCE AND TECHNOLOGY PROGRAM
SUPPORT AND EVALUATION

PURPOSE

This report summarizes the work performed for the Director of Army Research (DAR), Office Deputy Chief of Staff Research Development and Acquisition (ODCSRDA), Department of the Army, under Contract DAAG39-78-C-0046.

BACKGROUND AND SCOPE

The ODCSRDA, in conjunction with the U.S. Army Materiel Development and Readiness Command (DARCOM), has a continuing requirement to increase the efficiency and productivity of the Science and Technology (S&T) development program and to introduce mechanisms that facilitate an easy transition from the technology base to a systems-oriented development program. The Office of the DAR recently initiated efforts to enhance the management function and overall effectiveness of the S&T program. As an extension to this effort, System Planning Corporation (SPC) was tasked by the DAR to perform a comprehensive analysis of existing procedures and mechanisms that are utilized by the Department of Army to manage the S&T program which is executed by DARCOM. This review and evaluation included all the primary documentation mechanisms, specifically the Army Science and Technology Guide (STOG), the Management Summary Sheets (MSS) and Back-up Sheets (BUS), the Single Project Funding (SPF) and Single Program Element Funding (SPEF) reports, the DARCOM-developed Systematic Planning for the Integration of Defense Engineering and Research (SPIDER) charts, and the Research Development Acquisition Committee (RDAC) worksheets.

SPC also was tasked to analyze the priority structure, organization, technical content and cogency of the FY79 S&T program. develop issues in these areas as appropriate and provide both written and verbal rationale thereon. The results of this effort were to be available to aid in the RDAC decision process.

SUMMARY

A study plan and work schedule were submitted to DAR 14 days after contract award. The tasks performed and related output during the period of performance are summarized below.

SPC performed a thorough analysis of the SPIDER charts and STOG documents. For each capability category (CAPCAT) past, present, and projected funding profiles were summarized at the sub-sub CAPCAT level to that funding level relationships could be established with STOG priorities. This included a detailed examination of each S&T project to determine its appropriate CAPCAT placement and the relocation of those projects to the proper CAPCAT, where necessary. This analysis was portrayed in simple visuals that were suitable for RDAC presentations and management decisions; they reduced the complexity and detail of the supporting documentation and highlighted gaps as well as promising, yet underfunded, areas in the technology base program. This effort produced the following documentation:

- Overview funding profile of the total technology base program by CAPCAT (6.1 and 6.2)
- Funding profile of each CAPCAT by sub-CAPCAT
- A graphic overview, by CAPCAT, of the technology base development program thrusts
- A detailed written presentation of program thrusts in terms of funding by CAPCAT for both 6.1 and 6.2 development programs
- A written analysis of the S&T program funding profile in regard to STOG priorities
- Funding profiles of each CAPCAT by sub-sub CAPCAT for FY79 and the aggregate years FY80-83 for both 6.1 and 6.2 programs; these included funding changes for programs determined by SPC to be improperly placed in a CAPCAT

- A detailed analysis of funding emphasis, by CAPCAT
- A quantitative and qualitative analysis of Close Combat funding levels related to STOG priorities.

Analysis of the FY79 S&T base program provided the following comments and rationale:

- In general, the S&T funding profiles are not in tune with STOG priorities. This may have been caused by the change in procedures for listing STOG priorities after the FY79 budget was apportioned.
- There are instances where significant 6.2 dollar amounts are expended (e.g., AAH) on programs or systems that are well along in development. This could have a significant impact on an S&T program whose budget is ceiling limited.
- In those CAPCATs that have a sub-sub category designated "Future Systems," heavy funding was apparent. This is consistent with the objectives of the S&T program.
- A major thrust of the Fire Support CAPCAT was free flight rocket development (~ \$6.0M), while only \$1.7M was devoted to "smart" rocket technology. This may be an area for S&T program reorientation. Also, no follow-on work for a Lance-type system could be identified.
- There was an order of magnitude difference in funding in the mobility sub-sub CAPCAT of Combat Aviation to the Close Combat CAPCAT first priority, fire-and-forget missile.
- The complete lack of funding for noncooperative IFF (Air Defense Priority 2) may be an area for program reorientation.
- In both FY79 and the out-years, Close Combat consistently absorbs 30 to 33 percent of the S&T funds; Combat Aviation dominates the funding (46 percent). For FY79 6.1/6.2 funding, a comparison of the totals for the sub-Mission Areas of Close Combat with each other and with other totals reveals the following:

-- Within the Close Combat CAPCAT:

- Combat Aviation funds are more than double either Tank funds or Antitank funds, and are more than the total of these two funds.
- The "All Future Combat Aircraft" subelement of Combat Aviation alone exceeds Tank and Antitank funds.
- Light Weapons constitutes only 3 percent of Close Combat CAPCAT funding.

-- Comparing Close Combat CAPCAT Funding With Others:

- Combat Aviation funds within the Close Combat CAPCAT exceed any other CAPCAT total. Combat Aviation funds constitute 15 percent of FY79 6.1/6.2 funds.
- The "All Future Combat Aircraft" sub-CAPCAT of Combat Aviation alone exceeds all CAPCAT totals except the Other Combat Support element.
- Each of the sub-CAPCATs, Tank and Antitank, are roughly equal in funding to the Command Systems, Air Defense and Combat Service Support CAPCATs funding.
- While Fire Support appears to be significantly underfunded at approximately 31 percent of Close Combat funds, the figures may be misleading. Generally, the means for a tank or aircraft to acquire a target are treated as a part of the tank or aircraft system in the SPIDER charts. On the other hand, funds for acquisition of targets for indirect fire support systems are generally included in the RSTA element of the ISTA CAPCAT (e.g., RPV, SOTAS, countermortar radar, counterbattery radar, laser designators).
- The principal reason for the Other Combat Support funding emphasis is NBC. NBC constitutes 52 percent of the Other Combat Support total and, alone, is roughly equal in funding to each of the Command Systems, Air Defense, and Combat Service Support CAPCATs.

A further analysis was made of the issue surrounding the heavy emphasis on Combat Aviation. This analysis was conducted by a complete re-examination of the SPIDER charts. Funding profiles for Combat Aviation development programs were prepared and submitted to DAR. These profiles reflected funding levels by individual DARCOM laboratory and by system and the operational capabilities of firepower, mobility, sensing, and survivability/vulnerability for both the current year and the out-years FY80-83. The following observations and issues are results of this analysis:

- During FY79, the funds (6.1 and 6.2) for the Air Mobility Laboratory are approximately 46 percent of the total Combat Aviation budget. During the out-years (80-83), this percentage is increased to 60 percent (\$115M/\$191M).

- The ratio of Combat Aviation (Close Combat) funding for FY80-83 to Aviation Support (Combat Service Support) funding for FY80-83 is about 30:1. A significant portion of Combat Aviation-Mobility funds are applicable to utility and cargo aircraft; however, the imbalance is still considerable.
- Reconnaissance, surveillance and target acquisition platforms are assigned a fairly high (2.5) priority in the STOG. The planned funding for FY80-83 is about \$9M of 6.2, in contrast to the much heavier funding for Combat Aviation.
- About \$195M is programmed in 6.1, 6.2 and 6.3a for Combat Aviation-Mobility for FY80-83. To what extent can the considerable corresponding IR&D efforts of the aviation industry be drawn upon to reduce and/or complement this expenditure? The potential for savings and/or improved quality of results seems great.
- Of 84 work units listed under Combat Aviation-Mobility in the DARCOM SPIDER charts, none has TRADOC priority A, seven have TRADOC priority B (six are communications related), 48 have TRADOC priority C, and 29 have TRADOC priority D (A - critical, B - essential, C - required, D - no specific interest). Combat Aviation-Mobility funding shown for 6.1, 6.2 and 6.3a for FY80-83 (\$195M) almost equals the total funding for Close Combat-Tank (\$87M) and Close Combat-Antitank (\$120M). Of 326 work units, Tank and Antitank have a significantly higher average TRADOC priority.

Following the spring RDAC review, SPC investigated the funding emphasis in S&T programs that would have application to future systems. This information, in terms of actual dollars and percentages, was reported to the DAR for five different CAPCATs.

SPC analyzed selected individual DARCOM laboratory programs for structure, content, and emphasis of STOG priorities. These analyses were provided to the DAR as issues, points for discussion and questions to be asked during the Department of Army-DARCOM review of DARCOM laboratories and agencies.

A review was conducted of all available laboratory plans for: (1) support and implementation of each S&T special area of interest, (2) correlation with funding levels and user priorities shown in the SPIDER charts, and (3) correlation with the Army science and technology objectives expressed in the STOG. Selected SPF/SPEF reports were also included in

this review. Special reports were provided to the DAR on the laboratory plans for the following S&T special areas of interest:

- Ignition and Combustion in Gun Tubes and Propellants
- Gun Tube Wear and Erosion
- Millimeter Wave Technology.

The Army smoke development plan was analyzed for funding balance and interrelationship of activities among the several laboratories that participated in the program. A recommendation was made for increased participation by the Office of the Surgeon General of the Army.

In preparation for the summer RDAC review, SPC analyzed all available documentation to identify candidate issues that the DAR could present to the meeting. This analysis developed funding and other issues related to achieving S&T objectives, including technical base priorities and funding correlated with OSD consolidated guidance. This was an iterative process in conjunction with the Office of DAR. As a result, significant documentation that SPC provided to the DAR included:

- Funding trends of the S&T base program over the past several years through FY83
- Synopsis of the S&T base program in relation to OSD consolidated guidance
- Prepared lists of recommended program element priorities, including an allocation of RDT&E resources between DARCOM and the "Little Three"
- Potential issue papers for RDAC presentation.

As part of the pre-RDAC process, an assessment was made of the utility of continuing the preparation of MSS for degree of detail, time required, and psychological effects versus the necessity of the format and detail to make S&T program decisions. SPC recommended that MSS preparation be temporarily suspended pending the introduction of the Modernized Army Research and Development Information System (MARDIS). A preliminary exploration was made of the characteristics of MARDIS and its potential for support to the DAR in the performance of his management responsibilities and direction of the Army technology base program.