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DATA NEEDS FOR THE LONG-RANGE RESEARCH DEVELOPMENT AND
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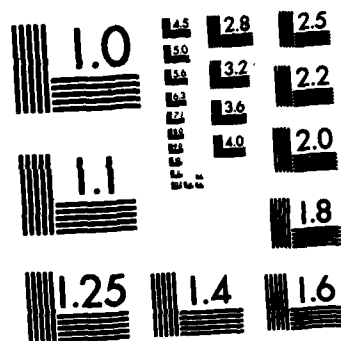
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SYSTEM PLANNING CORPORATION

**DATA NEEDS FOR THE
LONG-RANGE RESEARCH,
DEVELOPMENT AND
ACQUISITION PLAN**

**FINAL SUMMARY REPORT
SPC 855**

November 1982

Henry F. Grimm, Jr.

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**Prepared for
Office of the Deputy Chief of Staff
for Research, Development and Acquisition
Headquarters, Department of the Army
Washington, D.C. 20310**

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ABSTRACT

→ This document summarizes work in support of the Department of the Army's data needs for the long-range research, development, and acquisition plan.



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**ANALYSIS OF THE LONG-RANGE
RESEARCH, DEVELOPMENT AND ACQUISITION PLAN**

PURPOSE

This report summarizes work performed by System Planning Corporation (SPC) for the Director of Army Research (DAR) and the Director of Plans and Programs (P&P), Office of the Deputy Chief of Staff for Research, Development and Acquisition (ODCSRDA), Headquarters, Department of the Army (HQDA).

BACKGROUND

During FY79, ODCSRDA developed a draft long-range research, development and acquisition (RDA) plan that extended the planning process beyond the 5 years of the Program Objective Memorandum (POM) through the additional 10 fiscal planning years of the Extended Planning Annex (EPA) to the POM. The following major activities constitute the early long-range RDA planning process:

- Mission area analyses performed by the U.S. Army Training and Doctrine Command (TRADOC) schools and centers that evaluated Army mission performance and identified performance shortfalls; concurrent identification by HQDA and other agencies of performance shortfalls in areas outside the scope of TRADOC's responsibilities.
- Science and technology (S&T) plans prepared by developing agencies that identified technological opportunities to resolve mission deficiencies or improve mission performance.
- Information from user and developer agencies for incorporation in the long-range RDA planning process.
- Integration of the required information into a long-range RDA planning data base, formatted and programmed for retrieval in response to ODCSRDA's long-range planning requirements.

- Development of a format for the long-range RDA plan that is most responsive to the cycles of the planning, programming, and budgeting system (PPBS) and the needs of executive decisionmakers.

As the planning process was refined, it became apparent that time constraints mandated a plan that was a "snapshot" of the basic information needed at key decision points in the process. It also was clear that contractor support would have to be continuously provided to ODCSRDA staff officers who were refining the process to determine the long-range implications of ODCSRDA's current decisions. Furthermore, initiation of contractual support, while reasonably close to the start of the FY81 PPBS cycle, came in the middle of the long-range RDA planning cycle. As a result, contractual support for the analysis of the data requirements of the long-range RDA plan was provided incrementally (by informal memoranda) in response to the needs of the contracting officer's technical representative (COTR) and other ODCSRDA officers participating in the planning process. The final, summary requirement placed on the contractor was to organize a briefing on the total long-range RDA planning process and to provide accompanying visual aids.

During the contractual period of performance, ODCSRDA responsibility for long-range RDA planning was transferred from the Office, DAR, to the Office, Director of P&P. The COTR, Lieutenant Colonel James M. Acklin, Jr., was correspondingly transferred with this change in responsibility. When Lieutenant Colonel Acklin was reassigned to the Defense Advanced Research Projects Agency (DARPA), the successive COTRs were Lieutenant Colonels Brent Nichols and John Little.

SUMMARY

SPC submitted 17 informal responses to the COTR for analyses related to data needs for the long-range RDA plan. These memoranda addressed:

- The types of data needed for long-range RDA planning based on previously proposed formats
- Changes to and improvements in the previously proposed formats

- The utility of the U.S. Army Research, Development and Acquisition Information System Agency (ARDAISA) graphics display capability
- Mission-oriented graphics that should be included in the plan
- The interaction of the long-range RDA planning process and the PPBS through FY82
- Fire Support resource allocations for FY83-FY97
- Corrective actions needed to an ARDAISA printout of Research, Development, Test and Evaluation (RDTE) and Procurement Standard Study Number (SSN) worksheets
- A breakout of Army mission areas into sub-mission areas, major systems, key functions, ammunition, 6.3A projects, and Other
- Review of a draft plan for early development of the EPA to the POM
- Summary of the threat and recommended major thrusts, deficiencies, and programs for each Army mission area
- 6.3A programs by sub-mission area for demonstration within the context of the integrated battlefield
- A critique of the ARDAISA printout of sub-mission areas for the long-range RDA plan
- Analysis of current 6.3A projects and recommended FY82 6.3A starts
- Means for incorporating personnel planning data in long-range RDA planning worksheets
- Ways to assess the effects on available RDA resources from the introduction of future systems and a recommended means of systematically accounting for them in planning
- Implications of the Deputy Secretary of Defense's guidance on the PPBS for Army long-range RDA planning
- Organization of a briefing and preparation of accompanying visual aids that addressed long-range RDA planning as a whole.

Additional information on the content of each of these tasks is provided below.

Data Needs

Using formats developed by SPC during a previous contractual effort, the study team identified the kinds of data that are needed for the automated visual portrayals that were expected to be used in the summary plan presented to the DCSRDA. For the FY82-96 POM, for example, SPC recommended

that there be separate portrayals of the RDA Total Obligational Authority (TOA) stratified by procurement appropriations and RDTE development categories; by Army mission area; by procurement TOA; and by RDTE TOA; and that each Army mission area be stratified by procurement (showing existing and planned major systems, ammunition, and other procurements aggregated by sub-mission area) and by RDTE (showing existing and planned major systems, other systems aggregated by development category, and the technology base aggregated by development category).

Modification to Formats

Using printouts (worksheets) of actual Five-Year Development Plan (FYDP) Procurement and RDTE funding and projections from the EPA, SPC experimented with and improved upon the previously submitted formats in terms of what data could be effectively portrayed, the manner in which data from the worksheets were to be aggregated (e.g., the identification of all the SSNs that comprise a major system), and the scales of ordinates and abscissas needed to effectively present the information so that its implications could be readily understood.

Utility of ARDAISA Graphics

Using an ARDAISA working paper prepared for ODCSRDA that described its capabilities to graphically display RDA resource allocations over time, SPC analyzed the potential effectiveness of the displays to present data in the evolving long-range RDA planning formats. The results were used by ODCSRDA in interactions with ARDAISA to improve the utility of the automatically printed displays.

Mission-Oriented Graphics

This task required analyses of the contents of Army mission areas, Army capability categories (CAPCATs), U.S. Army Development and Acquisition Readiness Command (DARCOM) mission areas, and Office of the Secretary of Defense (OSD) mission areas, which, although different, could be printed out by ARDAISA. This task was complicated by the wide variations in the

resources allocated to each mission area; when graphically portrayed, the variations produced inappropriate imbalances in the "visibility" of systems and sub-mission areas. SPC recommended breakouts and scales of graphics that would enable the decisionmaker to better comprehend the relative allocation of resources.

Agency/Office Time-Based Interaction Chart

ODCSRDA needed a means for portraying to all of the principal participants in the long-range RDA planning process their roles and the timing and interrelationships of their activities. SPC prepared an agency/office and time-based chart to show the interaction of the long-range RDA planning process and the PPBS through FY82. This chart later was used as a basis for an ODCSRDA directive to the participants that defined their roles, with whom they were to coordinate, what their products must be, and when those products were to be submitted, through FY82, to ensure effective preparation of the FY83-97 POM.

Fire Support Resource Allocations

To model the portrayal of other mission areas, SPC prepared a "strawman" pictorial of the resources allocated to the Fire Support mission area. Quantification by year was based on an ARDAISA printout of all Fire Support RDTE worksheets. It was necessary to hypothesize about some future systems for which there were no plans in order to take advantage of policy guidance in projected growth of RDTE and procurement funding. This required SPC to review the projected threat and anticipated technology improvements.

Review of RDTE and Procurement SSNs

SPC reviewed the several hundred worksheets that contained RDA resource allocations over time for RDTE projects and procurement actions. The printout was annotated to identify anomalies and needed corrections by Army mission area. Some of the conditions noted were:

- Considerable difficulty in tracking procurement of some end items that logically follow identified full-scale engineering developments (FSED) (6.4) projects. It was believed that the resources for some of these had been aggregated with the "roll" of ammunition, and that the resources for others were included as modifications or additions to other end items.
- In some cases, procurement of an end item was shown as being completed in 1 or 2 years with no indication of production buildup to capacity.
- Procurement costs of major modifications to end items were sometimes omitted.
- Some profiles of RDTE projects showed a phasedown followed by a buildup over time without explanation (i.e., without identifying a possible major modification, product improvement, or preplanned product improvement). Some RDTE profiles began with an unrealistic first-year surge of funds.
- There were a number of relatively heavily funded Advanced Development (6.3) projects, particularly in the Close Combat Antitank and Night Observation sub-mission areas, for which there were no corresponding FSED (6.4) follow-on projects. In some cases, there were Advanced Development projects for which follow-on procurement was shown without showing any FSED.

Breakout of Army Mission Areas

By further analysis of the RDTE worksheets, SPC recommended the subdivisions of each Army mission area that should be accounted for and portrayed to decisionmakers in ODCSRDA. This material addressed major systems, key functions, ammunition, 6.3A projects, and Other. The need for this task was based on the fact that a standard breakout was not applicable to all mission areas; for example, some contained no major systems or ammunition. Some were heterogeneous (e.g., Other Combat Support contains combat engineer, mine/countermine, nuclear-biological-chemical, and night observation sub-mission areas) in contrast to the homogeneity of Fire Support. Because of greater resource allocations, others were adaptable to portrayals of the resources allocated to functions within sub-mission areas.

Draft Plan for EPA

SPC reviewed, analyzed, and made recommendations on a draft plan for early development of the EPA to the POM. This task was based on a review

of the results of all of the tasks described above, especially the time-based portrayal of the interaction of the long-range RDA planning process with the PPBS through FY82. SPC provided information and schedules for a directive to all participants in the long-range RDA planning process to prepare an FY83-87 POM with emphasis on the EPA. Circumstances identified by SPC that required correction in the FY83-87 POM included:

- Incomplete responses to identified materiel deficiencies
- Unrealistic funding profiles, including a large "bow wave" in the TOA; a tendency to terminate programs in the last year of the FYDP and initiate others in the first year of the EPA; long development periods and drawn-out procurements; the failure to plan procurement for some systems in development; failure to use demonstrated technologies for developments and improvements; and inadequate technology base response to some stated technology objectives (e.g., as stated in the Science and Technology Objectives Guide (STOG)).

SPC recommended selected "quick fixes" to the FY82-96 long-range RDA plan and revisions to the planning by field commands and the Army staff for the FY83-97 plan.

Mission Area Summaries

At the time that ODCSRDA was ready to prepare an initial draft of the written material intended to support the long-range RDA plan's graphics on resource allocations, SPC prepared a "strawman" text that summarized the threat and major thrusts, deficiencies, and programs recommended for each mission area.

6.3A Programs for the Integrated Battlefield

SPC reviewed current 6.3A programs, including their histories, present development status, and relationship to the needs of the Army's integrated battlefield concept (as furnished by ODCSRDA). The programs were principally in the areas of target acquisition, point target killers, distributed command-control-communication, long-range munitions delivery, enhanced logistics capability, survivability, the soldier-machine interface, and strategic deployability. SPC recommended early demonstration of those programs

that had sufficient maturity and significant applicability to the Army's future needs.

Critique of Sub-Mission Areas

As a follow-on to previous reviews of ARDAISA RDTE worksheets and graphics of RDA resource allocation, SPC prepared a critique of an ARDAISA printout of sub-mission areas for the long-range RDA plan. This task emphasized the suitability of the automated presentations for use in and in support of the most recent iteration of the long-range RDA plan. The utility of the numerical and graphics information on selected sub-mission areas also was assessed. SPC provided recommendations for minor improvements.

6.3A Project Analysis

Based on a continuation of its analysis leading to recommendations for demonstration of 6.3A projects, described above, SPC reviewed the technology base for candidate 6.3A project starts. According to an assessment of the maturity of candidate technology and the needs of the integrated battlefield, SPC recommended projects for transition from the 6.2 to 6.3A development category. These were considered by ODCSRDA for inclusion in the long-range RDA plan.

Personnel Planning Data

ODCSRDA expressed concern that there is insufficient advance personnel planning to accompany long-range RDA planning for the introduction of new systems, particularly with regard to system-peculiar numbers and skill levels. SPC analyzed the long-range RDA planning worksheets and recommended format entries and codings for personnel requirements based on such anticipated conditions as whether the system will require a new organization or will replace systems in an existing organization, the approximate size of the organization to be equipped (e.g., squad, platoon, company, battalion), the estimated number of crewmen, the estimated number of required system-peculiar combat service support and combat support personnel, and the relative skill levels required (on a numerical basis) for the operator and support personnel.

Impact Assessment of RDA Resources

SPC provided recommendations on a means for assessing the impacts on available RDA resources caused by the introduction of future systems and for systematically accounting for them in planning. This analysis was limited to the effects of systems that absorb a major share of the RDA funds. SPC recommended that, for future systems for which a Mission Element Needs Statement (MENS) had not yet been developed or approved, an abbreviated Development Concept Paper/Integrated Program Summary (DCP/IPS) be prepared and that the content of each be reflected in a corresponding long-range RDA planning worksheet. The abbreviated DCP/IPSS would be included in the list of Army major systems with projected availability dates. As the technologies mature and the systems enter development, the DCP/IPS would be updated, modified, or deleted, as appropriate, and the changes would be reflected in the worksheets. Based on the content of the full DCP/IPS, SPC recommended the appropriate types and levels of detail of information to be included in the worksheets. Thus, the hypothetical system would be treated as an actual one for planning purposes and most, if not all, of its impact on RDA resources would have already been considered before its initial development milestone.

PFBS

SPC initiated a review of the Deputy Secretary of Defense's most recent guidance on the PFBS and the acquisition process for its implications for Army long-range RDA planning. It was determined that (1) OSD emphasis on long-range planning to enhance program stability will require even greater Army attention on long-range RDA planning; (2) there is little OSD emphasis on the technology base--however, its importance to the Army's planning is great; (3) as soon as projected major systems are included in the EPA, a proponent should be designated to develop the acquisition strategy and realistically estimate the required resources; (4) because resource thresholds for major systems have been revised upward, there may be a need for the Army to retain lower criteria for some systems that warrant management visibility and individual display in mission area portrayals;

and (5) the new OSD plans for organization of the Office of the Under Secretary of Defense for Research and Engineering warrant immediate attention by Army long-range RDA planners to ensure that the planning processes in development are appropriate and compatible.

Long-Range RDA Briefing

The completion of the first cycle of the Army long-range RDA planning process revealed a need for a better understanding of the purpose of such planning, the process, and the benefits achieved. This was to be done by presenting briefings at several levels--to the OSD, the Army Staff, and the Army major subordinate commands, as well as to industry. SPC organized the briefing and prepared vugraphs that covered (1) the need for long-range RDA planning as expressed by questions from senior government officials, (2) the background of Army actions leading to the current plan and its strategy, (3) the methodology used and the principal goals, (4) the Army staff and major subordinate command interfaces leading to the current plan, (5) the methods of data collection and aggregation, (6) the format of the plan, (7) the planning guidance given by the DCSRDA for future planning, (8) what must be done for the next iteration of the plan, and (9) a briefing summary. So that the briefing could be adapted to diverse audiences, no accompanying text was prepared by SPC.