RESULTS OF A RESEARCH STUDY

TO

IDENTIFY HISTORICAL RDTE OBLIGATIONS AND EXPENDITURES

ON

MAJOR ARMY MATERIEL AND NON-MATERIEL SYSTEMS

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COST ANALYSIS DIVISION

U.S. ARMY FINANCE AND ACCOUNTING CENTER

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OFFICE OF THE COMPTROLLER OF THE ARMY
Results of a research study to determine the ability of the current Research, Development, Test and Evaluation (RDTE) Project Numbers to identify RDTE costs of major Army materiel and non-materiel systems from the Army's finance and accounting data.

Also includes three alternative architectures which were developed to examine ways to improve historical cost data collection.

The results of the study support an initial hypothesis that the project numbers, as currently defined, do not identify the total RDTE costs of major Army systems, but they can identify a significant portion of those costs.
11. Results of a Research Study to Identify Historical RDTE Obligations and Expenditures on Major Army Materiel and Non-Materiel Systems. (UNCLASSIFIED)
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EXECUTIVE SUMMARY

RESULTS OF A RESEARCH STUDY TO IDENTIFY HISTORICAL RDTE OBLIGATIONS AND EXPENDITURES ON MAJOR ARMY MATERIEL AND NON-MATERIEL SYSTEMS

OBJECTIVES. This study was conducted as part of a continuing effort to obtain actual (historical) life cycle costs of major Army systems from the Army's finance and accounting data. The objectives were:

   a. Develop insights and information on the assignment and structure of RDTE Project Numbers and their interface with related resource management systems. Produce appropriate flow diagrams.

   b. Develop correlation tables to relate RDTE Project Numbers to the total Army, with emphasis on Selected Acquisition Report (SAR) systems.

   c. Collect and compare RDTE costs of selected systems with their Baseline Cost Estimates.

ACTIONS. An hypothesis was formulated and tested concerning the ability of RDTE Project Numbers to identify total RDTE costs of major Army systems. Efforts also included research of rules and practice on assignment and structure of RDTE Project numbers, development of correlation tables relating the project numbers to the total Army, and formulation of three alternative approaches to obtaining system RDTE costs.

FINDINGS.

a. RDTE Project Numbers are converted to RDTE AMS Code which can be used to obtain RDTE costs. Both numbering systems are project oriented; the projects of a system must be identified and their costs summed to obtain system RDTE costs. It was determined that a significant portion, but not all of a system's RDTE costs can be identified if the system's projects can be identified.

b. RDTE project costs can be "tracked" for only four years in the finance and accounting system. At the end of the fourth year, any funds not disbursed are placed in an RDTE "M" account. After the balances are merged, funds may be disbursed to satisfy Government liabilities; however, transactions cannot be associated with specific projects/systems. Thus, total RDTE costs of a system are not available even if the system is well-defined.

c. As a consequence of system fragmentation, it was found that a set of "rules" was needed for defining systems. The criteria for selection of such a set of "rules" necessarily were that the list of systems produced be both totally exhaustive and mutually exclusive in capturing the total Army.

RESTRUCTURE. Three alternative architectures were developed to examine ways to improve historical data collection. The first approach does not involve restructure; rather, it uses the current project numbers, augmented by other PPBES data to obtain an approximation of total system RDTE costs. The second
approach addresses a change in Budget Structure; and the third involves changes in the numbering systems also.

CONCLUSIONS. In order to satisfy the need for cost feedback by major Army system, the following are required:

a. A unified "Systems Language". Consensus is required on what constitutes a system - as opposed to a non-system - and what is included with respect to modifications, armament, ammunition, support equipment, etc.

b. A "Common Architecture". Numbering systems vary among appropriations (BLIN's for Procurement, AMS Code for RDTE, etc.). System life cycle costs cut across appropriation lines. A common architecture should be prerequisite to development of "system" identification coding schemes.
CHAPTER 1
INTRODUCTION

1-1. Purpose. The purpose of this report is to provide the results of a study conducted to determine the ability of the current Research, Development, Test and Evaluation (RDTE) Project Numbers to identify RDTE costs of major Army systems.

1-2. Background.

a. The Army has a need to link downstream "execution" (accounting data which come from the finance and accounting system) with upstream "deciding" (cost data which come from the cost estimating and analysis system), i.e., a feedback mechanism. The Army's finance and accounting system evolved along lines required to report financial information by appropriation (funds accounting). However, managers within the Army need information that is system-oriented and that, by necessity, cuts across appropriation lines. Efforts to date to obtain the actual (historical) life cycle costs of major Army systems have not been successful, but attention recently has been directed toward the possibility that a significant portion of a system's research and development (R&D) costs could be captured if its RDTE Project Numbers could be identified.

b. The RDTE program is approved by Congress at the program element level, with funding authority issued at the same level; however, RDTE program approval and reprogramming actions are in terms of the RDTE projects. These projects hold the promise of providing RDTE costs by system, especially the costs of those major Army systems which are subject to Congressional calls for quarterly reports - the Selected Acquisition Reports (SAR's). Therefore, as part of a continuing effort to obtain the life cycle actual costs of major systems, a research project was initiated to study the current RDTE Project Numbers to determine their ability to provide cost data feedback.

1-3. Description of the Study. The study was conducted by analysts in the Cost Analysis Division, USAFAC, under the direction of the Chief, Mr. Noel B. Summers, Jr. The Point of Contact for this report is Mrs. Dina R. Philips. Alternate is Mrs. Mary Carson. POC's telephone number is AUTOVON 699-2674.
a. Objectives.

(1) Develop insights and information on the assignment and structure of RDTE Project Numbers and their interface with related resource management systems. Produce appropriate flow diagrams.

(2) Develop correlation tables to relate RDTE Project Numbers to the total Army, with emphasis on Selected Acquisition Report (SAR) systems.

(3) Collect and compare RDTE costs of selected systems with their Baseline Cost Estimates.

b. Scope. This study addresses only those RDTE Project Numbers which were funded in FY 83, as listed in the May 1983 Five Year Defense Program (FYDP) RDTE Project Listing.

c. Initial Hypothesis. Project Numbers as currently defined do not provide the total RDTE costs of major Army systems; however, they can provide a significant portion of those costs if the Project Numbers can be identified with specific systems.
What is an RDTE Project Number? It is a number established and used by the Army for internal control of RDTE programs. Two published definitions are:

"A grouping of tasks or efforts directed toward a single end result. As such, a project will contain effort unique to a single Program Element and the Budget Activity of which the Program Element is a part."

"A unit of RDTE effort or group of closely related efforts. Established to fulfill a stated or anticipated requirement."

Personnel in the Office of the Deputy Chief of Staff for Research, Development and Acquisition (ODCSRDA) establish these numbers in coordination with Army agencies involved in RDTE activities such as DARCOM, Corps of Engineers, The Surgeon General, etc.

RDTE Project Numbers are used in developing programs for which funds will be requested and to control approved programs. However, they do not appear in the President's Budget and they are not used in the Army's finance and accounting system.

1. The lowest element in the President's Budget is the Program Element. A given Program Element may contain more than one RDTE Project Number.

2. The Army Management Structure (AMS) Code is used in the finance and accounting system. There is a one-to-one relationship between RDTE Project Numbers and AMS Codes. ODCSRDA converts the RDTE Project Number to AMS Code for use in the finance and accounting system.

3. The AMS Code (AMSCO) is an element of the Accounting Classification. There is much confusion over what it is, the number of digits it contains and what they represent. The following information is taken from AR 37-100 (Financial Administration, Account/Code Structure). The RDTE AMS Code (AMSCO) has three parts and contains 20 digits:

<table>
<thead>
<tr>
<th>RDTE AMS Code (AMSCO)</th>
<th>Digits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Account</td>
<td>1-11</td>
</tr>
<tr>
<td>Functional Cost</td>
<td>12-16</td>
</tr>
<tr>
<td>Element of Expense</td>
<td>17-20</td>
</tr>
</tbody>
</table>

The part that closely relates to the RDTE Project Number is the Basic Account. In this study when the term, RDTE AMS Code, is used, we are referring to only the 11 digit Basic Account portion unless stated otherwise.
c. The purpose of this chapter is to provide the schema of the RDTE Project Number, Program Element, and RDTE AMS Code, and to show the close relationship between the code used in the Five Year Defense Program and the code used in the finance and accounting system.

2-2. RDTE Project Number Schema. RDTE Project Numbers contain 14 alphanumeric characters (schema is at Figure 2-1), though sometimes shortened to 12 by omitting the last two digits. The RDTE Project Number for the M1 Tank (Abrams) is 1X46620D2000. The RDTE Project Number for the M Block Improvement Program is 1X423735D33000. The characters that specify Tank Abrams are G20; the characters that specify M1E1 Block Improvement Program are 330. That is, the tenth, eleventh, and twelfth characters constitute the Project Serial Number. Other characters in the RDTE Project Number change, but the Project Serial Number generally remains the same throughout the life of the project. The Project Serial Number has no schema. There is no way to "break down" the number in order to identify the project. Initially there was an effort to assign certain blocks of alphanumeric characters to agencies involved in RDTE activities; however, some serial numbers were not properly assigned and adjustments were made. It should be noted here that some personnel who work with RDTE Project Numbers do not discriminate between the serial number and the project number; that is, if they are asked for the project number of the M1 Tank, they respond with the serial number (G20) instead of the entire project number. The serial number is easier to remember.

a. Positions One and Two. The number in the first position gives the organization:

1 = DARCOM
2 = Army Research Institute
3 = The Surgeon General
4 = Chief of Engineers
5 = Army Security Agency
6 = TRADOC
etc.

The letter in the second position is an internal agency designation. For example, "X" generally is used to signify the Project Manager. However, other letters may be specific to an Agency. When an agency is reorganized, a revised list is sent to ODCSRDA for inclusion in the next issue of the Five Year Defense Program Project Listing.

b. The Third Position. This position gives the Budget Activity.

1 = Technology Base
2 = Advanced Technology Development
3 = Strategic Programs
4 = Tactical Programs
5 = Intelligence and Communications
6 = Defensewide Mission Support

c. Positions Four through Eight. These positions comprise the Program Element (see list of FY 83 funded RDTE Program Elements at Appendix F). The
SCHEMA
RDT&E PROJECT NUMBER

EXAMPLE: 1X464620002000

RDT&E AGENCY

INTERNAL AGENCY DESIGNATOR

BUDGET ACTIVITY

PROGRAM ELEMENT

OSD CLASS

PROJECT SERIAL NUMBER

TASK NUMBER

Figure 2-1
Program Element is defined as follows:

"An integrated activity; combination of personnel, equipment and facilities which together constitute an identified military capability or support activity; a grouping of RDTE Projects which, while differing in their specific objectives, have a common purpose."

Program Elements in the FYDP Project Listing contain decimal points. For example, 63324 is shown as 6.33.24; however, the decimal points are not used when the Program Element is incorporated into the RDTE Project Number. In some listings the Program Element may be followed by a service designator: "A" for Army, "N" for Navy, etc. But since all RDTE Project Numbers relate to Army programs, the service designator is not used. The schema for the Program Element will be given later in this chapter.

d. The Ninth Position. The alpha character in this position may be called the DOD Classification, or it may be called the OSD Classification depending on the publication.

\[
\begin{align*}
A &= \text{Applied Research} \\
B &= \text{Basic Research} \\
D &= \text{Development-Test-Evaluation} \\
M &= \text{Management Support}
\end{align*}
\]

e. The Tenth through Twelfth Positions. As mentioned earlier, these constitute the Project Serial Number. Following are a few examples:

\[
\begin{align*}
697 &= \text{Chaparral} \\
H80 &= \text{Ballistics Technology} \\
341 &= 105 \text{MM Tank Gun Enhancement} \\
G20 &= M1 \text{ Tank (Abrams)}
\end{align*}
\]

f. The Thirteenth and Fourteenth Positions. These positions are zero-filled (or simply not used) at DA level, but they are used in the field for the Project Task Serial Number, defined as:

"A Project Task is part of a RDTE Project; a finite unit of effort which has unity of scope and purpose; may be divided into subtasks or work units."

2-3. Program Element Schemata. The Program Element is revisited to provide a closer look at its numbering system. Actually there are two numbering systems: one for Program 6 Research and Development, (schema at Figure 2-2), and one for programs other than 6 which may receive RDTE funding (schema at Figure 2-3). The first position of the Program Element gives the program number. Program Numbers in the May 83 FYDP Project Listing are:

\[
\begin{align*}
1 &= \text{Strategic Forces} \\
2 &= \text{General Purpose Forces}
\end{align*}
\]
SCHEMA
ROTE PROGRAM ELEMENT
(Program 6 Only)

EXAMPLE: 64620

Figure 2-2
SCHEMA
ROTE PROGRAM ELEMENT
(Other Than Program 6)

EXAMPLE: 23735

2

3735

PROGRAM ELEMENT SERIAL NUMBER

PROGRAM NUMBER

Figure 2-3
a. Schema for Program Elements in Program 6:

(1) Position One. This is the Program Number (6).

(2) Position Two. This is the R&D Category:

1 = Research
2 = Exploratory Development
3 = Advanced Development
4 = Engineering Development
5 = Management and Support

As an item of interest, it should be noted here that R&D Category 3 can be subdivided. Subcategory 3A is Advanced Development - Non-System, and 3B is Advanced Development - System. However, these subcategories were not used in any listings available to this study.

(3) Position Three. This is the Budget Activity that was used prior to FY 78. It is used now only as an historical reference.

(4) Positions Four and Five. These numbers constitute the Program Element Serial Number that identifies a specific Program Element when used with the first three digits. They cannot stand alone.

b. Schema for Program Elements in Other than Program 6. These Program Elements are in an R&D Category called Operational Systems Development.

(1) Position One. This is the Program Number. In the May 83 FYDP Project Listing, these programs are 1, 2 and 3.

(2) Positions Two through Five. These digits identify a specific Program Element when combined with the first digit. The RDTE literature does not provide further information with respect to a break-out of these digits. One might expect that the second digit would give the number for the category Operational Systems Development, which is "7". This is not the case. The Program Elements in Programs 1, 2, and 3 do not give the category. Actually none of these Program Elements has the digit 7 in the second position. The literature states that category 7 includes research and development efforts toward developing, engineering, and testing of systems, support programs, vehicles and weapons that have been approved for production and service employment; and that all items are major line item projects which appear as RDTE costs in other programs (i.e., other than Program 6). However, in the FYDP Project Listing these Program Elements and their RDTE Project Numbers are listed under the 6.7 Program Category; that is, Program 6, Category 7; even though the first digit of the Program Element is not 6. Research efforts failed to produce an explanation; it appears that this is a case of "it's always been done that way".

2-4. The RDTE AMS Code. RDTE Project Numbers are converted to RDTE AMS Code by ODCSRDA personnel. ODCSRDA sends these RDTE AMS Codes to USAFAC for
publication in AR 37-100-XX. They are used by the field to report execution data to USAFAC. The field does not report execution data by RDTE Project Number. However, some USAFAC personnel who work with these RDTE AMS Codes call them project numbers. Also, USAFAC produces a printout (RIN HCC 320) with a column heading "PROG/PROJ". Actually, there is a close relationship between the RDTE Project Number and the RDTE AMS Code. Consider the following:

**Patriot (SAM-D)**

<table>
<thead>
<tr>
<th>RDTE Project Number:</th>
<th>1 X 4 6 4 2 0 7 D 2 1 2 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDTE AMS Code:</td>
<td>644 3 0 7 . 2 1 2 0 0</td>
</tr>
</tbody>
</table>

Note that the RDTE AMS Code contains an extra digit between the first and second positions of the Program Element 64307. This number always matches the third digit of the RDTE Project Number which is the Budget Activity. Both contain the Program Element 64307, Patriot (SAM-D), and both contain the Project Serial Number 212, Patriot (SAM-D). The last two positions in each case are zero-filled at DA level but are designed to give the RDTE Task Number at other organizational levels. The first two positions in the RDTE Project Number are agency designators (for Patriot, these are 1X, signifying DARCOM, Project Manager). However, when DARCOM reports execution data to USAFAC, DARCOM uses its Operating Agency Number, and reports by RDTE AMS Code. The fiscal year when the project was funded also is reported since the AMS Code above does not contain a fiscal year designator. It should also be noted that the AMS literature calls the Program Element the "Program Element/Budget Subactivity" although it does not contain the DOD Budget Subactivity Numbers.

2-5. RDTE Project. A project, represented by RDTE AMS Code, can be executed in the Army's finance and accounting system. The RDTE Appropriation #2040 is a multiple year appropriation (available for obligation for two years). For example, FY 83 funds made available for this appropriation will expire for obligation purposes on 30 September 1984, and lapse for disbursement purposes on 30 September 1986. At the end of the fourth year, any funds not disbursed are placed in an "M" account where they are merged with balances of other closed accounts. After balances are merged, funds may be disbursed from the "M" account to satisfy Government liabilities; however, the disbursements cannot be "tracked" to obtain total costs of the project.

2-6. Observations.

a. During the effort to collect information on the schemata of the RDTE Project Number, Program Element, and RDTE AMS Code, and to crosswalk the project number to the AMS Code the following observations were made.

(1) In some cases, the information in the project number literature did not agree with the information in the finance and accounting literature or DOD budget guidance with respect to Budget Activities, Categories and Programs. For example, four lists of Budget Activities were found:
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>C = All Support from Other Appropriations</td>
</tr>
<tr>
<td>1</td>
<td>1 = Research (Mil. Science)</td>
</tr>
<tr>
<td>2</td>
<td>2 = Aircraft and Related Equipment</td>
</tr>
<tr>
<td>3</td>
<td>3 = Missiles and Related Equipment</td>
</tr>
<tr>
<td>4</td>
<td>4 = Military Astronautics and Related Equipment</td>
</tr>
<tr>
<td>5</td>
<td>5 = Ships, Small Craft and Related Equipment</td>
</tr>
<tr>
<td>6</td>
<td>6 = Ordnance, Combat Vehicles and Related Equipment</td>
</tr>
<tr>
<td>7</td>
<td>7 = Other Equipment</td>
</tr>
<tr>
<td>8</td>
<td>8 = Programwide Management &amp; Support</td>
</tr>
</tbody>
</table>

(AR 70-9)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 = Technology Base</td>
</tr>
<tr>
<td>2</td>
<td>2 = Advanced Technology Development</td>
</tr>
<tr>
<td>3</td>
<td>3 = Strategic Programs</td>
</tr>
<tr>
<td>4</td>
<td>4 = Tactical Programs</td>
</tr>
<tr>
<td>5</td>
<td>5 = Intelligence and Communication</td>
</tr>
<tr>
<td>6</td>
<td>6 = Defensewide Mission Support</td>
</tr>
<tr>
<td>7</td>
<td>7 = Other Equipment</td>
</tr>
<tr>
<td>8</td>
<td>8 = Programwide Management Expenses and RDTE Investment</td>
</tr>
</tbody>
</table>

(AR 37-112)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 = Technology Base</td>
</tr>
<tr>
<td>2</td>
<td>2 = Advanced Technology Development</td>
</tr>
<tr>
<td>3</td>
<td>3 = Strategic Programs</td>
</tr>
<tr>
<td>4</td>
<td>4 = Tactical Programs</td>
</tr>
<tr>
<td>5</td>
<td>5 = Intelligence and Communications</td>
</tr>
<tr>
<td>6</td>
<td>6 = Defensewide Mission Support</td>
</tr>
<tr>
<td>9</td>
<td>9 = Reimbursable Orders</td>
</tr>
</tbody>
</table>

(DOD 7110-1-M)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 = Technology Base</td>
</tr>
<tr>
<td>2</td>
<td>2 = Advanced Technology Development</td>
</tr>
<tr>
<td>3</td>
<td>3 = Strategic Programs</td>
</tr>
<tr>
<td>4</td>
<td>4 = Tactical Programs</td>
</tr>
<tr>
<td>5</td>
<td>5 = Intelligence and Communications</td>
</tr>
<tr>
<td>6</td>
<td>6 = Defensewide Mission Support</td>
</tr>
<tr>
<td>20</td>
<td>20 = Undistributed</td>
</tr>
<tr>
<td>35</td>
<td>35 = Reimbursable Programs</td>
</tr>
</tbody>
</table>

Personnel at ODCSRDA said to use the Budget Activities listed in AR 37-112 pending revision of the AR 70 series of which ODCSRDA is the proponent agency.

(2) Similar disconnects were encountered with Categories and Programs.
Categories
(AR 37-112)

1 = Research
2 = Exploratory Development
3 = Advanced Development
4 = Engineering Development
5 = Management and Support

(AR 37-100-83)

1 = Research
2 = Exploratory Development
3 = Advanced Development
4 = Engineering Development
5 = Management Support
(for Budget Activity 9, Reimbursables Orders, the Category position contains numbers 1-6 of the other Budget Activities; that is, they give Reimbursables by Budget Activity)
(also for Budget Category 9, there are two special designators: B2 = Reimbursables Received for BASOPS SPT provided to others - for use by NARADCOM only; and B3 = Reimbursables Received for BASOPS SPT provided to others - for use by Aberdeen Proving Ground only)

(AR 70-1)

1 = Research
2 = Exploratory Development
3 = Advanced Development
3A = Non-System
3B = System
4 = Engineering Development
5 = Management Support
7 = Operational Systems Development

Programs (which may receive RDTE funds)

(AR 37-112)

1 = Strategic Forces
2 = General Purpose Forces
3 = Intelligence and Communications
6 = Research and Development
9 = Administration and Associated Activities

2-10
AR 70-91

1 = Strategic Forces
2 = General Purpose Forces
3 = Intelligence and Communications
6 = Research and Development
7 = Central Supply and Maintenance
8 = Training, Medical and General Personnel Activities
9 = Administration and Associated Activities
0 = Support of Other Nations

(AR 37-100-83)

Same as AR 37-112; however, modified for use as follows:

1 = Strategic Forces
2 = Operational Systems Development - General Purpose Forces
3 = Operational Systems Development - Intelligence and Communications
6 = Research and Development
9 = Administration and Associated Activities

(3) Some of the disconnects are necessary, i.e. the finance and accounting system and Department of Defense (DOD) need an additional Budget Activity for Reimbursables and DOD needs one for Undistributed Programs; but the Budget Activity Numbers for Reimbursables differ. DOD's is #35, Reimbursable Programs; and the F&A system's is #9, Reimbursable Orders. The differences, even though justifiable, can be confusing.

(4) Some information provided by the current literature appears to be outdated. For example, AR 37-112 specifies that the fourth digit of the RDTE AMS Code for Program 6 is a repeat of the second digit. However, the fourth digit now is the historical Budget Activity.

b. These observations are presented here to preclude the possibility that readers might be confused or misled by one or another of the referenced publications if they have occasion to pursue independent research. In this report the "disconnects" were resolved by questioning the POC's, by selecting the AR with the latest date, or simply by accepting practice over publication.
CHAPTER 3
INTERRELATIONSHIP OF RDTE PROJECT NUMBERS TO THE PPBES

3-1. Introduction. The Army's Planning, Programming, Budgeting, and Execution System (PPBES) is a comprehensive, dynamic, and complex process. Its principal products are The Army Plan, the Five Year Defense Program, and the Budget. During the execution phase of the annual cycle, programs are executed and Army resources are managed. The intent of this chapter is to show the interrelationship of RDTE Project Numbers to the PPBES.

3-2. Revisions to the PPBES Handbook.

a. Prior to 1982, the name of the Army's primary resource management system was the Planning, Programming, and Budgeting System (PPBS). The execution phase was a part of the budgeting function. In 1982, when the third edition of the handbook was published, execution became a separate function and the name was changed to the Planning, Programming, Budgeting, and Execution System (PPBES):

"Army and other defense managers more and more perceive that emphasis on planning, programming, and budgeting overlooks an essential system ingredient. The three-phase focus, they believe, subordinates concern for how well program and budget execution applies resources to achieve intended purposes. As a first step to reemphasize the need to review program and budget execution, the Army has renamed its primary resource management system."

b. Another major change in the system is the replacement of mission areas by the following which were structured around basic Army functions:

FUNCTIONS
Structure
Man
Equip
Train
Mobilize

---

1 PPBES Handbook, 3d Ed., 1982, pps. xxv-xxvi
2 Ibid. p. xvi
The above functions were used for prioritization in the May 1983 Program Objective Memorandum (POM).

### Planning

The principal product of the planning function is The Army Plan. It conveys guidance and establishes operational priorities for program construction, supporting preparation of command Program Analysis and Resource Review (PARR) documents and the Program Objective Memorandum (POM).

**Army Planning Cycle**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Period</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements planning</td>
<td>Mid-February to Mid-August</td>
<td>Army planning force requirements</td>
</tr>
<tr>
<td>Objectives planning</td>
<td>July to late August</td>
<td>Constrained objective force</td>
</tr>
<tr>
<td>Planning decision</td>
<td>Mid-September</td>
<td>The Army Plan</td>
</tr>
</tbody>
</table>

There is no direct relationship with the RDTE Project Numbers; however, the decisions made will determine programs which directly affect their structure and usage.

### Programming

The programming function translates planning decisions into a balanced allocation of forces, manpower, materiel, and funds. Each PPBES cycle advances the program one fiscal year. The baseline for each new cycle is the Army portion of the Five Year Defense Program (FYDP), which is the official summary of programs approved by the Secretary of Defense and reflected in the President's budget. The Program Element is the basic building block of the FYDP.

**a. The Program Element.** The FYDP RDTE Project Number Listing published by ODCSRDA lists all RDTE Project Numbers by Program Element. There may be one or more RDTE projects in a Program Element. For example, in FY 83, the Program Element #63712 (Mapping and Geodesy) contains RDTE Project Numbers 1S563712D580 (Field Army Mapping) and 1A563712DT44 (Digital Topographic Support) but 136 of the 211 Program Elements funded in FY 83 contain only one project. The RDTE Project Numbers - specifically their Project Serial Numbers - identify the projects used to execute the Program Element. However, ODCSRDA cautions that the FYDP is a programming document rather than an execution document, and that Program Elements in the FYDP may not be the same used during execution of a project, especially in the outyears.

**b. Program Development Increment Packages (PDIP's).** Each program is described by a PDIP. Most of the continuing programs are safe from serious challenge; they form a program "core". Above the core, there is competition for the limited resources. PDIP's are ranked, integrated into functional programs, prioritized on the basis of functional analysis, and adjusted by the Program and Budget Committee (PBC) through program review. ODCSRDA publishes
3-5. Budgeting. There are two stages in the budgeting phase: Budget Formulation which comprises development of Army budget estimates for review and approval as part of the President's budget, and Budget Justification which relates to the process of congressional review and approval. These activities express the program need for dollars and manpower as requests for congressional appropriations. Exhibit R-1 (Supporting data for the President's Budget) is at the Program Element level; RDTE Project Numbers are not in this document. Exhibit R-1 contains the proposed RDTE portion of the Army budget which is forwarded to the Office of the Secretary of Defense for inclusion in the OSD Budget. Program Budget Decisions (PBD's) help translate approved programs into budget estimates. This is an iterative process.

a. Program Budget Decision (PBD). The PBD's distribute resources among Budget Activities (See Figure 3-1). Project Numbers do not contain PBD numbers. In the RDTE Appropriation #2040, the PBD's and the Budget Subactivities (BSA) have the same nomenclature and use the same numbering system. An ODAB representative advised that for all practical purposes they are identical. See Table 3-1 for a list of RDTE Budget Subactivities taken from DOD publication dated June 1982, and the Subactivities that were the subjects of PBD's in FY 83. The differences simply may be a function of time.

b. DOD Budget Subactivities (BSA). These three digit numbers do not appear in RDTE Project Numbers. However, it should be noted that their nomenclature and that of Army Mission Areas (AMA) bear a striking resemblance. Actually, many have the same names as Army Mission Areas as well as Program Budget Decisions (PBD). For example:

<table>
<thead>
<tr>
<th>NOMENCLATURE</th>
<th>PBD</th>
<th>BSA</th>
<th>AMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Warfare</td>
<td>230</td>
<td>230</td>
<td>210</td>
</tr>
<tr>
<td>Air Warfare</td>
<td>235</td>
<td>235</td>
<td>220</td>
</tr>
<tr>
<td>Theater Nuclear Warfare</td>
<td>246</td>
<td>246</td>
<td>240</td>
</tr>
<tr>
<td>Chemical Warfare</td>
<td>248</td>
<td>248</td>
<td>270</td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although "Missions Areas" have been replaced in the "deciding process" by "Functions", it appears that Mission Areas will remain very much a part of the PPBES unless the Budget Subactivities/Program Budget Decisions are renamed.

3-6. Execution. The Secretary of the Army is accountable for program execution and day-to-day management of Army resources. In response to initiatives introduced by the Reagan administration for better defense management, concern has centered on how well program and budget execution applies resources to achieve intended purposes. The Chief of Staff of the Army directed that an execution function be incorporated into the PPBS in order to encourage and accelerate needed procedures which has resulted in the
Program Development Increment Packages.

Program Budget Decisions help translate approved program into Budget Estimates.

Figure 3-1
<table>
<thead>
<tr>
<th>BSA</th>
<th>NOMENCLATURE</th>
<th>PY 87 PBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Reimb Program</td>
<td></td>
</tr>
<tr>
<td>197</td>
<td>Prod Invest Fnd</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>Defense Research</td>
<td>200</td>
</tr>
<tr>
<td>204</td>
<td>Explor Develop</td>
<td>204</td>
</tr>
<tr>
<td>216</td>
<td>Avd Tech Demo</td>
<td>216</td>
</tr>
<tr>
<td>220</td>
<td>Strat Off-A&amp;D</td>
<td>220</td>
</tr>
<tr>
<td>224</td>
<td>Strat Def-A&amp;D</td>
<td>224</td>
</tr>
<tr>
<td>228</td>
<td>Strat C31 &amp; Sup</td>
<td>228</td>
</tr>
<tr>
<td>230</td>
<td>Land Warfare</td>
<td>230</td>
</tr>
<tr>
<td>235</td>
<td>Air Warfare</td>
<td>235</td>
</tr>
<tr>
<td>246</td>
<td>Theater Nuc War</td>
<td>246</td>
</tr>
<tr>
<td>248</td>
<td>Chem Warfare</td>
<td>248</td>
</tr>
<tr>
<td>250</td>
<td>Defwide C31 Sup</td>
<td>250</td>
</tr>
<tr>
<td>252</td>
<td>Theater &amp; Tac C31</td>
<td>252</td>
</tr>
<tr>
<td>254</td>
<td>Mobility</td>
<td>254</td>
</tr>
<tr>
<td>256</td>
<td>Warfare C&amp;C</td>
<td>256</td>
</tr>
<tr>
<td>260</td>
<td>Defwide Mission</td>
<td>260</td>
</tr>
<tr>
<td>262</td>
<td>EW&amp;C3 Cntermeas</td>
<td></td>
</tr>
<tr>
<td>270</td>
<td>Mgmt &amp; Support</td>
<td>270</td>
</tr>
<tr>
<td>275</td>
<td>Test &amp; Evaluation</td>
<td>275</td>
</tr>
<tr>
<td>296</td>
<td>Cong Act - R&amp;D, A</td>
<td>296</td>
</tr>
<tr>
<td>330</td>
<td>Consolidated Crypt Prog</td>
<td>330</td>
</tr>
<tr>
<td>331</td>
<td>GDIP</td>
<td>331</td>
</tr>
<tr>
<td>335</td>
<td>Foreign Counterintelligence</td>
<td>335</td>
</tr>
<tr>
<td>336</td>
<td>Other Def Intel Prog Adj</td>
<td>336</td>
</tr>
<tr>
<td>340</td>
<td>Emerg &amp; Extra - Ord Exp Limit</td>
<td>340</td>
</tr>
<tr>
<td>350</td>
<td>Comm Sec Prog</td>
<td>350</td>
</tr>
<tr>
<td>401</td>
<td>Indust Fund, A</td>
<td></td>
</tr>
<tr>
<td>697</td>
<td>JRWA</td>
<td></td>
</tr>
</tbody>
</table>

Table 3-1
a. Flow of Funds. After the President signs an appropriation act, the Treasury issues Appropriation Warrants to the Army. Concurrently, the Office of Management and Budget (OMB) apportions the funds and the Office of the Secretary of Defense (OSD) releases the programs. The Funds Control Officer at USAFAC assures that all elements balance; i.e., there is obligation authority with respect to given programs, and the cash is available for disbursement. Then, upon request of Appropriation Directors, the funds are allocated by USAFAC, and suballocated or allotted by Special Operating Agencies/General Operating Agencies (SOA/GOA) to installations in order to execute approved programs. Figure 3-2 shows this flow of funds.

b. The Army's finance and accounting system uses the RDTE AMS Code to account for RDTE funds. The RDTE Project Numbers are converted to RDTE AMS Code by ODCSRDA and sent to USAFAC for publication in AR 37-100-XX. The Army agencies involved in RDTE activities report to USAFAC in terms of the RDTE AMS Code, not by RDTE Project Numbers. (See Listing 1 for file dump of data received from the field.)

(1) Listing 1. The number "21" at the beginning of each line stands for "Army". The next field gives the last number of the fiscal year funds, followed by the RDTE Appropriation Symbol, 2040. The third field, 0000, currently is not used. Positions 3 and 4 of the fourth field give the Operating Agency Number (6D for the first line) of the reporting activity. The last eleven positions of that field contain the RDTE AMS Code (the decimal within the AMS Code is not printed). The fifth field repeats the Program Element and OSD Classification. The sixth field gives the data code:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC</td>
<td>Funds Available - Direct</td>
</tr>
<tr>
<td>BJ</td>
<td>Obligations - Direct</td>
</tr>
<tr>
<td>BD</td>
<td>Deobligations of Prior Year Obligations</td>
</tr>
<tr>
<td>BK</td>
<td>Disbursements (Non-Interfund) Direct</td>
</tr>
<tr>
<td>BF</td>
<td>Commitments Outstanding</td>
</tr>
<tr>
<td>2B</td>
<td>DA Unobligated Balance</td>
</tr>
<tr>
<td>2E</td>
<td>DA Unliquidated Balance</td>
</tr>
<tr>
<td></td>
<td>etc.</td>
</tr>
</tbody>
</table>

The dollars and cents are in the next to last field. Example: 0000440900000 equals $4,409,000.00. The last field gives mode of transmission and processing data. This raw data is organized by USAFAC to produce another listing (see Listing 2).

(2) Listing 2. This listing gives the total amount per RDTE AMS Code obligated, disbursed, etc., reported by RDTE activities in the field.

3PPBES Handbook, 3d Ed., 1982, pps. 8-2, 3
<table>
<thead>
<tr>
<th>BASIC APPROPRIATION</th>
<th>DATA CODE</th>
<th>YEAR</th>
<th>AMOUNT FIELD</th>
<th>PROJ/PROJ</th>
<th>R1/4 RCG-373</th>
</tr>
</thead>
<tbody>
<tr>
<td>12C040</td>
<td>BJ</td>
<td>1</td>
<td>1,235,024.00</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>BJ</td>
<td>2</td>
<td>146,400.00</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td>12C040</td>
<td>BJ</td>
<td>3</td>
<td>25,460.23</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>3,417,384.23</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12C040</td>
<td>BK</td>
<td>1</td>
<td>65,037.14</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>BK</td>
<td>2</td>
<td>69,934.97</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td>12C040</td>
<td>BK</td>
<td>3</td>
<td>2,393,385.26</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>3,203,955.46</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32C040</td>
<td>BP</td>
<td>1</td>
<td>6,402,310.40</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>6,402,310.40</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>ZH</td>
<td>2</td>
<td>3,091,400.00</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>3,091,400.00</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>ZC</td>
<td>2</td>
<td>20,465,826.75</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td>12C040</td>
<td>ZC</td>
<td>3</td>
<td>6,215,831.89</td>
<td>24373069700</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>26,682,308.64</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32C040</td>
<td>BK</td>
<td>1</td>
<td>36,317,300.00</td>
<td>24373149000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>36,317,300.00</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32C040</td>
<td>BC</td>
<td>1</td>
<td>36,317,000.00</td>
<td>24373169500</td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>BC</td>
<td>2</td>
<td>14,102.61</td>
<td>24373169700</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>36,455,102.61</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>BD</td>
<td>2</td>
<td>25,405.77</td>
<td>24373169000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>25,405.77</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>BJ</td>
<td>1</td>
<td>16,926,355.10</td>
<td>24373169000</td>
<td></td>
</tr>
<tr>
<td>22C040</td>
<td>BJ</td>
<td>2</td>
<td>12,991.38</td>
<td>24373169000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td></td>
<td></td>
<td><strong>16,939,346.48</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **TOTAL AMOUNT** |           |      | **16,938,909.57** |          |               |

| 22C040 | BK | 1 | 2,346,336.18 | 24373169200 |
| 22C040 | BK | 2 | 12,116,649.43 | 24373169400 |
| 12C03  | BK | 3 | 17,581.00   | 24373169700 |
| 02C040 | BK | 4 | 10,010.29   | 24373169800 |

| **TOTAL AMOUNT** |           |      | **14,549,619.09** |          |               |
b. USAFAC Accounting Reports. As programs are executed, the data reported to USAFAC by the field is subjected to numerous analyses, reconciliations and reviews before the data are consolidated and accounting reports are prepared and distributed. (See Table 3-2 for a list of major RDTE Accounting Reports.)
USAFAC

MAJOR RDTE ACCOUNTING REPORTS

Flash Report on Obligation Status
Report on Budget Execution
Appropriation Status by Fiscal Year Programs and Subaccount
Report on Obligations
Report on Reimbursable Transactions
Status of Approved Operating Budget

Table 3-2
CHAPTER 4

RDTE PROJECT NUMBERS VIS-À-VIS SYSTEM CORRELATION

4-1. Approach. Following research on current rules, regulations, and practice in assigning, structuring and defining RDTE Project Numbers, an attempt was made to correlate FY 83 RDTE Project Numbers with the "Total Army" on a system basis in order to test the initial hypothesis that a significant portion of a major Army system's RDTE costs can be obtained if the system's projects can be identified.

a. RDTE Project Number List. The list at Appendix B contains 411 project numbers. They were taken from the May 83 FYDP RDTE Project Listing. ODCSRDA advised that the entries containing dollars in the FY 83 column are valid (i.e., funded). A comparison was made between these project numbers and the RDTE AMS Codes listed in AR 37-100-83. The number of AR 37-100-83 entries was greater. Some of the projects represented by an RDTE AMS Code did not become funded - this regulation is published before the fact - and there were AMS Codes for Reimbursables and Carrier Accounts which are used in the finance and accounting system but have no counterpart in the RDTE Project Number system. Reimbursables are those accounts, by Budget Activity, which represent efforts in behalf of others, and Carrier Accounts are maintained as repositories of costs that cannot be identified with a project but that later may be transferred to accounts of specific projects. Field Two of the listing at Appendix B contains the RDTE AMS Codes specific to each RDTE Project Number; however, this listing of RDTE AMS Codes is not all-inclusive since it does not contain the Reimbursables and Carrier Accounts.

b. System List. A list of Army systems was taken from Tables 4-3 and 4-4 of a draft paper prepared in the Office of the Director of Cost Analysis titled, "A Mission Area Structure for the Management of Army Resources", DCA-P-XX, September 1981. This list was used because it is the only one known to exist that is "totally exhaustive and mutually exclusive" in capturing the total Army. The System List is at Appendix C and gives the systems by class. The following shows the number of systems in each materiel and non-materiel class:

<table>
<thead>
<tr>
<th>CLASS</th>
<th>NUMBER OF SYSTEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATERIEL</td>
<td></td>
</tr>
<tr>
<td>Aircraft</td>
<td>8</td>
</tr>
<tr>
<td>Missiles</td>
<td>18</td>
</tr>
<tr>
<td>Electronics</td>
<td>29</td>
</tr>
<tr>
<td>Tracked Combat Vehicles</td>
<td>7</td>
</tr>
<tr>
<td>Cannon, Artillery, Mortars and Guns</td>
<td>8</td>
</tr>
<tr>
<td>Engineering and Related Systems</td>
<td>5</td>
</tr>
<tr>
<td>Ground Vehicles</td>
<td>11</td>
</tr>
<tr>
<td>Ammunition</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
</tr>
<tr>
<td>Subtotal</td>
<td>96</td>
</tr>
</tbody>
</table>
An attempt was made to crosswalk the RDTE Project Numbers to the systems with emphasis on the Selected Acquisition Report (SAR) systems.

4-2. Observations. Several observations were made during the correlation efforts.

a. Conflict of Rules. There is a "conflict of rules" for defining systems within the Army which indicates a need for a unified "Systems Language".

(1) Comparison of Program Development Increment Packages (PDIP's), Baseline Cost Estimates (BCE's), Selected Acquisition Report (SAR) systems, and systems as defined by the Appropriation Directors at ODCSRDA showed variations as to what constitutes a system - as opposed to a non-system - and what that system includes with respect to modifications, support equipment, ammunition, armament, etc.

(2) Some Appropriation Directors include modifications in their systems; some do not include modifications unless required in specific cases such as SAR's. Another variation is the inclusion in a system of only a portion of a project. For example, the Baseline Cost Estimate for Blackhawk contains portions of the following projects:

1X464711D665 A/C Surveillance Equipment
1A464268D106 A/C Component Improvement Program

The remaining funds in these "split" projects may or may not be included in other materiel system BCE's. Rules also differ on whether ammunition should be included. For purposes of this study, ammunition is a system which includes all RDTE costs relating to ammunition; however, others may consider ammunition to be a component of a system. For example, RDTE costs for 120MM Tank Gun Ammo Development are included in the M1 Abrams Tank system as defined
The definitions in the draft paper which supplied the System List at Appendix C were used in this study; however, some systems were undefined and some were not clearly defined. In those cases and for purposes of this study, "working" definitions were formulated. For example, Defense Research would relate to projects providing joint benefits with Department of Defense, NATO, and other government agencies and industry; all other projects in categories 1 and 2 (Research and Exploratory Development) which could not be associated with other defined systems would be cross-walked to the System Materiel/Combat Development Activities. It should be noted, therefore, that this study may have contributed another set of rules to those now existing and that the correlation tables may not "track" with PDIP's, BCE's, etc.

b. Difficulty in Relating Schema to Systems. If the RDTE Project Number's nomenclature contained the name of a system (M1 Tank, Chaparral, Cobra TOW, UH-60A Blackhawk, etc.) or, if the Program Element's nomenclature contained the name of a system, then no difficulty was encountered in cross-walking the project number to the system. When these conditions did not prevail, then it was hoped that the schema would be helpful (see Chapter 2 for schema). Unfortunately, the combinations of Program, Budget Activity, Category, and OSD Classification did not provide much help in identifying systems:

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>BUDGET ACTIVITY</th>
<th>CATEGORY</th>
<th>OSD CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>None</td>
<td>D</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>None</td>
<td>D</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>None</td>
<td>D</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>None</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>1</td>
<td>A,B</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>2</td>
<td>A,D</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>3</td>
<td>A,D</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>3</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3,4,5</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>3,4</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>4</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>5</td>
<td>M,D</td>
</tr>
</tbody>
</table>

(1) For example, consider the following combinations:

611A  Program 6 = Research & Development
      Budget Activity 1 = Technology Base
      Category 1 = Research
      OSDC A = Applied Research

665M  Program 6 = Research & Development
      Budget Activity 6 = Defensewide Mission Support
      Category 5 = Management & Support
      OSDC M = Management Support

35D   Program 3 = Intelligence & Communications
      Budget Activity 5 = Intelligence & Communications
      OSDC D = Development-Test-Evaluation
633 Program 6 = Research & Development
Budget Activity I = Strategic Programs
Category 3 = Advanced Development
OSDC D = Development-Test-Evaluation

They provide information, often redundant, concerning the phase and nature of activity but few "clues" to system correlation.

(a) All modifications/improvements were in Program 2 (General Purpose Forces), but not all of the projects in Program 2 appeared to be modifications/improvements. All were in Budget Activity 4 (Tactical Programs) and all were in the OSD Classification D (Development-Test-Evaluation).

(b) All of the RDTE Project Numbers associated with materiel systems contained the OSD Classification D (Development-Test-Evaluation); however, the numbers associated with non-materiel systems could contain OSD Classification D, A, B, or M. Therefore, while this information provided a check on correlation with materiel systems, it was of little value for non-materiel systems.

(2) There is a striking similarity/redundancy in nomenclature of Program Elements and RDTE Project Numbers. In FY 83, there were 211 Program Elements and 411 RDTE Project Numbers (averaging 1.9 projects per element). However, 136 (approximately 33.0%) of the Program Elements contained only one RDTE Project Number each and, in almost all cases, they had the same nomenclature. Examples follow:

<table>
<thead>
<tr>
<th>PROGRAM ELEMENT</th>
<th>RDTE PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAPARRAL</td>
<td>CHAPARRAL</td>
</tr>
<tr>
<td>MATERIALS</td>
<td>MATERIALS</td>
</tr>
<tr>
<td>MISSILE TECHNOLOGY</td>
<td>MISSILE TECHNOLOGY</td>
</tr>
<tr>
<td>GRASS BLADE</td>
<td>GRASS BLADE</td>
</tr>
<tr>
<td>PERSHING II</td>
<td>PERSHING II</td>
</tr>
</tbody>
</table>

Examples of a few cases where there was only one project to an element and their nomenclature was not the same:

<table>
<thead>
<tr>
<th>PROGRAM ELEMENT</th>
<th>RDTE PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK SYSTEMS</td>
<td>M1 TANK (ABRAMS)</td>
</tr>
<tr>
<td>JOINT TACTICAL FUSION PROG</td>
<td>ALL SOURCE ANALYSIS SYS</td>
</tr>
<tr>
<td>COMBAT SUPPORT SYS</td>
<td>SMOKE MUNITIONS &amp; MATERIAL</td>
</tr>
</tbody>
</table>

Fewer Program Elements would be needed if they were generic rather than specific in nomenclature.

(3) When a project progresses from one category to another category (such as from Advanced Development to Engineering Development) the Program Element changes because the category designator is the second digit of the Program Element. For example, the Pershing II Program Element was 63311. Now it is 64311. The nomenclature remained the same; the number changed. Sometimes the Program Element Serial Number also changes. In FY 78, the Program Element for GRASS BLADE was 63317. It changed to 64313 (the second
4. The RDTE Project serial number list may change. If a project changes category during a fiscal year, it could be 1X463620D99E and the other letters a 1X464620D99E. Changes in Program Element and Project serial number could obstruct audit trails in tracking system costs.

5. Some RDTE Project Numbers proved extremely difficult to crosswalk to a system; however, the problem may be attributable to the list of systems, not necessarily to the project numbers. For example, consider the RDTE Project Number 1X463723D335 (Communicative Technology). There are several systems in the system list that might be appropriate:

<table>
<thead>
<tr>
<th>SYSTEM CLASS</th>
<th>SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Management</td>
<td>Automation/Communications Systems</td>
</tr>
<tr>
<td>Electronics</td>
<td>Tactical Satellite Communications</td>
</tr>
<tr>
<td>Electronics</td>
<td>Communications Intelligence Systems</td>
</tr>
<tr>
<td>Electronics</td>
<td>Communications Security Systems</td>
</tr>
<tr>
<td>Electronics</td>
<td>Theater/Tactical Communication Systems</td>
</tr>
<tr>
<td>Ground Combat/Combat Support</td>
<td>Communications Combat Support</td>
</tr>
</tbody>
</table>

The first step is to get any information possible from the schema. For RDTE Project Number 1X463723D335, the schema gives the following:

- Organization = DARCOM
- Internal Designator X = Project Manager
- Budget Activity = Tactical Programs
- Program Element 63723 = Command and Control
- 6 = Program 6 (Research and Development)
- 3 = Category 3 (Advanced Development)
- 7 = Historical Budget Activity (Other Equipment)
- 23 = Program Element Serial Numbers when used with the first three digits.
- OSD Classification = Development-Test-Evaluation
- Project Serial Number 335 = Communicative Technology

The schema does not solve the problem which is to select one of the above systems. However, the Program Element provides a clue. There is a system class named Installation Management which "sort of" relates to Command and Control. A search is made for other RDTE Project Numbers containing Program Element #63723 (Command and Control). The following are located:

- 1X463723D101 (Tactical Automation)
- 1X463723D185 (Military Software Standardization)
- 1X463723D186 (Military Computer Family)

A decision is made to place RDTE Project Number 1X463723D335 (Communicative Technology) in the Automation/Communications Systems. This decision is based on the fact that other RDTE Project Numbers in the same Program Element contain words such as Automation, Software, and Computer; therefore, it follows that Communicative Technology also pertains to automation. Granted, the argument may be tenuous; however, this case is presented to show the
nature of problems encountered in the correlation efforts and to underscore the need for a unified "Systems Language" within the Army and a coding scheme which would effectively identify projects to those systems.

4-5. Correlation Statistics. This section attempts through the use of some statistical data to show the degree of correlation achievable with today's RDTE Project Number structure.

a. Correlation Tables are at Appendices D, and E:

Appendix D - Correlation Table One
(Materiel Systems)

Appendix E - Correlation Table Two
(Non-Materiel Systems)

b. There were 411 FY 83 RDTE Project Numbers and 148 Systems:

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>RDTE Project Numbers were identified with</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>32 of 96 Materiel Systems</td>
<td>20.7%</td>
</tr>
<tr>
<td>326</td>
<td>22 of 52 Non-Materiel Systems</td>
<td>79.3%</td>
</tr>
<tr>
<td>411</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

All RDTE Project Numbers were crosswalked to 54 of 148 systems, and account for 100% of the FY 83 RDTE funds in the Current Approved Program as of May 83. Projects were associated with 10 of 13 SAR systems.

c. It should be noted again that RDTE costs (commitments, obligations, disbursements, etc.) must be tracked in the finance and accounting system by RDTE AMS Code. Although 100% of the RDTE Project Numbers were crosswalked to systems, 100% of RDTE costs cannot be tracked. At the end of the fourth year appropriation accounts expire and balances remaining (if any) are merged into "M" accounts. Further disbursements/adjustments cannot be tracked by project/system.

d. The finance and accounting system also maintains RDTE AMS Codes for Carrier Accounts which contain costs not identifiable with a project/system, but which eventually should reach a zero balance. Until these costs are identified, total costs of a project/system cannot be tracked.

e. The practice of "splitting" costs of a project between systems presents serious problems to tracking system costs. For example, portions of two RDTE projects are included in the Blackhawk Baseline Cost Estimate. The remaining costs of these are attributable to other material or non-materiel systems.
4-4. Summary. Correlation efforts show that 100% of the RDTE Project Numbers can be crosswalked to a list of Army systems given that the list is "totally exhaustive and mutually exclusive" in capturing the total Army. However, there is a conflict of rules within the Army for defining systems, i.e. what constitutes a system as opposed to a non-system and what that system includes with respect to modifications, support equipment, ammunition, armament, etc. Also, the numbering systems (schemata) of RDTE Project Numbers, Program Elements and RDTE AMS Codes do not effectively identify projects to systems. These findings indicate a need for a unified "Systems Language" within the Army and a single schema that can effectively identify RDTE projects to those systems.
FY 83 PROJECT NUMBERS
CURRENT APPROVED PROGRAM (MAY 83)

MATERIEL SYSTEMS
85
20.7%

NON-MATERIEL SYSTEMS
326
79.3%

DISTRIBUTION OF RDTE PROJECT NUMBERS

FIGURE 4-1
FY 83 PROJECT NUMBERS
CURRENT APPROVED PROGRAM (MAY 83)

MATERIEL SYSTEMS
$960445
24.7%

NON-MATERIEL SYSTEMS
$2924338
75.3%

DISTRIBUTION OF RDT&E PROJECT DOLLARS

FIGURE 4-2
FY 83 RDTE PROJECTS
CURRENT APPROVED PROGRAM (MAY 83)

DISTRIBUTION OF RDTE PROJECT NUMBERS BY MATERIEL SYSTEM CLASS

FIGURE 4-3
FY 83 RDTE PROJECTS
CURRENT APPROVED PROGRAM (MAY 83)

DISTRIBUTION OF RDTE PROJECT NUMBERS BY NON-MATERIEL SYSTEM CLASS

FIGURE 4-4
FY 83 PROJECT NUMBERS
CURRENT APPROVED PROGRAM (MAY 83)

OTHER MATERIEL
$787218
20.2%

OTHER NON-MATERIEL
$505391
13.0%

ELECTRONIC SYS
$173227
4.5%

DEFENSE RESEARCH
$2410911
62.3%

DOLLAR VALUE OF TWO LARGEST SYSTEM CLASSES

FIGURE 4-5
FY 83 PROJECT NUMBERS
CURRENT APPROVED PROGRAM (MAY 83)

DISTRIBUTION OF MATERIEL SYSTEM RDTE PROJECT NUMBERS
BY FYDP PROGRAM CATEGORY

FIGURE 4-6
FY 83 PROJECT NUMBERS
CURRENT APPROVED PROGRAM (MAY 83)

ENGINEERING DEV
51
15.7%

OP SYSTEMS DEV
13
4.0%

MANAGEMENT & SUP
88
27.0%

RESEARCH
32
9.8%

EXPLORATORY DEV
50
15.2%

ADVANCED DEV
92
28.2%

DISTRIBUTION OF NON-MATERIEL SYSTEM PROJECT NUMBERS
BY FYDP PROGRAM CATEGORY

FIGURE 4-7
5-1. Feasibility of Architectural Change. The purpose of the study was to determine the ability of the current RDTE Project Numbers to identify RDTE costs of major Army materiel and non-materiel systems. It was determined that 100 percent of the RDTE Project Numbers could be correlated with total Army systems, but that costs of systems as tracked by RDTE AMS Code would be less than 100 percent and that system costs would be fragmented; i.e., in order to track system costs it would be necessary to know how to put the "pieces" together. The intent of this chapter is to present ways in which RDTE Project Numbers and their RDTE AMS counterparts could be restructured/redefined and/or used to assist in identifying RDTE costs of major Army systems.

5-2. Barriers to System Cost Monitorship. During the search for ways in which the schema could be restructured/redefined, two constraints were recognized. First, effort should be made to maintain or improve upon the close relationship of the RDTE Project Numbers and their RDTE AMS Codes and, second, effort should center on changes which would facilitate system identification.

a. Example 1. At present there is a close relationship between RDTE Project Numbers and RDTE AMS Codes:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>RDTE AMS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 X 4 6 3 6 2 0 D G 2 0 0 0</td>
<td>6 4 3 6 2 0 . G 2 0 0 0</td>
</tr>
</tbody>
</table>

The third digit and the second digit of the RDTE Project Number and the RDTE AMS Code, respectively, match. They should be properly aligned; that can be accomplished by advancing the number two positions to the right:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>RDTE AMS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 X 6 4 3 6 2 0 D G 2 0 0 0</td>
<td>6 4 3 6 2 0 . G 2 0 0 0</td>
</tr>
</tbody>
</table>

The ninth position gives the OSD Classification (D). This position corresponds to the decimal point in the AMS Code (the decimal point is not used in USAFAC reports). Therefore, the OSD Classification could replace the Budget Activity that was moved:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>RDTE AMS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 X 6 4 3 6 2 0 G 2 0 0 0</td>
<td></td>
</tr>
</tbody>
</table>

No information has been lost. The result is a closer relationship:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>RDTE AMS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 X 6 4 3 6 2 0 G 2 0 0 0</td>
<td></td>
</tr>
</tbody>
</table>

Now that the numbers are aligned, consideration can be given to system identification.

b. Example 2. The following RDTE Project Numbers were funded in FY 83
Even if the numbers were realigned, no information is available to identify the "piece-parts" of the system without some knowledge of how the system is defined. The result is that realignment, while "nice", has not provided system identification. Approaches should be formulated with a view to capturing RDTE costs on a system basis. Discussions on some approaches follow.

5-3. Approaches. Three approaches to obtaining system RDTE costs follow. The first does not involve restructure; rather, it is a procedure that employs data that are readily available to obtain an approximation of a major system's total RDTE costs. The second approach involves adding a new Budget Activity to provide system identification of major systems. The third approach also involves digit realignment to provide identification of the major system "class" as well as the specific system.

a. Approach #1.

(1) The concept of this approach is that by using system-unique project numbers (this term will be used to mean either RDTE Project Numbers or their related RDTE AMS Codes) in conjunction with other PPBES data, a high percentage of major systems' RDTE actual costs/obligations could be tracked/derived. Actually, five steps would have to be accomplished. The first step would be to identify all current fiscal year project numbers totally attributable to each major system. Next, the approved program amount associated with the identified project numbers would be obtained from USAFAC data files (information supplied by ODCSRDA) and summed for each system. The total approved program amount for each set of system project numbers would then be compared with the current fiscal year RDTE estimate in the latest Baseline Cost Estimate (BCE) for each system. The next step would be the identification/explanation of any difference between the systems' approved program and the BCE's. The last step is the actual tracking/derivation of the systems' RDTE actual cost/obligations.

(2) A test of the above approach was conducted. Because the Current Approved Programs supplied to USAFAC by ODCSRDA are classified, permission was received from ODCSRDA to use the amounts in the FY 83 column of the FYDP RDTE Project Listing of May 83, which at that point in time reflected the Current Approved Program. Three SAR (Selected Acquisition Report) systems were used in the test - the UH60 (BLACKHAWK) aircraft, the PATRIOT missile system, and the M1 (ABRAMS) tank. The criteria used in selecting the systems were that they had a significant FY 83 RDTE program, a recent BCE available, and represented three different materiel system classes. The BCE data used in this test were obtained from the following:
The FY 83 current dollars expressed in the BCE's for PATRIOT and M1 ABRAMS Tank had been calculated with inflation indices promulgated by OSD and published in 1982. The FY 83 current dollars in the BLACKHAWK BCE had been calculated with updated indices published in early 1983. To provide consistency among systems, the BLACKHAWK data were deflated to constant dollars and then re-inflated with the index for FY 83, as published in 1982. The decision to change the BLACKHAWK data rather than the PATRIOT and M1 data was made in order to avoid bias. That is, the difference would have been smaller because the index published in 1983 showed a lower rate of inflation.

The next step in the test was to determine how much of each system's FY 83 RDTE estimate in the BCE could be identified from the projects in the current approved program and explain the differences if any. Differences were caused by "split" projects in the BCE (claiming only a portion of a project), and increases or decreases not reflected in both the BCE and current approved program due to timing of preparation. And, of course, errors in rounding would not be trackable. Figures 5-1, 5-2, and 5-3 graphically show the results in terms of the percentage of the BCE that the projects identified and percentages for some of the differences that are explainable. The data below supports the initial hypothesis that a significant percentage of a major system's RDTE costs could be tracked if the system's projects could be identified:

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>PERCENT OF COSTS IDENTIFIED/EXPLAINED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLACKHAWK Aircraft</td>
<td>94.40%</td>
</tr>
<tr>
<td>PATRIOT Missile System</td>
<td>99.15%</td>
</tr>
<tr>
<td>M1 ABRAMS Tank System</td>
<td>93.20%</td>
</tr>
</tbody>
</table>

This approach could be implemented unilaterally because all the data sources needed are available, and it would not impact on any of the current procedures in the PPBES. The approach could satisfy to a great extent the need for RDTE cost data; however, it would not provide total RDTE dollars and would not address the system fragmentation inherent in the current project number structure and in the "M" accounting procedures which effectively obstruct efforts to collect total actual (historical) RDTE cost by system.

b. Approach #2. This approach would add a new Budget Activity - Major Systems - but would not involve realignment of digits. The Program Element Serial Number (last two digits of the Program Element) would give the specific major system. For example:
RDTE
FY 83 BLACKHAWK PROGRAM

CURRENT DOLLARS (MILLIONS)

$19.8  \rightarrow \text{BASELINE COST} \rightarrow \text{NON-TRACKABLE (5.6%)}

$18.7  \rightarrow \text{EXPLAINABLE (52.0%)}

RDTE PROJECT NUMBERS
1X464711D665
1A464268D106

$8.4  \rightarrow \text{TRACKABLE (42.4%)}

RDTE PROJECT NUMBER
1X464206D069

FY 83

Figure 5-1
RDTE
FY 83 M1 PROGRAM

CURRENT DOLLARS (MILLIONS)

$117.4
$109.4

RDTE PROJECT NUMBERS
1X4646200020
1X4646300287
1X42375D330
1X4646300060
1X4646300064
1X464632D173
1X463633D161

BASELINE COST ESTIMATE
NON-TRACKABLE (6.8%)

TRACKABLE (93.2%)

FY 83
It should be noted that there could be several Program Elements per major system. Digit Number 5 in the RDTE Project Number (same as Digit Number 1 in the RDTE AMS Code) gives the Category. Some projects in a system could be in different categories (some in Advanced Development and others in Engineering Development, for example). Each project with a different category would mean another Program Element for the same system:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>RDTE AMS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 X 7 6 3</td>
<td>673</td>
</tr>
<tr>
<td>1 X 7 6 4</td>
<td>674</td>
</tr>
</tbody>
</table>

Digit Number 4 in the RDTE Project Number (same as Digit Number 1 in the RDTE AMS Code) gives the Defense Program. This is the first digit of the Program Element. Some projects in a major system could be in different Programs. Each project with a different program number would mean another Program Element for the same system:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>RDTE AMS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 X 7 6</td>
<td>6</td>
</tr>
<tr>
<td>1 X 7 2</td>
<td>2</td>
</tr>
</tbody>
</table>

For example, if the system code for the M1 Tank should happen to be "M1", then in FY 83, there would have been two Program Elements:

<table>
<thead>
<tr>
<th>PROGRAM ELEMENT</th>
<th>PROJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>646M1</td>
<td>G20 - Tank, M1 (ABRAMS)</td>
</tr>
<tr>
<td></td>
<td>064 - 120 MM Tank Gun Ammo Development</td>
</tr>
<tr>
<td></td>
<td>060 - 120 MM Gun Development</td>
</tr>
<tr>
<td></td>
<td>287 - Tank Systems Integration</td>
</tr>
<tr>
<td></td>
<td>173 - Tank Target Practice</td>
</tr>
<tr>
<td></td>
<td>161 - Tank Ammunition and Fuzes</td>
</tr>
</tbody>
</table>
If the category is Systems Operational Development, the Program is 1, 2, or 3. It is not Program 6.

(2) If there is no objection to having more than one Program Element per major system in Exhibit R-1, then this would be a simple approach to tracking RDTE costs of major systems.

(3) However, there must be consensus on how a major system is defined. If modifications (Operational Systems Development) are not to be included in a system, then it would not matter that modifications are in Program 2.

c. Approach #3. This approach would add a Budget Activity - Major Systems, involve realignment of digits in the project numbers, and provide additional information to facilitate tracking of system RDTE costs. That information would identify the following:

- System Class
- System
- System Project(s)

At the present time, only the System Projects are identified. The revised schema follows:

| RDTE Project Number | 1X D 4 6 7 6 A A B B C C 0 0 |
| RDTE AMS Code       | 6 7 6 A A B B C C 0 0 |

<table>
<thead>
<tr>
<th>Where:</th>
<th>No change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = RDTE Agency</td>
<td>No change</td>
</tr>
<tr>
<td>X = Internal Designator</td>
<td>Realigned</td>
</tr>
<tr>
<td>D = OSD Classification</td>
<td>Realigned</td>
</tr>
<tr>
<td>4 = Category</td>
<td>No change</td>
</tr>
<tr>
<td>6 = Program</td>
<td>&quot;7&quot; for Major Systems</td>
</tr>
<tr>
<td>7 = Budget Activity</td>
<td>No change</td>
</tr>
<tr>
<td>6 = Historical Budget Activity</td>
<td>No change</td>
</tr>
<tr>
<td>AA = System Class</td>
<td>Program Element Serial Number</td>
</tr>
<tr>
<td>BB = System</td>
<td>Added</td>
</tr>
<tr>
<td>CC = Project Serial Number</td>
<td>Two digits instead of three</td>
</tr>
<tr>
<td>00 = Task</td>
<td>No change</td>
</tr>
</tbody>
</table>

One digit has been added to the RDTE Project Number but no digits were added to the RDTE AMS Code. Since the Project Serial Number will not stand alone (it will be system-specific), two alphanumeric positions will be sufficient. It should be noted that the Program Element still contains five digits. Even the Program Element in the RDTE AMS Code which formerly contained an extra digit now contains only five digits.

(1) This approach would require coordination between agencies involved in programming, budgeting and execution functions, since it impacts on the Program Element which is common to both the RDTE Project Numbers and
2 The Program Element contributed greatly to system automation. As mentioned in Chapter 4, many Program Elements contain one or more project and, in almost all cases, the nomenclature is identical. This has resulted in an excessive number of Program Elements (211 Program Elements for 41 RDTE Project Numbers). The goal in this approach was to make the Program Element more generic in nature so that more projects could be included in the Program Element. This would reduce the number of Program Elements needed and greatly reduce the activity required in maintaining the Program Element list. As it is now, the list must be revised whenever any of the Program Element's digits change. For example, a change in Category such as from Advanced Development to Engineering Development requires a new Program Element.

3 Caveats. The realignment of digits as mentioned at the beginning of this chapter should cause little difficulty in implementation. No information is lost either to the RDTE Project Number or RDTE AMS Code. However, an additional realignment was made above. The Category digit, because it may change and generate another Program Element, was moved out of the Program Element. It is retained in the RDTE Project Number, but is no longer in the RDTE AMS Code. If the Category digit is critical to finance and accounting system processing, then this approach is sensitive in that respect. Also, since modifications always are in Program 2 (General Purpose Forces) while the other components of the system are in Program 6 (Research and Development), modifications could not be tracked as part of a system. This is because the first digit of the Program Element gives the Defense Program and, thus, there would be two Program Elements for the same system class.

4 Although some turmoil might be expected as adjustments are made, and the addition of a new Budget Activity would require coordination with OSD, this approach would provide RDTE costs of major systems and satisfy to a significant degree the requirement for cost feedback. The basic rationale for this approach is that major systems should be important enough to justify one separate Budget Activity and require identification of all RDTE funds/costs associated with specific major systems. This parallels the current concept of the ASARC/DSARC process, SAR reporting, and Functional (System) PDIP's.

*Reference DACS-DPZ-A Memorandum, dated 29 Apr 83, subject: Integration of Weapons Systems Costing, Programming, and Execution Management Systems, which is just the latest of many requirements for cost feedback.
The Study. This study was conducted as part of a continuing effort to obtain actual (historical) systems' life cycle costs from the Army's finance and accounting data. The objectives of the study were:

Develop insights and information on the assignment and structure of RDTE Project Numbers and their interface with related resource management systems. Produce appropriate flow diagrams.

Develop correlation tables to relate RDTE Project Numbers to the total Army, with emphasis on Selected Acquisition Report (SAR) systems.

Collect and compare RDTE costs of selected systems with their Baseline Cost Estimates.

a. The publications that were researched provided technical details on the assignment and structure of RDTE Project Numbers and the information systems employed to control RDTE funds; however, personal contact with operations personnel provided a "walk through" of the process that brought a broader understanding and a greater awareness of the tasks involved, and the opportunity to identify and investigate the related resource management systems.

b. There is a close relationship between RDTE Project Numbers and their RDTE AMS Codes:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>1 X 4 6 4 6 2 0 D G 2 0 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDTE AMS Code</td>
<td>644 6 2 0 . G 2 0 0 0</td>
</tr>
</tbody>
</table>

Both contain the Program Element (AMS Code Program Element contains an extra digit); both contain the Project Serial Number followed by two digits reserved for the Project Task (zero-filled at DA level):

<table>
<thead>
<tr>
<th>Program Element</th>
<th>64620</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Serial Number</td>
<td>G20</td>
</tr>
<tr>
<td>Task Number</td>
<td>00</td>
</tr>
</tbody>
</table>

c. The initial hypothesis was that a significant portion of RDTE costs of a major system could be tracked if the system's projects could be identified. Although RDTE Project Numbers are not used in the Army's finance and accounting system, their counterpart - RDTE AMS Code - is closely related and available for tracking RDTE costs. Research supports the initial hypothesis that although 100 percent of a system's RDTE costs cannot be identified, a significant portion can be identified.
e. System costs are fragmented; i.e., a system's RDTE funds may be included in several projects. For example, the M1 Tank system may include six or seven different projects depending on who is defining the system. Therefore, in order to track system costs, the projects pertaining to the system must be identified. As a consequence of system fragmentation, it became necessary to locate a set of "rules" which could be used to define a "system." The set that was used yielded a list of systems that was both totally exhaustive and mutually exclusive in capturing the total Army. It was determined, however, that the Army does not have a unified "Systems Language." Comparisons were made with other resource management procedures such as Selected Acquisition Reports (SARs), Program Development Increment Packages (PDIP's), Baseline Cost Estimates, and Appropriation Manager's systems at DA level. System definitions were different.

f. Even if a "system" can be defined adequately, 100 percent of the RDTE costs of that system are not trackable in the finance and accounting system. RDTE projects can be tracked for only four years. At the end of the fourth year, the appropriation accounts are retired. Any funds not disbursed are merged into an "M" account. After the balances are merged, funds may be disbursed to satisfy Government liabilities; however, the transactions cannot be associated with an RDTE Project. Consequently, "total" RDTE costs of a system are not available even if the system is well-defined.

g. Correlation Tables were developed by attempting to crosswalk the FY 83 RDTE Project Numbers to a list of materiel and non-materiel systems taken from tables in a draft paper prepared in the Office of the Director of Cost Analysis titled, "A Mission Area Structure for the Management of Army Resources," DCA-P-XX, September 1981. A summary of the crosswalk statistics follows:

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>PERCENTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>20.7%</td>
</tr>
<tr>
<td>326</td>
<td>79.3%</td>
</tr>
<tr>
<td>411</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

All RDTE Project Numbers were crosswalked to 54 of the 148 available systems, and account for 100% of the FY 83 RDTE funds in the Current Approved Program as of May 83. Ten of 13 SAR systems were identified. It should be noted again that RDTE costs (commitments, obligations, disbursements, etc.) must be tracked in the finance and accounting system by RDTE AMS Code; and although 100% of RDTE Projects can be crosswalked to systems, 100% of the systems' RDTE costs cannot be identified since the appropriation accounts expire after the fourth year. At the present time, there is no way to track transactions in the "M" account by RDTE Project.

h. Three approaches to obtaining system RDTE costs were developed. The
first approach involves a procedure which uses the current RDTE Project Numbers, augmented by other data available in the PPBES, to obtain an approximation of total systems' RDTE costs. The second approach addresses a change in budget structure; and the third adds a new Budget Activity and realigns the digits in the project numbering systems.

Approach #1. This procedure evolved from an effort to use the current RDTE Project Numbers, augmented by information available in other PPBES documents, to obtain an approximation of total systems' RDTE costs. It can be implemented unilaterally because it does not require restructure of RDTE Project Numbers or RDTE AMS Code. The data sources are the RDTE Project Numbers in the Current Approved Program and the Baseline Cost Estimates. This procedure was tested on three SAR systems. A summary of the results is shown below:

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>PERCENT OF BASELINE COST IDENTIFIED/EXPLAINED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLACKHAWK Aircraft</td>
<td>94.40%</td>
</tr>
<tr>
<td>PATRIOT Missile System</td>
<td>99.15%</td>
</tr>
<tr>
<td>M1 ABRAMS Tank System</td>
<td>93.20%</td>
</tr>
</tbody>
</table>

The results of the test indicate that a large portion of system RDTE costs could be determined with this procedure; and, as noted previously, it could be accomplished without the need to restructure/redefine the project numbers. It would not impact on any of the current procedures in the PPBES. This approach could be exercised in the short run since all of the data sources are at hand. It could satisfy to a large extent the need for RDTE cost data; however, it would not provide the total RDTE dollars, and it would not address the problems inherent in the current Budget Structure and in "M" accounting procedures which effectively obstruct efforts to collect actual (historical) cost data by system.

(2) Approach #2. This approach would add a new Budget Activity and reserve the last two digits of the Program Element (P.E.) as the system designator:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>1 X 7 6 4 6 A A D G 2 0 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDTE AMS Code</td>
<td>674 6 A A . G 2 0 0 0</td>
</tr>
</tbody>
</table>

Where: 7 = New Budget Activity, Major Systems
       AA = Alphanumeric Characters Identifying Specific Major System

The current, and new, Budget Activities are shown below:

1. Technology Base
2. Advanced Technical Development
3. Strategic Programs
4. Tactical Programs
5. Intelligence and Communications
6. Defensewide Mission Support
NEW------7. Major Systems
The purpose of this short, simple System Support Data for the President's Budget is at Program Element level. RDTE Project Numbers do not appear in Exh. 14-1. The Program Elements in Exhibit 14-1 are arranged by Budget Activity. If there is only one Budget Activity for major systems, then these major systems would appear in one section, be highly visible and identifiable. Second, since the second digit in the RDTE AMS Code Program Element always denotes the Budget Activity number and since the projects in a system normally may be in different Budget Activities, there could be more than one RDTE AMS Code Program Element per major system; however, a constant ("7") as a Budget Activity for major systems would solve this problem.

(b) The two alphanumeric digits reserved for specific system identification would be sufficient to identify the desired number of systems; the systems would be visible in the budget; and RDTE costs could be tracked by system in the Army's finance and accounting system.

(c) However, there are two other digits in the Program Element which may differ among a system's projects and generate additional Program Elements for a specific system: The FYDP Program (1st digit) and the FYDP Category (2nd digit in the RDTE Project Number and 3rd digit in the RDTE AMS Code). If there is no objection to having more than one Program Element per Major System, then this Approach would be appropriate. It does not involve realignment of digits either in the RDTE Project Number or RDTE AMS Code.

(3) Approach #3. This approach would add a new Budget Activity as above for Major Systems, but it also would involve realignment of digits (restructure) in order to improve the close relationship between the RDTE Project Numbers and RDTE AMS Code and to avoid generation of multiple Program Elements per major system. In addition to system identification, this approach also provides identification of Major System Class. That is, for the Blackhawk, for example, the Class is Aircraft, the System is Blackhawk, and the Project is UH-60 Feasibility Demonstration. The revised schema is shown below:

<table>
<thead>
<tr>
<th>RDTE Project Number</th>
<th>1 X D 4 6 7 6 A A B B C C 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDTE AMS Code</td>
<td>6 7 6 A A B B C C 0 0</td>
</tr>
</tbody>
</table>

Where:  
1 = RDTE Agency No change  
X = Internal Designator No change  
D = OSD Classification Realigned  
4 = Category Realigned  
6 = Program No change  
7 = Budget Activity "7" for Major Systems  
6 = Historical Budget Activity No change  
AA = System Class Program Element Serial Number  
BB = Major System Added  
CC = Project Serial Number Two digits instead of three  
OO = Task No change
One digit has been added to the length of the Project Number but the AMS Code has not been lengthened. Since the Project Serial Number will be system-specific, two alphanumeric positions will be sufficient.

(a) This approach would require extensive coordination between agencies involved in programming, budgeting and execution functions, since it impacts upon the Program Element which is common to both the RDTE Project Numbers and their RDTE AMS Codes. Since ODCSRDA converts RDTE Project Numbers to RDTE AMS Codes for use in the finance and accounting system, it seems wise to maintain as close a relationship as possible between the RDTE Project Number and the RDTE AMS Code. Realignment of digits is needed to avoid generation of multiple Program Elements per major system. A new Budget Activity, for major systems, would insure that they are listed together in one section of the budget and are highly visible.

(b) This approach is sensitive with respect to system modifications and FYDP category. Modifications currently are not in Program 6 (Research and Development); they are in Program 2 (General Purpose Forces). Since the Program Element’s first digit gives the program, there would be two Program Elements for systems which contained modification projects unless one of two courses was pursued. First, all modifications could be moved to Program 6; or, modifications could be recognized apart from the major system in a Budget Activity called "Modifications". It depends on how a major system is defined: with or without modifications. As the result of realignment, one bit of information, the FYDP Category, does not now appear in both the RDTE Project Number and RDTE AMS Code. It is missing from the RDTE AMS Code. If the category digit is critical to finance and accounting system processing, then this approach is sensitive in that respect.

6-2. Concluding Thoughts. In order to satisfy the many expressions of need for cost feedback, the following are required:

1. A unified "Systems Language"
2. A "Common Architecture"

a. Unified Systems Language. System codes have no value if consensus does not exist as to exactly what constitutes a system - as opposed to a non-system - or what a system includes with respect to modifications, ammunition, armament, support equipment, etc. There are a number of procedures used within the Army to manage its major systems; however, system definitions vary. There is no definitive set of "rules" to follow.

b. Common Architecture. Reporting schemata used in the Army's finance and accounting system vary by appropriation. For example, BLIN's are used in Procurement while RDTE AMS Code is used for Research, Development, Test and Evaluation. A common architecture would facilitate the identification of system costs which cut across appropriation lines.

c. Together, a unified systems language and a common architecture would serve to repair the disconnects, and restore communication/feedback, between the functional areas of the Planning, Programming, Budgeting and Execution System to insure that Army resources are managed efficiently and effectively.
APPENDIX 1

LIST OF REFERENCES

CIRCULARS

A-1
Preparation and Submission of Budget Estimates, June 1981
A-34 Instruction on Budget Execution, July 1976 (as amended)
A-109 Major System Acquisition, 5 April 1976 (as amended)

ARMY REGULATIONS

AR 1-1 Planning, Programming and Budgeting within the Department of the Army, 25 May 1976
AR 11-13 Cost Analysis Program, 10 October 1975
AR 37-100 Army Management Structure Code, 1 August 1980
AR 37-100-83 The Army Management Structure (AMS), July 1982
AR 37-108 General Accounting and Reporting for Finance and Accounting Offices, 15 Nov 1975 (as amended)
AR 37-112 Management Accounting for the RDTE Appropriation, 15 March 1982
AR 37-151 Accounting and Reporting for Operating Agencies, September 1975 (as amended)
AR 37-200 Selected Acquisition Reports, 1 March 1979
AR 70-1 Army Research, Development and Acquisition, 1 May 1975
AR 70-6 Management of the Army Research, Development, Test and Evaluation Appropriation, 12 November 1974
AR 70-9 Army Research and Development Information System Program Planning and On-Going Work Reporting, 1 May 1981
AR 1000-1 Basic Policies for System Acquisition, 1 May 1983

DEPARTMENT OF DEFENSE

DOD 5000.1 Major Systems Acquisition, 29 March 1983
DOD 5000.2 Major Systems Acquisition Procedures, 8 March 1983
DOD 7000.1 Resource Management Systems of the Department of Defense, 22 August 1966

A-1
LIST OF REFERENCES

ACCOUNTING GUIDANCE HANDBOOK,
1 February 1973

OTHER REFERENCES

1. Army Guidance, Volume II, 3 September 1982
2. CSR 11-5 Army Program (Chief of Staff Regulation), 17 August 1982
3. DA Budget Directive, 5 July 1983
4. Departmental Budgetary Reporting System, Functional Description,
   19 February 1983
5. Five Year Defense Program RDTE Project List, May 1983
7. Planning, Programming, Budgeting, and Execution System Handbook,
   3d Edition, 1982
8. Program Development Increment Package Procedures, 1981

In addition to the above publications, information was obtained from personnel
assigned to the following:

U.S. Army Finance and Accounting Center

Office of the Deputy of Staff for
Research, Development, and Acquisition

U.S. Army Research, Development and
Acquisition Information Systems Agency

Office of the Chief of Staff (Program
Analysis and Evaluation Directorate)
APPENDIX E

PROJECT NUMBER - AMS CODE LIST

The following list contains FY 83 Funded RDTE Project Numbers, their associated RDTE AMS Codes, and common nomenclature. The RDTE Project Numbers were taken from the Five Year Defense Program RDTE Project Listing dated May 83. RDTE AMS Codes are from AR 37-100-83.
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<th>Category</th>
<th>Example Code</th>
<th>Description</th>
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<td>04230</td>
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<tr>
<td>Digital Group Multiplexers (TRI-TAC)</td>
<td>04231</td>
<td>Digital Group Multiplexers (TRI-TAC)</td>
</tr>
<tr>
<td>Other Services Assigned TRI-TAC Tasks</td>
<td>04232</td>
<td>Other Services Assigned TRI-TAC Tasks</td>
</tr>
<tr>
<td>Facility Support Element (TRI-TAC)</td>
<td>04233</td>
<td>Facility Support Element (TRI-TAC)</td>
</tr>
<tr>
<td>Short Range Wide-Band Radio (SRWBRA) Assemblies</td>
<td>04234</td>
<td>Short Range Wide-Band Radio (SRWBRA) Assemblies</td>
</tr>
<tr>
<td>Modular Record Traffic Terminal</td>
<td>04235</td>
<td>Modular Record Traffic Terminal</td>
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<tr>
<td>Net Radio Interface</td>
<td>04236</td>
<td>Net Radio Interface</td>
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<td>Joint Test Support (TRI-TAC)</td>
<td>04237</td>
<td>Joint Test Support (TRI-TAC)</td>
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<td>Automatic Communications Central Office</td>
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<td>Scientific/Technical Intelligence</td>
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<td>TECRA's (Tech Recon &amp; Survival)</td>
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<td>Satellite Communications</td>
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<td>Tactical Satellite Communications (TACSATCOM)</td>
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APPENDIX C

SYSTEM LIST

The following list of Army systems (materiel and non-materiel) was used in constructing the correlation tables. It was taken from Tables 4-3 and 4-4 of an ODCA draft paper, titled "A Mission Area Structure for the Management of Army Resources," DCA-P-XX, dated September 1981.
### MATERIEL SYSTEMS

#### CLASS SYSTEM

#### AIRCRAFT
- AH-1S
- AAH-64
- OH-58C
- RPV
- UH-1
- UH-60A
- CH-47D
- AHIP

#### MISSILES
- TOW
- IMAAWS
- DRAGON
- PERSHING
- MLRS
- LANCE
- HONEST-JOHN
- SERGEANT
- CSWS
- DSWS
- REDEYE
- STINGER
- CHAPARRAL
- ROLAND
- HAWK
- NIKE HERCULES
- PATRIOT
- HELLFIRE

#### ELECTRONICS
- PEWS
- MILES
- IRETS
- ARTBASS
- TACFIRE
- RADAR CHRONOGRAPH, M90
- BCS
- GLLD
- FIREFINDER
- AN/TMQ-34
- FORWARD AREA LASER WEAPON
- SOTAS
- TRAILBLAZER
- QUICKLOOK
- QUICKFIX
- GUARDRAIL
- TEAMPACK

ELECTRONICS COUNTERMEASURES SYSTEMS

C-2
### MATERIAL SYSTEMS

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C-4
*** SYSTEM LIST ***

NON-MATERIEL SYSTEMS

CLASS SYSTEM

HEALTH CARE
FIELD MEDICAL SUPPORT
HEALTH CARE IN FACILITIES
MEDICAL MANAGEMENT HG
MEDICAL PROFESSIONAL DEVELOPMENT
MEDICAL MANPOWER/PERSONNEL MGT
MEDICAL MATERIEL MANAGEMENT
MISC MEDICAL ACTIVITIES

INSTALLATION MANAGEMENT
INSTALLATION MGT HQ
HOUSING SUPPORT
INSTALLATION MAINT/SVC OPS
MORALE & WELFARE OPS
AUTOMATION/COMMUNICATIONS SVCS

PERSONNEL & RELATED SERVICES
TACTICAL PERSONNEL & ADMIN OPS
PSYOPS/CIVIL AFFAIRS OPS
PERSONNEL/ADMIN/FIN SVCS
RECRUITING
RESERVE COMPONENT SUPPORT

SUPPORT OUTSIDE ARMY
DOD/Joint SUPPORT
SUPPORT TO OTHER GOVT AGENCIES
SUPPORT TO OTHER NATIONS

DEFENSE RSCH/ADV TECH DEV
DEFENSE RESEARCH
MATERIEL/COMBAT DEV ACTIVITIES

INTELLIGENCE ACTIVITIES
THEATER/TACTICAL INTELLIGENCE
ARMY-WIDE INTELLIGENCE
DOD/NATIONAL INTELLIGENCE

ARMY HEADQUARTERS
ARMY MANAGEMENT HEADQUARTERS
CLOSE COMBAT COMMAND & CONTROL
FIRE SUPPORT/AIR DEF COM & CONT
COMBAT SUPPORT COMMAND & CONTROL
COMBAT SVC SUPPORT COM & CONT

TRAINING
PRECOMMISSIONING TRAINING
TRAINING MGT/DEVELOPMENT
UNIT TRAINING ACTIVITIES
ACCESSION/PROFESSIONAL TRAINING

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### System List

**Non-Materiel Systems**

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C-6
This table gives the RDTE Project Numbers associated with the materiel systems.
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*Selected Acquisition Report (SAR) Systems*
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### CORRELATION TABLE I.E.###

**MATERIAL SYSTEMS**

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### CORRELATION TABLE TWO ###

#### MILITARY SYSTEMS ####

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### CORRELATION TABLE -1- ###

**DEPARTMENT OF THE ARMY**

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APPENDIX F

PROGRAM ELEMENT LISTING
(MAY FY 83 CURRENT APPROVED PROGRAM)

The following list contains only those Program Elements from the FYDP RDTE Project Listing of May 1983, which were funded for FY 83.
## APPENDIX F

### PROGRAM ELEMENT LISTING

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