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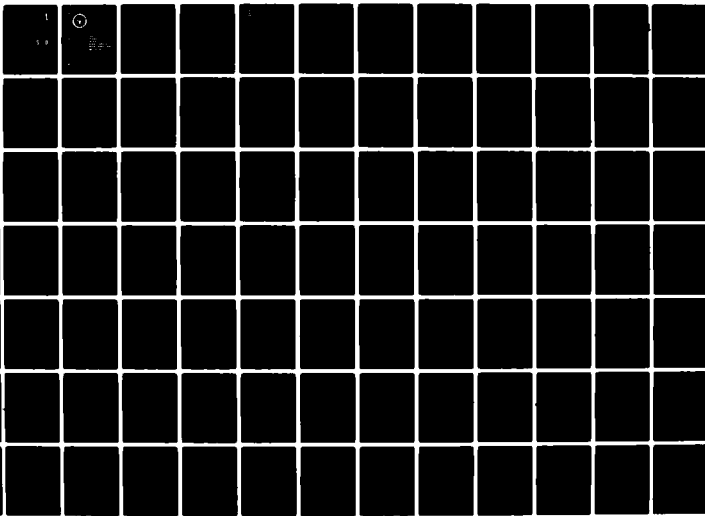
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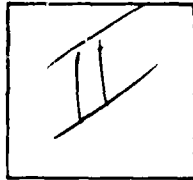
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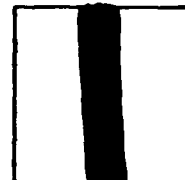
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Joint Test and Evaluation Procedures Manual

September 1980

**Office of the Under Secretary
of Defense
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(Director
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The purpose of this manual is to establish policies for the conduct of Joint Tests and Evaluations and provide guidance for the participating Services, DoD Agencies and the Joint Test Director who is responsible for executing the test. The manual documents systems by which the Director Defense Test and Evaluation (DDTE) administers the JT&E program, describes the roles and (OVER)		

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responsibilities of OSD, the Services and the Defense Agencies, and outlines the mission, organization and function of the Joint Test Director and the Joint Test Force. The DDTE procedures and mechanisms for planning, budgeting, executing, and controlling the total JT&E program are also described in the manual, which is designed primarily to assist the Joint Test Director in organizing a Joint Test Force and planning and executing a JT&E to achieve the test objectives.

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RESEARCH AND
ENGINEERING

OFFICE OF THE UNDER SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

FOREWORD

Joint Test and Evaluation (JT&E) will be conducted on a continuing basis to examine the capabilities of various systems, to provide data for the development of requirements and planning, and to obtain information pertinent to doctrine, tactics, and operational procedures. Joint Test and Evaluation programs are conducted in accordance with the Department of Defense Directive 5000.3.

The purpose of this manual is to establish policies for the conduct of Joint Tests and Evaluations and provide guidance for the participating Services, DoD Agencies and the Joint Test Director who is responsible for executing the test. The manual documents systems by which the Director Defense Test and Evaluation (DDTE) administers the JT&E program, describes the roles and responsibilities of OSD, the Services and the Defense Agencies, and outlines the mission, organization and function of the Joint Test Director and the Joint Test Force. The DDTE procedures and mechanisms for planning, budgeting, executing, and controlling the total JT&E program are also described in the manual, which is designed primarily to assist the Joint Test Director in organizing a Joint Test Force and planning and executing a JT&E to achieve the test objectives.

Proposed changes to this manual shall be initiated through appropriate command channels to the Office of the Secretary of Defense, Director Defense Test and Evaluation, Washington, D.C. 20301.

ISHAM LINDER
Director Defense
Test and Evaluation

JOINT TEST AND EVALUATION PROCEDURES MANUAL

RECORD OF CHANGES

CHANGE NUMBER	EFFECTIVE DATE	PAGES AFFECTED	COMMENTS

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CHAPTER I ARCHITECTURE

A. INTRODUCTION

1. Purpose

This manual is designed to serve two major purposes. The first is to document the system by which the Office of the Secretary of Defense/Director Defense Test and Evaluation (OSD/DDTE) administers the Joint Test and Evaluation (JT&E) program. The manual describes the roles and responsibilities of OSD, the Services and the Defense Agencies. The second purpose is to provide guidance to a newly-selected Joint Test Director (JTD) in the organization and implementation of a JT&E.

2. Scope of Joint Test and Evaluation

JT&Es are conducted when required and initiated by the DDTE. The primary purpose of JT&E is to examine the capability of developmental and deployed systems to perform their intended missions in a joint environment. JT&Es may also be conducted to provide information in the following areas: technical concepts evaluation; system requirements; system improvements; systems interoperability; force structure planning; testing methodologies; and doctrine, tactics, and operational procedures for joint operations. Responsibility for managing the organization and implementation of each JT&E is delegated to a specific DoD component (the Lead Service) and supported by forces and materiel from each participating component. Conduct of JT&E is in accordance with established joint doctrine and consistent with the assigned mission of each participating Service. Tests involving alternative concepts, organization, tactics, or procedures are coordinated with the Office of the Joint Chiefs of Staff (OJCS) and the Services.

JT&Es must be structured to provide valid evaluation data and adequate scope for test and evaluation of large, complex supporting systems. When possible, the test environment should include representative forces, threat, terrain, climate and weather. Data acquired from JT&Es are consolidated with other information and used as a basis for future systems

acquisition, mission area analysis, program decisions on related forces, force issues, operational procedures, and doctrine.

The DDTE has established a JT&E planning, budget, and review process and publishes a Five-Year Test Plan (FYTP) to permit proper programming and budgeting. The plan includes the establishment of priorities for accomplishing JT&E. The OJCS and the Services participate in the review and selection process and assist in the development of the FYTP and the test priority list.

The criteria for JT&E selection are:

- The feasibility of the JT&E can be verified by study.
- Two or more Services will participate in a joint environment.
- An appropriate range/maneuver area with a minimum number of constraints is available.
- Forces are representative, and resources are available.
- A desired degree of realism can be achieved.
- Funds--Operation and Maintenance (O&M), Research and Development (R&D), and other funds--have been identified and programmed.

B. THE DOD JOINT TEST AND EVALUATION PROGRAM

1. Background

As a distinct DoD activity, Joint Test and Evaluation originated in the 1970 report of the Blue Ribbon Defense Panel. The report recommended that continuing responsibility be vested in an OSD staff element dedicated to test and evaluation. This group was to direct realistic test and evaluation and to develop means to assure that productive joint testing would be accomplished. That recommendation resulted in what is now the Office of the Director, Defense Test and Evaluation (ODDTE). In 1979, DDTE undertook the structuring and codifying of a process which until that time had been largely ad hoc. The architecture of the JT&E process is described in the following sections. Two major aspects of JT&E are considered throughout. The cycle of initiation, execution, and completion of specific joint tests is described. Equally important, the process by which the

total JT&E program is integrated into the Defense program is also discussed.

2. Nomination, Selection and Budgeting Process

The DDTE is responsible for planning, programming, and budgeting for the JT&E program. The Services and Defense Agencies have a responsibility to program and budget for specific joint tests which will involve their forces. In order to provide the information required on a timely basis, the DDTE has established a nomination and selection cycle which is aligned with key action dates in the DoD Planning, Programming, and Budgeting System (PPBS). A diagram of the JT&E cycle is shown in Figure I-1.

a. Nomination and Selection

The formal cycle begins each year when the DDTE issues a reminder to the Services, Defense Agencies, the OJCS and the OSD staff to prepare JT&E nominations. By May 1, the Services submit to the DDTE the nominations of joint tests they believe should be undertaken in the next five fiscal years. Nominations of JT&Es which concern issues related to joint doctrine or mission must be submitted through the OJCS for coordination and concurrence. OSD staff and Defense Agency nominations are submitted directly to the DDTE unless they also concern mission and doctrine and must be forwarded through the OJCS. The CINCs of the Unified and Specified Commands submit all nominations through the OJCS. Figure I-2 provides a graphic summary of the nomination process.

Nominations should be for the succeeding five years for inclusion in the FYTP. The goal is a definitive five-year JT&E program with new test start dates, tailored to test requirements and budget constraints. The FYTP will be updated each year to accommodate changes induced by current test performance, new test selections, feasibility study results, and the funding implications of each. Nominations should provide the information contained in the sample format in Figure I-3.

(1) Planning Committee

After receiving the nominations, the DDTE convenes the Planning Committee to review the proposed nominations. The membership and

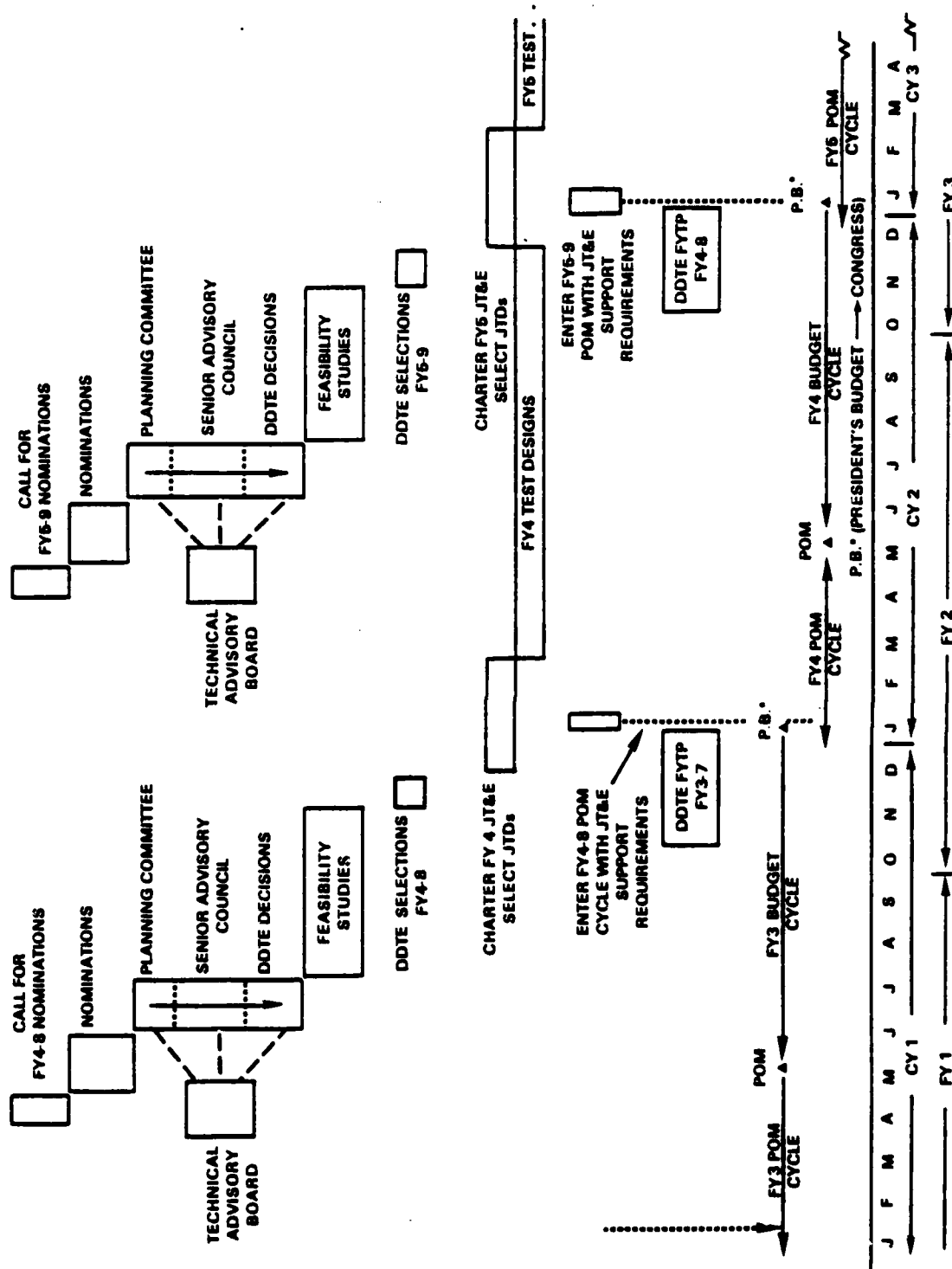
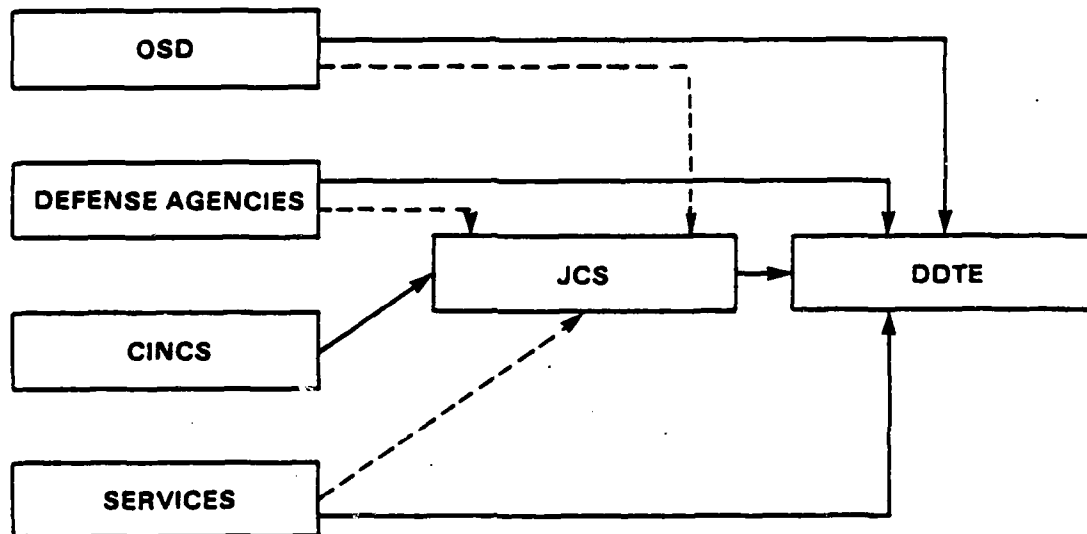


Figure I-1. Joint Test and Evaluation Planning Cycle

JT&E NOMINATION PROCESS



—— STANDARD NOMINATION FLOW
--- FLOW FOR ISSUES CONCERNING MISSION AND DOCTRINE

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Figure I-2. JT&E Nomination Process

**JT&E
NOMINATIONS**

I. TITLE

II. TEST OBJECTIVE—ISSUES TO BE ADDRESSED—UTILITY & IMPACT IF OBJECTIVES ARE MET

III. RECOMMENDED TEST DATE(S) (INCLUSIVE)/MILESTONES

IV. SPECIAL REQUIREMENTS (TERRAIN, WEATHER, CLIMATE, ETC.)

V. SUGGESTED PARTICIPANTS (BY SERVICE OR CINC)

VI. OUTLINE TEST CONCEPT

VII. ESTIMATE OF FUNDS AND RESOURCES

Figure I-3. Sample JT&E Nomination Format

responsibilities of the Planning Committee are listed in Figure I-4. The permanent committee members will be from the Services; nonpermanent members will be from Agencies submitting JT&E nominations. The permanent Service and Agency members must have authority to speak for their organizations and will coordinate/interface with their respective Services and/or Agencies. The Services and Agencies may send additional personnel for information and/or to assist the permanent members. Meetings of the Planning Committee will be held annually or at the call of the Chairman. The Chairman and the committee members will be the action staff for the Senior Advisory Council.

(2) Technical Advisory Board

A Defense Technical Advisory Board (TAB) is available to advise the DDTE on technical issues during the nomination, selection, conduct, and evaluation of JT&E programs. The membership and responsibilities of the TAB are listed in Figure I-5. The TAB consists of twelve high-level civilian scientists from the Army, Air Force, and Navy/Marine Corps who have current knowledge, experience, and/or responsibility for advising their own Service in the design, planning, conduct, and evaluation of large-scale tests and exercises and who can provide both memory and expertise on the technical problems and solutions associated with such testing. The TAB provides recommendations for personnel to staff smaller Technical Advisory Groups (TAGs), which are formed to provide technical advice to the Joint Test Director of each JT&E program. The TAB supports the DDTE in a strictly advisory capacity. It meets annually, after the Planning Committee has submitted its nominations, or at the call of the DDTE.

(3) Senior Advisory Council

Upon completion of the Planning Committee review, the proposed update of the FYTP (new starts, changes, etc.) will be presented to the Senior Advisory Council (SAC) by the Chairman of the Planning Committee. Membership and responsibilities of the SAC are listed in Figure I-6. The SAC will provide the DDTE with recommendations concerning approval/disapproval of the proposed FYTP, Service/Agency views, and specification of the impacts on the Services of the proposed tests. With the information provided by the Senior Advisory Council, the DDTE will amend

PLANNING COMMITTEE

Permanent Members:

Chairman: ODDTE, Deputy Director Tactical Air and Land Warfare Systems
One representative of JCS Staff
One representative of each Service

Nonpermanent Members:

One representative from each agency submitting nominations for consideration.

Responsibilities:

1. Receive JT&E nominations from ODDTE.
2. Review nominations to:
 - a. Initially determine feasibility.
 - b. Identify duplication and possible consolidation.
 - c. Determine adequacy of data and details of nominated JT&E.
3. Place nominated tests in priority order for presentation to Senior Advisory Council.
4. Review, refine, and validate objectives, data and details of nominated tests and endorse desirability and feasibility of nominated tests.
5. Recommend to the Senior Advisory Council JT&Es to be conducted by priority.
6. Develop Five-Year Test Plan and submit the FYTP to the Senior Advisory Council for approval.
7. Act as action staff for the Senior Advisory Council.
8. Coordinate:
 - a. Preliminary test concepts with nominating Service/ Agency.
 - b. Schedules of nominated tests.
 - c. Development of test definition and test design with nominating Service/ Agency and ODDTE Support Agent, when designated.
9. Chairman, Planning Committee will be executor and nonvoting member of the Senior Advisory Council.

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Figure I-4. Membership and Responsibilities of the Planning Committee

TECHNICAL ADVISORY BOARD

Permanent Members:

Twelve civilian scientists (four each from the Army, Air Force, and Navy/Marine Corps)

Chairman: Rotated periodically among permanent members

Responsibilities:

1. Provide technical recommendations to the DDTE concerning:
 - a. JT&E Nominations
 - b. Evaluation Plan
 - c. Test Design
 - d. Simulation Plan
 - e. Instrumentation Plan
 - f. Analysis Plan
2. Recommend personnel to staff the smaller Technical Advisory Groups (TAGs) created for each JT&E.
3. Provide technical advice to the DDTE on other matters as required.
4. The Chairman of the Technical Advisory Board will serve as a technical advisor and nonvoting member of the Senior Advisory Council.

Figure I-5. Membership and Responsibilities of the Technical Advisory Board

SENIOR ADVISORY COUNCIL

Permanent Members:

Chairman: Director Defense Test and Evaluation.
One member from the JCS Staff.
One member from each Service.

Executive/Advisor:

Chairman of the Planning Committee.

Nonpermanent Members:

One representative from each agency, as applicable.

Responsibilities:

1. Recommend JT&Es to be conducted as part of DoD JT&E program presented by the DoD JT&E Planning Committee.
2. Establish priorities and schedules of JT&Es to be conducted.
3. For each selected JT&E review:
 - a. Preliminary test concepts and objectives.
 - b. Feasibility of tests.
 - c. Impacts of resource requirements.
 - d. Planned budget level of OSD/DDTE funds.
 - e. Selection of Lead Services and participating Services.
4. Recommend next FY starts and JT&E Five-Year Plan.
5. Review and recommend JT&E management and policy changes.
6. Review JTD and Independent Evaluator's Final Test Report.

Figure I-6. Membership and Responsibilities of the Senior Advisory Council

and approve the FYTP and direct the conduct of feasibility studies on new start tests. The Chairman, Senior Advisory Council, will approve those JT&E to be conducted under the DoD JT&E Program. Permanent OJCS and Service members will coordinate for their respective Services/Agencies. Nonpermanent members will be advisory on JT&Es nominated by their Agencies. Meetings will be held annually or at the call of the Chairman. The decisions of the DDTE will be communicated to the Services, OJCS, Defense Agencies, and the OSD staff.

b. Feasibility Determination

A study will be conducted to determine the feasibility of accomplishing a JT&E selected by the DDTE. Normally, the feasibility study will be conducted by a DDTE Support Agent. Participating Services and the JTD (when appointed) will work with the Support Agent to provide resource estimates and advice on operational matters. Occasionally, a test may be so constrained or so conceptually simple, that it is judged, prima facie, to be feasible. Because of the potential cost growth and other difficulties, such a judgment is expected to be rare. DDTE Support Agents are the organizations chosen by DDTE, as required, to carry out feasibility studies, test designs, and independent evaluations. A support agent may also be selected to perform an independent evaluation of the test. The support agent may be a DoD organization, a Federal Contract Research Center (FCRC), or a qualified contractor.

Results of the feasibility studies are provided to the DDTE, and the DDTE makes a final decision concerning test conduct. If the tests are judged feasible, the refined resource estimate from the feasibility study will be used to update the JT&E budget estimate. Timing of feasibility studies must be in consonance with the budget cycle. With the cycle shown earlier in Figure I-1, the feasibility studies will terminate in time for the OSD budget submission in December for the budget year and the authorization year. Equally important, the feasibility studies will provide better resource estimates and the Services can update their Program Objective Memorandum (POM) inputs to reflect a best estimate of the JT&E requirements.

For a particular joint test, the end of the feasibility determination is a crucial milestone. If feasible, the joint test becomes a firm entry in the FYTP and implementing actions begin.

c. Budgeting

Each year, the DDTE prepares a dynamic working plan called the Five-Year Test Plan (FYTP). The FYTP includes the overall JT&E program budget with ongoing tests, previously selected tests, and new starts organized by fiscal year. Adjustments to the overall program budget are made to meet fiscal limits established by the OSD Comptroller. The DDTE tasks existing Joint Test Forces (JTFs) for budget updates. These are usually submitted in writing, then subsequently briefed by the JTD. Thus, the DDTE remains cognizant of budget changes which have occurred since the previous submission and of the ramifications of adjusting the JTF's budget, should this become necessary.

The completed FYTP becomes one element of the overall DoD Research Development Test and Evaluation (RDT&E) program which, with all other programs, is subjected to intensive review within OSD and the Office of Management and Budget (OMB) prior to becoming a part of the President's Budget. During this review cycle, adjustments may be and usually are made to the RDT&E program. In turn, adjustments to the FYTP may be required. If so, the DDTE readjusts the FYTP and FY budgets accordingly, with due consideration given to the effect of reduction on current tests. The DDTE works closely with the JTDs during this time to avoid adversely affecting test plans and schedules. Priority is normally given to those tests in or entering the execution phase, and to long-lead items which, if delayed, would significantly increase the total cost of a given test.

During the remainder of the PPBS cycle, from January to September, Congress reviews the budget, takes testimony, and initiates and enacts authorization and appropriation bills for presidential signature. The authority to fund approved programs is granted by OMB through allocation of appropriations to the federal departments. With this authority, offices within DoD such as ODDTE may allot funds to individual JTFs for purchasing goods and services.

Service support to JT&E is usually drawn from RDT&E and O&M funds, and the personnel and equipment resources are tightly constrained. In the past, support of a JT&E usually meant that some training, testing, or exercise activity was excluded to provide the resources for JT&E. The JT&E planning process provides the Services with knowledge of the FYTP, thereby allowing the Services time for advance planning and to internally reallocate resources in order to achieve the commitments implied by the FYTP. Any RDT&E or procurement Service expenditures required to support a JT&E are subject to the same lead time and review processes as the DoD JT&E funds.

3. Implementation

The implementation of a JT&E may be separated into three distinct processes. These are test planning, test execution, and test reporting.

a. Test Planning

Upon completion of the feasibility study and entry into the budget, a JT&E enters the test planning phase. Several key events occur at this time. The DDTE appoints the Lead Service and requests that a JTD be nominated. The JTD is then appointed by the DDTE; Deputy Test Directors (DTDs) are appointed by their respective participating Services in coordination with the DDTE. While the JTD/DTD selection process is underway, the DDTE will prepare a charter for the JTD and the Joint Test Force (JTF) in coordination with the appropriate Services. The DDTE will prepare tasking to the DDTE Support Agent for development of the test design. This tasking will be based on the details contained in the nomination and on the feasibility study. When the JTD has been nominated and approved, the charter will be provided to all Services involved. Actual preparation of the test design should begin at this point. During preparation of the test design, the JTD will work closely with the test designer and the participating Services. The test design will be coordinated with the JTD and the participating Services to provide a precise response to the DDTE test objectives. Everyone should be striving for the goal of a test design that will achieve the test objectives and be operationally feasible and within budget/resource constraints.

During preparation of the test design, the JTD must also be planning and organizing his staff, deciding upon a headquarters location for the JTF, and selecting appropriate test site(s). By the time the test design has been coordinated and approved, the key members of the JTD staff should be in place. As soon as the personnel resources are available, the JTD should commence development of the test plans necessary to successfully and reliably conduct the JT&E. The Field Test Plan contains a step-by-step description of the activities to be undertaken during the JT&E. An Instrumentation Plan, a Data Management Plan, a Simulation Plan (if required), and a Logistics Support Plan must also be prepared. If the DDTE directs an independent evaluation, a DDTE Support Agent will be tasked to develop an Independent Evaluation Plan, based on the approved test design. The Field Test Plan will be coordinated with the participating Services and approved by the DDTE.

b. Test Execution

Based on the approved Field Test Plan, the JTD will undertake all activities necessary to meet the test objectives (see Chapter III, JT&E Implementation). Briefly, the JTD must prepare and checkout his instrumentation, data management, data validation, simulation, and analysis systems. As the preparation proceeds, detailed subplans should be prepared as necessary and tasking (as previously coordinated) provided to the Services for participating forces and equipment, and required personnel, facilities, and administrative support. Finally, test record trials must be conducted, and data collected and validated in accordance with the Field Test Plan. During the execution phase, the JTD must keep all principals fully informed, especially regarding resource taskings. The DDTE will monitor and evaluate the test execution.

c. Test Reporting

Throughout the test execution, the JTD will submit test reports and interim and special reports, as required. (See Chapter III.E, Post-Test Activities.) These reports will document test conditions, progress achieved, and any expected deficiencies and problems. Upon completion of each test, reports documenting test conditions and results will be

generated and submitted to the DDTE for inclusion in a JT&E information file. Two reports, a JTF Final Test Report and a JTD Management Report, will be prepared.

A "JTF Final Test Report" will document the factual aspects of the test such as environmental test conditions, test limitations, scenarios played, data collected, statistical summaries, preliminary empirical results, the results of quick look analysis, test participants, and any related items or comments relevant to the analysis and assessment of the test results. Evaluating and reporting of test results is the primary responsibility of the JTD.

A "Management Report" will document the JTD's assessment of the test objectives, the lessons learned, recommendations, and the potential utility of the test. If required, the DDTE will provide the results of the test to the DDTE Support Agent selected to conduct an independent evaluation. Test reports will be provided to the participating Services and the Senior Advisory Council.

4. Management Evaluation

The life cycle of a typical JT&E ends in management evaluation which includes provision for the retention of valuable test findings and for improving the JT&E process. The management evaluation process should provide a sound basis for the screening, selection, and administration of future JT&Es.

a. Information Control Process

The DDTE will establish and maintain a JT&E information file containing a library of completed test and evaluation reports and identifying the data bases developed and computer models created. Through the library, the DDTE will be the focal point for JT&E data and will provide information exchange service to interested parties. The DDTE will prepare an Annual Report and submit it to the Services, OJCS, and OSD. This report will be updated annually and will provide a synopsis of JT&Es completed or ongoing as well as all known uses of JT&E products. Users will be asked to assist in updating this report.

b. Management Evaluation Process

All JT&E reports submitted by the JTD and the Support Agent will be evaluated and approved by the DDTE. These reports will also be reviewed by the Senior Advisory Council, and necessary recommendations for improving the JT&E process will be made.

5. Summary

The JT&E process described above is the framework of an evolving system which will allow timely nomination and effective planning, programming and budgeting of proposed JT&Es. Further, since it is designed to assure early consideration of proposed JT&Es, associated resource problems should be minimized.

CHAPTER II ORGANIZING FOR JT&E

A. RESPONSIBILITIES OF KEY PARTICIPANTS

1. Introduction

Before guidelines for organizing a Joint Test Force can be discussed, an understanding of the key participants' responsibilities and organizational relationships is essential. The sections which follow contain summaries of the responsibilities of the Director Defense Test and Evaluation (DDTE), the Office of the Joint Chiefs of Staff (OJCS), the Joint Test Director (JTD), the Lead Service, the participating Services and the DDTE Support Agent. Each summary is supplemented by a detailed listing of the specific responsibilities of the individual participants.

2. Director Defense Test and Evaluation

The Director Defense Test and Evaluation has overall responsibility for joint testing and evaluation. In coordination with the OJCS and the Services, he selects the joint tests which will be conducted. His responsibilities include the provision of funds for test-unique items such as feasibility studies, test designs, data management, independent evaluation, and instrumentation which is peculiar to JT&E. Specific DDTE responsibilities are as follows:

- Select JT&Es (in coordination with the OJCS and Services)
- Prepare plans, programs and budgets for JT&E
- Fund JT&E unique costs (in accordance with DoD Budget Guidance Manual 7110-1-M)
- Appoint the Lead Service
- Appoint and charter the Joint Test Director
- Designate participating Services
- Approve feasibility studies for JT&E
- Approve test design (in coordination with the OJCS, Services, and Joint Test Director)

- Direct an independent evaluation of test data when required
 - Establish overall policy and direction for JT&E programs
 - Chair the JT&E Senior Advisory Council
 - Provide a chairperson for the JT&E Planning Committee.
3. Office of the Joint Chiefs of Staff

The Office of the Joint Chiefs of Staff (OJCS) receives nominations from the CINCs each year. The OJCS also receives nominations from the Services, Defense Agencies and OSD for those JT&Es which concern joint doctrinal or mission issues. The OJCS usually recommends integration of JT&E with OJCS exercises whenever possible. The OJCS also selects the CINC responsible for the conduct of the JT&E, if required. Specific OJCS responsibilities include the following:

- Receive JT&E nominations from the CINCs, assign priority and forward to the DDTE
- Receive JT&E nominations concerned with joint mission/doctrine, coordinate and forward to the DDTE
- Recommend JT&Es which can be integrated with JCS exercises
- Select CINC responsible for JT&E conduct, if required
- Participate in test design
- Review final report
- Provide a permanent member to the JT&E Senior Advisory Council
- Provide a permanent member to the JT&E Planning Committee.

4. Joint Test Director

The Joint Test Director is responsible to the DDTE for the overall management and execution of a specific JT&E. He is directly responsible for assuring that the test design and objectives are met and that a final test report and a JTD management report are published. He is responsible for the management, supervision and direction of all Joint Test Force activities and resources. Specific JTD responsibilities are as follows:

- Participate in test design
- Manage and supervise all facets of the JT&E

- Ensure that test conduct accomplishes test objectives as directed by the DDTE
- Direct and supervise JTD staff
- Organize a functionally effective JTF
- Control and account to the DDTE for OSD funds and monitor Service expenditures related to the JT&E
- Develop, maintain, and update funding requirements and submit the requirements to the DDTE and the Services, as appropriate
- Coordinate the integration of the JT&E with JCS exercises, if required
- Coordinate the use of required resources (e.g., forces and weapons systems) and facilities (e.g., range and maneuver areas)
- Develop plans to support the test (e.g., field test plan, instrumentation plan, data management plan, simulation plan, logistics support plan)
- Collect and validate data from the JT&E
- Analyze and evaluate data and report test results to the DDTE
- Prepare summary statistics and findings of fact
- Submit interim and special reports, as required, to the DDTE
- Submit a JTF final test report and a JTD management report to the DDTE
- Acquire and control special instrumentation and other investment resources and develop a plan for their return or disposition in accordance with established procedures
- Oversee acquisition and disposition of OSD-funded materiel in accordance with the established procedures described in Chapter III, Section E-2 of this manual.

5. Lead Service

The Lead Service is responsible to the Secretary of Defense for ensuring that the Joint Test Director has available all resources necessary for the successful administration and completion of the JT&E. These include the personnel necessary to staff the JTF as well as non-test unique resources required for the actual test conduct. Other participating

Services also provide and administer resources necessary to support the JTD. Specific Lead Service responsibilities are as follows:

- Nominate Joint Test Director to the DDTE
- Provide resources, facilities, and administrative support
- Obligate funds necessary to support the JT&E, excluding test unique expenses funded by the DDTE
- Support test planning, execution, evaluation, and reporting
- Designate unit responsible for providing JT&E support
- Designate Service points of contact to ensure coordination with participating agencies.

6. Services

The Services submit to the DDTE by May 1 of each year nominations of the JT&Es they believe should be undertaken in the next five fiscal years. Information forwarded with the nominations should cover the areas shown in Figure I-3 in Chapter I. Nominations of JT&Es which concern doctrinal or mission issues must be submitted through the OJCS for coordination and concurrence before they are forwarded to the DDTE. The Services also identify special requirements for data or test events which may be incorporated into a specific JT&E. A prime Service responsibility is to plan, program, and provide necessary resources and funds not provided by OSD to support the JT&E FYTP. Specific Service responsibilities are as follows:

- Annually nominate to the OJCS and/or the DDTE joint tests for initiation during the succeeding five fiscal years
- Participate in the preparation of the test design
- Identify special Service requirements for data or special test events which may be incorporated in the JT&E
- Program and provide non-test unique funds and resources to conduct the approved JT&Es
- Appoint the Deputy Test Director in coordination with the DDTE
- Provide fully qualified personnel to staff the Joint Test Force
- Designate a unit or agency within the Service responsible for Service coordination

- Designate a point of contact for specific JT&E
 - Act as Lead Service, when selected
 - Procure and/or modify test items, systems, equipment, and instrumentation as requested by the Joint Test Director and coordinated by the Services
 - Conduct an independent evaluation of test data, if desired
 - Review final test reports
 - Provide a permanent member to the JT&E Senior Advisory Council
 - Provide a permanent member to the JT&E Planning Committee.
7. DDTE Support Agent

If required, a Support Agent is selected by the DDTE to conduct detailed feasibility studies and prepare independent evaluation plans and test designs. The Support Agent may also perform an independent evaluation of the test results for the DDTE. The organization selected may be a DoD element, a Federal Contract Research Center, or a private contractor. The Support Agent will not work directly for the JTD in the performance of his charter. Specific DDTE Support Agent responsibilities include:

- Conduct feasibility study
- Prepare independent evaluation plan
- Develop test design in coordination with the JTD and participating Services
- Prepare independent evaluation report for the DDTE.

8. ESTABLISHING THE JTD STAFF

1. Mission and Functions of the JTD Staff

The mission of the Joint Test Director and his staff is to plan, execute, evaluate, and report the results of the assigned JT&E. In discharging his mission, the JTD will report directly to the DDTE for test policy, program direction, planning, execution, and reporting of the funding program. Because JT&E is a mutually supported activity with the DDTE and the participating Services providing essential resources, the JTD must

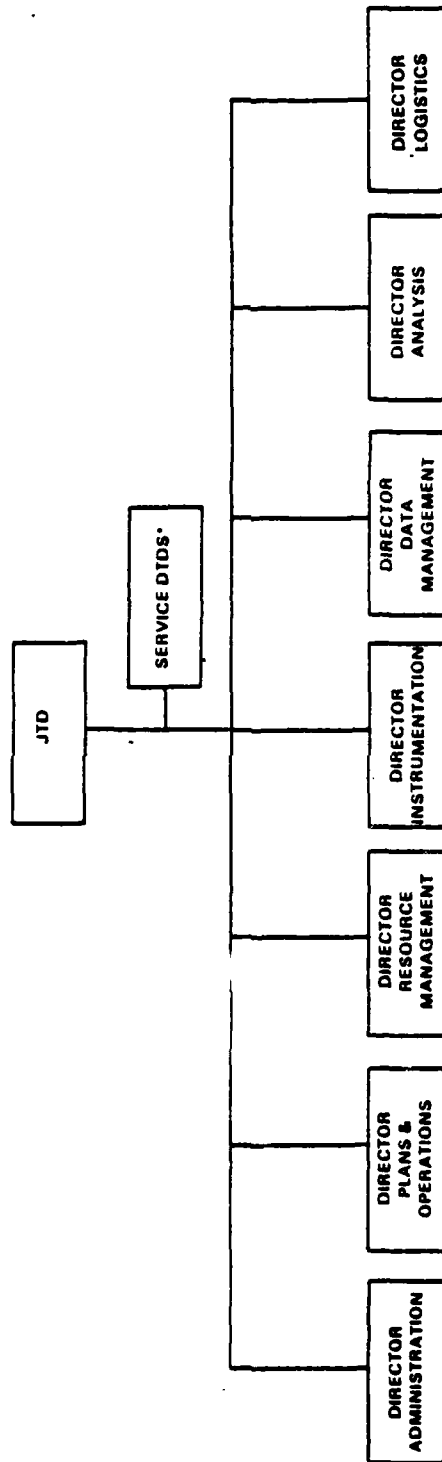
have the full support of the Lead Service and the other participating Services to ensure the successful accomplishment of the JT&E. The DDTE is responsible for the conduct of each JT&E, and the JTD must act for the DDTE in planning, executing, evaluating, and reporting the results of the JT&E. Formally assigned responsibilities of the JTD were listed in Section A of this chapter.

2. JTD Staff Organization

The organization of a JTD staff must be designed with a clearly understood flow of authority. The structure may vary with the size and scope of the test. There are, however, certain basic functions which are common to all joint tests. These include test plans and operations, resource management, instrumentation, data management, analysis, logistics, and administration.

Past experience indicates that gathering all data functions in a single directorate is not the best approach. It is useful, for example, to have a check and balance between the instrumentation group and the data processing group. Further, the function of data validation is closely related to the analysis function. Data-related functions can be separated into the four distinct areas of instrumentation; data collection; processing, storage and manipulation; and analysis and validation.

Figure II-1 depicts the baseline organizational structure for a JTD staff. This baseline can be used as a starting point; adjustments should be made when necessary. In the early stages of the JT&E, individuals may have minimum demands in their intended position and at the same time possess skills which are usable in other areas and functions. For example, analysts on board in the early stages may be able to assist the instrumentation directorate or data management directorate. Conversely, in the later stages, instrumentation engineers may be available to assist in analysis or data processing. If those "attachments" tend to be long-term, the JTD should consider organizing to meet the needs of each distinct phase (i.e., having a planning organization and an execution organization). In general, that should not be the case, and attaching people to other organizations will be done on a coordinated, but informal basis.



*SENIOR FUNCTIONAL DIRECTOR OF EACH SERVICE MAY, IN ADDITION TO ANY OTHER ASSIGNED DUTIES, ACT AS DTD FOR HIS SERVICE

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Figure II-1. JTD Staff Organizational Structure

3. Roles of the Deputy Test Directors

The primary responsibility of a Deputy Test Director is to support the Joint Test Director in the overall direction and management of the test. He may also act as a functional director of one of the key organizational elements, e.g., Director of Plans and Operations, Director of Data Management, or as overall Deputy to the JTD.

At the same time, a Deputy Test Director functions in an important secondary role: he serves as the senior representative of and spokesman for his Service. In this capacity he must:

- Provide Service-specific expertise in resolving personnel and administrative problems related to his Service
- Oversee the performance evaluation process for all personnel from his Service to assure that ratings are representative of the performance
- Provide advice and expertise to the JTD on specific Service issues and areas of interest
- Act as a focal point for arranging Service support necessary for the conduct of the test
- Provide test progress and significant action reports to his Service on a continuing basis.

In summary, the role of a Deputy Test Director is to fully support the conduct of the test as a member of the JTF and as the focal point for all matters concerning his parent Service. As such, he should be granted appropriate authority by his Service.

4. Scoping the Test

The first task for the JTD is to achieve a clear understanding of the scope and most probable time-line for the test. The time-line drives all the substantive parts of the test. Funding and budgeting, personnel acquisition and management, test planning, instrumentation, test execution, and reporting are all sensitive functions of the time-line.

It is particularly important for the JTD to make his own judgment concerning the compatibility of the proposed scope and time-phasing. He must determine that the scope is defined sufficiently so that a valid

judgment of the time required can be made. At this early stage, the JTD should not be concerned if a 36-month estimate is off by 3 or 4 months. Instead, the JTD should be attempting to discern whether the test clearly falls into one of the following three natural classes of time-lines for JT&E: Short - essentially a TDY/TAD effort; Normal - PCS effort, but no personnel replacement problems; Long - PCS, test length greater than normal PCS tour length. The first category (short) consists of those tests which are sharply limited and can be accomplished in less than a year. In these cases, the JTD staff can be manned on a TDY/TAD basis. (Examples of such tests include MAVERICK, A-7/A-10, and Imaging IR MAVERICK). The second category (normal) is the class of test which is more than one but less than four years. In this class, the JTD staff will be assigned on a PCS basis. (Examples include ACEVAL/AIMVAL, ARMVAL, and RABVAL). Finally, the current trend is toward tests of increasing complexity and scope; total duration may be well in excess of a normal PCS tour length. In such a case, the JTD must create a staffing plan which accounts for personnel departures and replacements (which may include his own).

5. Selecting the JTF Location

Another important question which merits early resolution is determining the headquarters location for the JTF. JTFs have been located in many places, but generally they have been located:

- In Washington, D.C. (or nearby)
- At the home station of a Service organization with management responsibilities for test support (for example, AFTEC, Kirtland AFB, NM or USACDEC, Fort Hunter Liggett, CA)
- At the actual test site (for example, Nellis AFB, NV or White Sands Missile Range, NM).

In at least one test, the JTD chose to establish, on a PCS basis, a headquarters in Washington, D.C., which was later moved PCS to the test range. Such a course of action often adds considerably to management difficulties. If the first location is disestablished when the second is formed, there are problems of maintaining continuity. Two distinct locations imply separate physical facilities, personnel support, and fiscal

support -- perhaps even support by two different Services. PCS moves must be planned to comply with established DoD and Service policies. They will also impact on Service budgets. Two separate staffs could be used; however, this adds to overhead costs for the test.

There is strong motivation for the JTD to have easy access to Washington, D.C. in the preliminary phases of the test (shortly after his selection, until test design is complete). If he is physically in Washington, the JTD will be better able to personally interact with the DDTE, the Support Agent, Service Headquarters, and other participants. The starting period of any test is both the most crucial and most poorly defined, and the presence of the JTD at this time is very important.

6. Use of a Start-Up Task Force

Consideration should be given to using a start-up task force for the early stages of forming the JTF. This technique has been used with great success. First, the JTD must think through the test and decide which of the elements are likely to be crucial. He can then convene TDY/TAD task forces from each participating Service and charge them with creating action plans to resolve problem areas. For example, the JTD might anticipate that the crucial areas will be:

- Instrumentation
- Near real time assessment
- Data management
- Test item modification
- Simulation.

The JTD must vigorously guide the conduct of the task forces and ensure that JTD efforts are coordinated with the DDTE. Task forces are not seeking to define the details of a final solution. Rather, they are seeking to outline methods of approach, key action agencies, bounding guidelines, and estimates of cost and schedule. Such early resolution of test issues and problems can assure an orderly start-up. The JTD who developed this technique used a few key people, permanently assigned but part time, to supervise the start-up task force. He used some of the same people to form the nucleus of his PCS JTD staff at the test site. The JTD remained

in Washington, periodically visiting the test site during test execution. The combination of identification of the crucial elements, skillful use of start-up task forces, and aggressive follow-up techniques should assure effective start-up and minimize the occurrence of future crises.

7. Personnel Management

a. Staffing

Personnel matters will be a major concern of the JTD throughout the course of the test. For the sake of clarity, the personnel considered here are assigned PCS or TDY/TAD to the staff of the JTD. In general, the JTD will not be as concerned with the background, skills, and other attributes of test player force or data collection personnel. Using the scope and time-line considerations described earlier in Section B-4 of this chapter as a backdrop, the general staffing problems are addressed below.

(1) TDY/TAD Staff

For the short, well-bounded test, selection of a TDY/TAD staff is appropriate. However, the JTD should carefully review the test schedule to assure that test planning, test execution, reporting, and wrap-up actions can be accomplished within the normal TDY/TAD limit of 179 days. If not, fully qualified personnel must be phased in and out to meet the 179-day limit or a reasonable number of Secretarial waivers must be obtained to satisfy the requirement through the end of the test. For the short test, TDY/TAD staff may be the only choice. The management challenge faced by the JTD in the case of TDY/TAD is potentially severe because of the following:

- Difficulty in creating a truly cohesive joint staff
- Allegiance of the TDY/TAD person tending to remain with his home organization
- Financial and personal hardship for the people involved
- Motivational difficulty because of the temporary nature of the test.

However, there are some offsetting positive attributes of TDY/TAD staffing:

- Required lead time is short
- Because of the short total involvement, career disruption is not perceived to be a problem.

(2) PCS Staff

Given that the considerations of scope and time phasing allow a PCS staff, the JTD should select that technique. Former JTDs strongly recommend that the staff be PCS and on-site. The JTD must address the technical and organizational aspects of his test early to promptly justify manpower authorizations and requisition personnel. Lead times vary, depending upon many factors, but twelve months is a reasonable planning factor. In a lengthy test, lead time is a major consideration for only the key personnel, since the build-up in the staff can probably be time-phased without impact.

(3) Obtaining the Staff

The JTD must provide as much lead time as possible to assure selection and assignment of the best qualified persons. Having carefully considered the topics discussed earlier in this manual, the JTD should have a clear idea of his charter, mission, the outline of his staff organization, and his headquarters location. Further, if he is using temporary start-up task forces, he may well have begun to identify crucial elements which merit close management attention. Therefore, he is now in a position to define the skill and grade requirements, by Service, of his key staff members. Having defined these requirements and established the justification, he should provide his requirements to the headquarters point of contact for each of the Services involved. (For points of contact see Chapter IV, Section A.) In addition to written requests, the JTD should brief each Service regarding his current view of the test and the role the requested personnel will discharge. This serves two purposes:

- It is the most effective means for achieving positive response to the personnel request.

- It provides a valuable early dialogue on the substantive aspects of the test.

b. Requirements for Key Disciplines

Research for this manual revealed some valuable lessons learned regarding the following personnel specialties which have proven to be key factors in past tests: security, resource manager, contracting, program planning and control, frequency allocation, and logistics.

(1) Security

In almost every JT&E, security is an extremely important factor. Skilled administrative security personnel are required to provide procedural and document security for the JTF. Two other security areas can be important for particular tests:

- Operations Security (OPSEC) for any test using operating or development equipment
- Communications Security (COMSEC) for JTF telephonic communications and for RF communications of player forces during the test.

(2) Resource Manager

A resource manager who is experienced in budgeting, funding, and cost accounting is absolutely essential since this is a critical function, especially for large tests. The resource manager must transfer fiscal authorizations and track fund commitments, obligations, and disbursements. Depending upon the complexity of the test, the resource manager may not need all the fiscal skills cited, but he should have some knowledge of the areas listed.

(3) Contracting

In general, it is not recommended that the JTD have a warranted contracting officer on his staff. However, he must have a person conversant with the Armed Services Procurement Regulations (ASPRs), the language, and the general nature of the procurement process. In almost every case, the JTD will be funding and specifying tasks for contracts administered by a supporting contracting office. The JTD will probably be the Contracting Officer's Technical Representative (COTR) with responsibility for protecting the Government's interest during contract performance.

(4) Program Planning and Control

Program planning and schedule and cost control represent key management tasks. Not all JTDs have created a special organizational element to handle these tasks. In lieu of a program control office, the responsibility has been vested in a deputy or a functional director. However the JTD chooses to accomplish them, the functions of program control are essential.

(5) Frequency Allocation

Radio frequency assignment and use is essential to many joint tests. Adequate consideration of these problems in the planning and execution phases can avoid environmental impacts and can enhance test effectiveness and realism. While a frequency allocation expert, per se, is probably not required, one or more persons on the staff must be conversant with the language, paperwork, and potential delays/disruption inherent in the frequency allocation process.

(6) Logistics and Facilities

An early and often vexing problem is the establishment of appropriate facilities and support for the JTD and his staff. Further, throughout the life of the JTD staff, there are requirements for facilities or services which may not be normally provided by the Service which supports the JTD and his staff. An officer skilled in the area of facilities, services, and logistics can be invaluable.

c. Administration

The administrative function of the JTD staff must be prepared to deal effectively with the specific requirements of each of the Services involved. The administrative director must provide cohesiveness and consistency to the functioning of the JTF. Professional handling of administrative issues can be of significant assistance to the JTD in establishing the truly joint nature of the JTF. Two functions which affect all permanent members of JTF are pay and evaluation.

(1) Performance Evaluations

The JTD must clearly explain the rating system, emphasizing two complementary aspects. First, since the JT&E is an important

joint task, the rating structure will reflect the organization of the JTD staff, and evaluations will be based upon the ratee's performance in discharging the mission of the JTF. Second, and equally important, ratings will be reviewed by the DTD of the ratee's Service so that, to the maximum extent possible, all of the formal and informal rating rules of his parent Service will be scrupulously observed. The rating structure will be as follows:

- The JTD will be rated by the DDTE. The rating will be endorsed by his parent Service.
- The DTD will be rated by the JTD with endorsement/review or additional ratings provided by the parent Service of the ratee. Note: the DTDs may have additional duties as functional directors.
- All others in the JTD staff will be rated by their supervisors in the JTD staff. Endorsement or additional rating will be provided by the next higher level of supervision. However, the JTD must ensure that the highest level of endorsement in the JTF is of the ratee's parent Service (normally the DTD from his Service).

The performance evaluation system is depicted below.

<u>RATEE</u>	<u>PRIMARY RATER</u>	<u>CONCURRENT RATING/ENDORSEMENT</u>
JTD	DDTE	Parent Service
DTD	JTD	Parent Service
JTF Staff Member	Immediate Supervisor	DTD from Parent Service

Figure II-2. Performance Evaluation System

(2) Pay

Expertise on pay systems of each participating Service must be available. If that expertise is available, pay and travel reimbursement should offer no particular difficulty. The Navy and Marine participants will be paid from the nearest U.S. Navy Finance Office. Army or Air Force personnel will be supported by the Consolidated Base Personnel

Office at the nearest installation of that Service. The JTD staff need not be a servicing personnel or pay office. It must only be familiar with how to access and use the support structure of each Service and how to directly interface with the appropriate Service agency to solve the problems of individual JTF personnel.

8. Contracting

Virtually without exception, the preparation and execution of a JT&E will require contractual arrangements for the procurement of equipment and services. For example, the JT&E may require surrogate vehicles to examine new systems and concepts or unique instrumentation to collect and/or process data. In the case of services, contracting may be an efficient and cost-effective method of acquiring special skills and expertise in technical areas such as engineering, statistics, analysis, and computer science. Contractual services during the initial planning stages may be particularly useful in the accomplishment of thorough field test planning and systems integration.

As soon as the JTD is selected, he should examine his mission, organization, and available resources. In this examination, the JTD must identify the most crucial contracting areas. Many items require a long lead time; in order to have such items available in time for testing, contracts must be executed in a timely manner.

The laws, regulations, and policies governing the procurement of equipment, supplies, and services are many and complex. It is imperative that the JTD understand the procurement process to effectively discharge his responsibilities. The Armed Services Procurement Act states the preferred methods of procurement. The Act provides for the use of the type of contract that best adapts to the unique needs of the JTD. The JTD must depend on a Contracting Officer (Procurement Office), duly appointed with authority to enter into and administer contracts. The JTD, or his designated representative, will be the Contracting Officer's Technical Representative (COTR) whose primary role is to protect the interest of the Government during contract performance.

While all DoD and Service procurement offices operate in accordance with Federal Procurement Regulations and Armed Service Procurement Regulations, their authorities and operations vary. The JTD must provide the Contracting Officer with a comprehensive description of the systems, equipment, or services to be procured. The JTD can suggest the type of contract based on his specific needs. Formal advertisement is the preferred method of procurement; however, negotiated purchases are authorized where circumstances require or justify a departure from formal advertising. Prominent factors in such cases are that often the procurements are of a unique character or time constraints preclude lengthy formal procurements. In some cases, contracts may exist which can be modified to provide the required equipment or service and maximize the JTD's ability to meet the established schedule. Early development of the procurement requirements for equipment and services and prompt selection of a Contracting Office which can best serve the needs of the JTD is vital to successful accomplishment of the JTD's mission.

9. Financial Management

Sound financial management is essential if the test objectives are to be achieved within the bounds of the resource limits established by the DDTE and the Services. Guidance concerning the development and implementation of a financial management system is contained in Chapter III.

CHAPTER III

JT&E IMPLEMENTATION

A. OVERVIEW

1. Introduction

This section provides an overview of the general process of joint test execution. In the final analysis, the JTD is the individual responsible for the proper execution of the joint test. It is the JTD who must assemble the organization and resources to conduct the test and ensure that they are used in a manner which provides meaningful results consistent with the JTF charter and test objectives. However, the JTD does not operate in isolation; the DDTE, the Lead Service, the participating Services, and the Support Agent all have roles to play in the execution of a joint test. Thus, the JTD must be aware of these Agencies' responsibilities and use them to ensure that the test is accomplished effectively and economically.

2. Structure of Testing

Generally, any test can be viewed in terms of four components: planning, execution, analysis, and post-test activities.

a. Planning

Strictly speaking, joint test planning begins many months prior to the appointment of the JTD and the formation of the JTF. However, planning is a continuous process; consequently, the JTD should become thoroughly familiar with all program documentation and be prepared to become fully involved in test planning regardless of the stage at which he is appointed. Comprehensive planning for a joint test requires that the test be viewed as a total program, not just a collection of discrete activities. This, in turn, requires thorough familiarity with the feasibility study, involvement in preparation of the test design, and positive control over the development of the Field Test Plan, the Instrumentation Plan, the Data Management Plan, the Logistics Support Plan, and the Simulation Plan, if one is required.

In many cases, lengthy and complex JT&Es will overlap with other test or exercise activities or conflict with operational requirements. The JTD must coordinate his planning activities carefully to avoid schedule conflicts. Conflicts which cannot be solved by the JTD will be resolved by the DDTE.

b. Execution

Test execution is the measure of the adequacy of test planning. While heroic efforts have been attempted to change the course of past tests at the mid-point, no amount of analysis can recover data that was not collected or data that was invalid in its content. The JTD will be the sole authority for implementing the test plan; directing test resources so that valid data is generated to meet test objectives; and ensuring that the data is collected, reduced, and managed to facilitate effective analysis.

Test execution consists of two phases: preparation for testing and active testing. Test preparation involves scheduling and assembling required resources, training test players, verifying test support from other agencies (including range facilities and contractors), and ensuring that approved data management procedures are implemented and operating.

Active testing is the phase during which the basic mission of the JTF is fulfilled. As a percentage of the overall life of a JTF, active testing may be quite short. However, the phase will be intense, requiring day-to-day, hour-by-hour management by the Joint Test Director. Critical aspects of active testing are test control, data management, and, as a goal, near real-time assessment. Since the primary function of test execution is the collection of data to support the test objectives, the JTD must know that the test is progressing according to plan, that data are being captured as planned, and that the results are useful.

c. Analysis

The nature of joint testing requires that the JTD analyze the data generated during test execution and that he submit a test report containing an evaluation of test results. The JTD is the best qualified to determine the validity of the data, understand the details of each trial,

and thoroughly comprehend the test from beginning to end. Analysis goes beyond simply reducing and storing data for later manipulation in an independent evaluation. Often, the analysis performed will be statistical in nature in an attempt to accept or reject hypotheses stated in the test objectives. Analysis should therefore be an ongoing feature (near real time) of test management rather than a post-test activity, since it is likely that the conduct of specific trials during the test can be of great assistance or hindrance in drawing inferences. Analysis efforts should be integrated so that those who are involved in the test planning process also take part in the analysis of the data collected.

d. Post-Test Activities

Post-test activities include test reporting and briefing, disposition of resources, and the establishment of a data repository. At the end of a joint test, two major reports are prepared. The first is the Test Report which documents the factual aspects of the test as well as the JTD's analysis and evaluation of test results. The other report is a Management Report to document the JTD's assessment of the test objectives, lessons learned, recommendations, and the potential utility of the test.

B. TEST PLANNING

1. Role of the Joint Test Director in Test Planning

Joint test planning begins when the test is first nominated. Each nomination is accompanied by a preliminary test concept containing a brief description of the test purpose, objective, concept and utility, along with a budget estimate. After a test is selected, the Planning Committee coordinates the preparation of an amplification of the preliminary test concept for submission to the DDTE for use in preparing the Feasibility Study, the Test Design, and the Evaluation Plan.

The JTD should be selected and the JTF organized as early as possible to allow participation in development of the Test Design. The JTD will actively provide input and coordinate with the DDTE, the participating Services, and the Support Agent at every opportunity, since the results of

the Test Design and requirements of the Evaluation Plan will be the basic building blocks of the Field Test Plan he will have to develop. Consequently, the JTD should identify issues and problems which would limit his ability to plan for and manage the test. The Test Design should have the full confidence of the JTD and participating Services or Agencies; the JTD should not proceed until he has an acceptable Test Design.

Following the completion, coordination, and approval of the Test Design, the JTD assumes responsibility for accomplishing the remainder of the test planning process. He will prepare the Field Test Plan and will constantly review and revise it as necessary as the test proceeds. Since the Field Test Plan is based upon the Feasibility Study, Test Design, and Evaluation Plan, it is essential that the JTD, if he has not participated in their development, be thoroughly familiar with their content and implications. The next sections summarize the contents of these documents. The following sections then discuss the development of the Field Test Plan, the Data Management Plan, the Instrumentation Plan, the Logistics Management Plan, and the Simulation Plan.

2. Feasibility Study

The Feasibility Study should describe: (1) the test concept; (2) the general test objectives; (3) a preliminary schedule; and (4) an estimate of the resources required. The JTD, if appointed, and the participating Services/Agencies should assist the DDTE Support Agent in conducting the study and should also review the final report.

In reviewing the general test objectives, the JTD and the Services should be concerned with translating them into meaningful test elements. A determination must be made concerning the achievability of the test objectives relative to the available resources.

A careful review of the preliminary schedule is essential. There is a real possibility that the Feasibility Study will be based on an optimistic schedule which does not adequately consider actual test problems (e.g., late equipment delivery, mission failures, conflicts with other test or operational requirements, instrumentation problems, weather at the test site). If the schedule is not achievable, the JTD and the participating

Services should develop a more suitable schedule and submit it to the DDTE for approval. The DDTE is responsible for establishing the priority for test accomplishment.

Similarly, the estimate of resource requirements must be carefully scrutinized. Often, feasibility studies implicitly assume that required resources will be made available. The JTD and the Services should identify resources such as instrumentation or simulators which are likely to be difficult to obtain on schedule (or at all), and determine the impact of the lack of such items on the JTD's ability to meet the test objectives. Serious issues which arise as a result of this review should be raised with the DDTE and the Support Agent for resolution as quickly as possible.

3. Test Design

The Test Design will provide specific test objectives, test events, instrumentation, test methodology, data requirements, data management needs, and analysis requirements. Ideally, the JTD should be continuously involved with the Support Agent during the development of the Test Design because of the considerable impact it will have on his test planning and execution. The Test Design should:

- Provide a refined estimate of resources required
- Structure and organize the approach to testing in terms of specific test objectives
- Identify key measures of effectiveness (MOE)
- Identify the number and type of test events
- Identify data required and how the data will be gathered, stored, and analyzed
- Recognize special requirements of participating Services/Agencies
- Provide sufficient flexibility to allow for the unexpected
- Be coordinated with the participating Services and approved by the DDTE.

The JTD should work toward ensuring that these requirements are met in a way which facilitates his job of conducting the test. Understanding the key elements of a Test Design and being prepared to provide input to the Support Agent are essential to accomplishing this goal.

Listed below are some of the key elements along with suggestions concerning areas in which the JTD should be especially alert:

a. Test Approach

The test approach specifies the methods and techniques to be used in conducting the test. The JTD should carefully review with the participating Services the assumptions concerning test locations, resources, and time requirements underlying the approach.

b. Constraints and Limitations

The JTD should be in agreement with the Support Agent's perception of constraints and limitations which bound the test. The JTD's previous operational and/or testing experience should be applied. Typical, but often overlooked, constraints include: instrumentation, a realistic test scenario, test schedule compression, range safety, lead time for test items, availability of support equipment, and priority conflicts on the test range.

c. Identification of Required Data Elements

The data elements required to meet test objectives determine the types of measurements to be made and the instrumentation required to obtain them. Qualitative information may be required, thus necessitating development of structured questionnaires and debriefings. The JTD should thoroughly understand the required data elements in order to properly plan for their collection, reduction, and use in analysis.

d. Automation

The JTD must trade-off the desire to automate data collection with the cost of such automation. For one-of-a-kind tests with few repetitions, it is usually preferable to rely on manual data processing rather than develop complex computer software. On the other hand, few new JTDs realize the amount of data which can be generated in a large JT&E. In one test, over fifty cubic feet of "data" were estimated to have been collected each day.

e. Statistical Design

Most test designs are based on a statistical model which allows generalization from relatively few observations. The complexity and

extent of testing hinges on the type of statistical model being used. The JTD should become familiar with the statistical basis for the Test Design as well as the trade-offs between the number of data points actually obtained in the test and the amount of uncertainty involved in generalizing from the test. A discussion of statistical analysis is provided in Section D of this chapter. A statistician or operations researcher must be part of the JTF.

It should be remembered that statistical models are based on underlying assumptions about the "real world," and that a good operational scenario may conflict with the assumptions for a specific statistical design. An alternative design may be more consistent with the scenario and testing limitations; consequently, the JTD should be prepared to not only critique the Test Design on this point but to offer alternatives as well. The statistical design will drive the number of repetitions required of each test event. Consequently, it has a considerable impact on test costs and realism.

f. Resource Estimate

It is essential that the test design specify all facilities, manpower, equipment, and instrumentation required from the Services. This allows for maximum planning and budgeting time and will materially reduce future conflicts and/or limitations.

4. Evaluation Plan

The Evaluation Plan is closely linked to the Test Design, especially the statistical model(s) on which the Test Design is built. Since the JTD will be expected to provide evaluation and analysis of test data, he must understand the Evaluation Plan well enough to ensure that his own evaluations and analyses are consistent with it. Further, the JTD should understand that any changes made to the Test Design will have to be reconciled with the Evaluation Plan. For example, if the Test Design is built on a distribution-free (nonparametric) model, then the Evaluation Plan cannot call for regression analysis on certain data, since regression assumes a certain distribution to underlie the population being tested.

Other aspects of the Evaluation Plan requiring scrutiny by the JTD are the assumptions about resources and level-of-effort required to conduct the analysis. Data analysis efforts are often seriously underestimated. For example, one JT&E subtest took three weeks for testing and required two person years of analytical effort. The operations researcher or statistician on the JTF will have expert knowledge of how to scope the required level of effort.

5. Field Test Plan

a. Introduction

The test plan translates the test design into "real world" resources, procedures, and responsibilities. The JTD has full responsibility for preparing this document; consequently, it provides him with the best opportunity to insert into the JT&E planning process his own methods of accomplishing test objectives within the constraints of time, budget, manpower, and material resources. In preparing the Field Test Plan, the JTD should remember that, even deep into the test, planning remains a continuous process involving ongoing studies, analyses, validations, reviews, and changes.

Experience indicates that operational realism has a positive effect on the validity, credibility, and utility of joint testing. Major characteristics of realistic tests are:

- Operational and support personnel with relevant combat experience should participate in the selection of test objectives and development of the test design. They should also be participants in data collection and evaluation (White Force) functions.
- System operators should not have test data collection responsibilities; this function should be the responsibility of trained White Force personnel so that system operator performance is not affected.
- Real-time casualty assessment and damage assessment should be considered if they can be done accurately and will contribute to the accomplishment of the objectives.

- Instrumentation should be provided which permits the operators and the threat to exercise (by simulation) options available to them in combat.
- Instrumentation should be as invisible as possible and should not be cumbersome or impose limitations on the systems, equipment, or personnel in the test. Realism should be a key factor.
- The program should consist of exercises simulating combat or combat support situations in which test data collection is superimposed. They may be supplemented by experiments and other measurements not involving exercises.
- Exercises should be sized for simulations of two-sided engagements.
- Operators of systems being evaluated should be subjected to combat zone conditions and status during the test.
- Test players should be subjected to stress as in combat, using isolation, rumors, noise, odors, smoke, pyrotechnics, blank charges, time constraints, foreign languages, and other devices and procedures.
- System operators should be typical operational personnel with varying skill levels (including system maintenance personnel) and should use approved and established operational procedures.
- Tactical profiles and combat delivery modes should be used.
- Testing should be performed in a variety of operationally representative physical environments, including climate and season, weather, terrain, vegetation, visibility, and electronic warfare characteristics.
- Scenarios should provide planned conditions in which crews react to "enemy" actions and system problems.
- Uncertainty must be maintained in the minds of the players if valid data are to be collected for such measurements as detection times, detection probabilities, reaction times, engagement opportunities, probabilities of success, or other such performance-related measurements.

- Threats should be simulated according to current DIA-approved intelligence on enemy doctrine, deployments, tactics, appearance, signals, and actions.
- Tactics should be consistent with Joint and Service doctrine, the selected military situation, and the test environment.
- Whenever possible, it is desirable to avoid distortion of event results which can occur when small numbers of player force personnel are involved in repetitious tasks.

The following guidelines are provided to assist the JTD in scoping his Field Test Plan:

- Understand and attempt to resolve test issues early
- Identify the most promising testing opportunities and potential problem areas which will impact the test
- Explore alternative courses of action for accomplishing the test
- Assemble the best available talent and know-how for planning the test
- Establish and adhere to a structured planning process
- Initial resources commitments are based on the test design. Early and thoughtful justification are absolutely essential when the field test plan changes affect resources requirements.

b. Basic Components of the Field Test Plan

The size and complexity of the Field Test Plan are dictated by the nature of the particular joint test being planned. Nevertheless, the Test Plan should address a minimal set of issues to be a useful, "living" document. This section discusses the essential components of the Field Test Plan.

(1) Test Purpose and Objectives

This section provides a brief statement of the overall purpose of the test. Critical issues relevant to the test are also identified. Finally, the general and specific objectives of the test should be clearly stated with priorities assigned.

(2) Concept of Test Operations

This section defines all aspects of the system/concept to be tested including: test items, operator/training requirements, maintenance concepts, personnel and training, logistics and supply, scenario requirements, expected test duration, and special supporting personnel and equipment.

(3) Scenario

As soon as the initial concepts of the test are approved, the JTD should have a detailed scenario "wargamed" by the staff. While this scenario will probably change, it prevents early misconceptions from becoming embedded in resource estimates. The individual Services can also become more actively involved by participating in the scenario review process rather than simply awaiting the draft test plan. The JTD should carefully consider the requirement to employ multiple test scenarios. Some evaluations are likely to be very scenario-sensitive. But costs of multiple scenarios must be a prime consideration.

(4) Method of Accomplishment

This section defines how each test or subtest is to be accomplished. In general, the JTD should:

- Identify objectives for each test/subtest
- Describe the actions to be taken and procedures to be used during the conduct of each test/subtest
- Summarize raw data to be collected and their sources
- Describe data collection methods and instrumentation requirements
- Summarize all test events necessary to accomplish each test/subtest
- Prepare trial/variable matrices as appropriate.

(5) Test Schedule

The JTD should specify significant milestone dates, using a line chart (if appropriate) showing duration and time phasing of important test activities. Example milestone dates include:

- Distribution of Field Test Plan
- Finalization of support agreements

- Equipment and instrumentation procurement or modification
- Briefings and meetings
- Contractor support procurement
- Deployment of supporting units
- Test commencement
- Test completion.

(6) Test Management and Organization

In this section, the JTD identifies key personnel and command relationships. In addition, this section specifies points of contact within the JTF and within each Service supporting the test. Finally, the organization(s) exercising administrative support for JTF personnel should be identified. The JTD should execute a clear Memorandum of Understanding (MOU) with the Lead Service and each participating Service/Agency.

(7) Responsibilities

This component of the Field Test Plan identifies each participating organization and lists their responsibilities along with the services and/or equipment they are to provide. Much of this information is drawn from the directives issued by the DDTE; however, amplification of these directives will be required to avoid misunderstandings during the test.

(8) Personnel

This section identifies the personnel (in addition to the JTF) required to support the test program in terms of: job title, grade, specialty, period of utilization, providing organization, and number required. The Lead Service and/or the designated Service Agency will provide the JTD with assistance in formulating these requirements. In addition, this section should specify any specialized training which test participants will require. This is an important consideration for tests involving new doctrine/tactics or unusual data collection/instrumentation devices.

(9) Required Test Reports

This section of the plan states the required frequency of test reports, their recipients, special content/format instructions, and preparation responsibilities. At a minimum, the JTD should identify and schedule the Interim Report, Management Report, and Final Test Report.

(10) Safety

Safety planning will vary from test to test based on inherent hazards. At a minimum, this section should: designate a Safety Officer and outline his responsibilities, identify critical safety aspects of the test, specify procedures to be followed, and establish an emergency reaction plan.

(11) Security

This section should discuss all security aspects of the test including storage, handling procedures, restricted areas, TEMPEST, and communications security. The JTD will develop a detailed classification guide consistent with DoD/Service requirements and directives.

(12) Environmental Protection

If an environmental assessment has shown the test to have potential impact upon the environment, this section should identify those actions and procedures which will be taken to minimize, mitigate, or neutralize any adverse effects of the test. This will normally be subsumed in the Environmental Impact Statement for the range or test facility to be used.

c. Coordination and Approval

The completed Field Test Plan is submitted to participating Services, the Lead Service, and the DDTE for review and concurrence. Submission for approval is made to the DDTE.

d. Other Components of the Field Test Plan

Each joint test is unique. Consequently, the Field Test Plan will contain additional components to reflect this uniqueness. Usually, these additions will be in the form of annexes to the basic

document outlined above. Examples of unique test aspects requiring additional amplification include:

- Extensive use of computer simulation as part of the testing process
- Specialized simulators
- Extensive equipment modification.

In addition to dealing with unique aspects of particular tests, annexes should be provided to discuss in detail certain management problems which will arise in any test. Such annexes include:

- Test Design Overview
- Reliability and Maintainability Data
- Intelligence/Threat Information.

6. Data Management Plan

a. Purpose

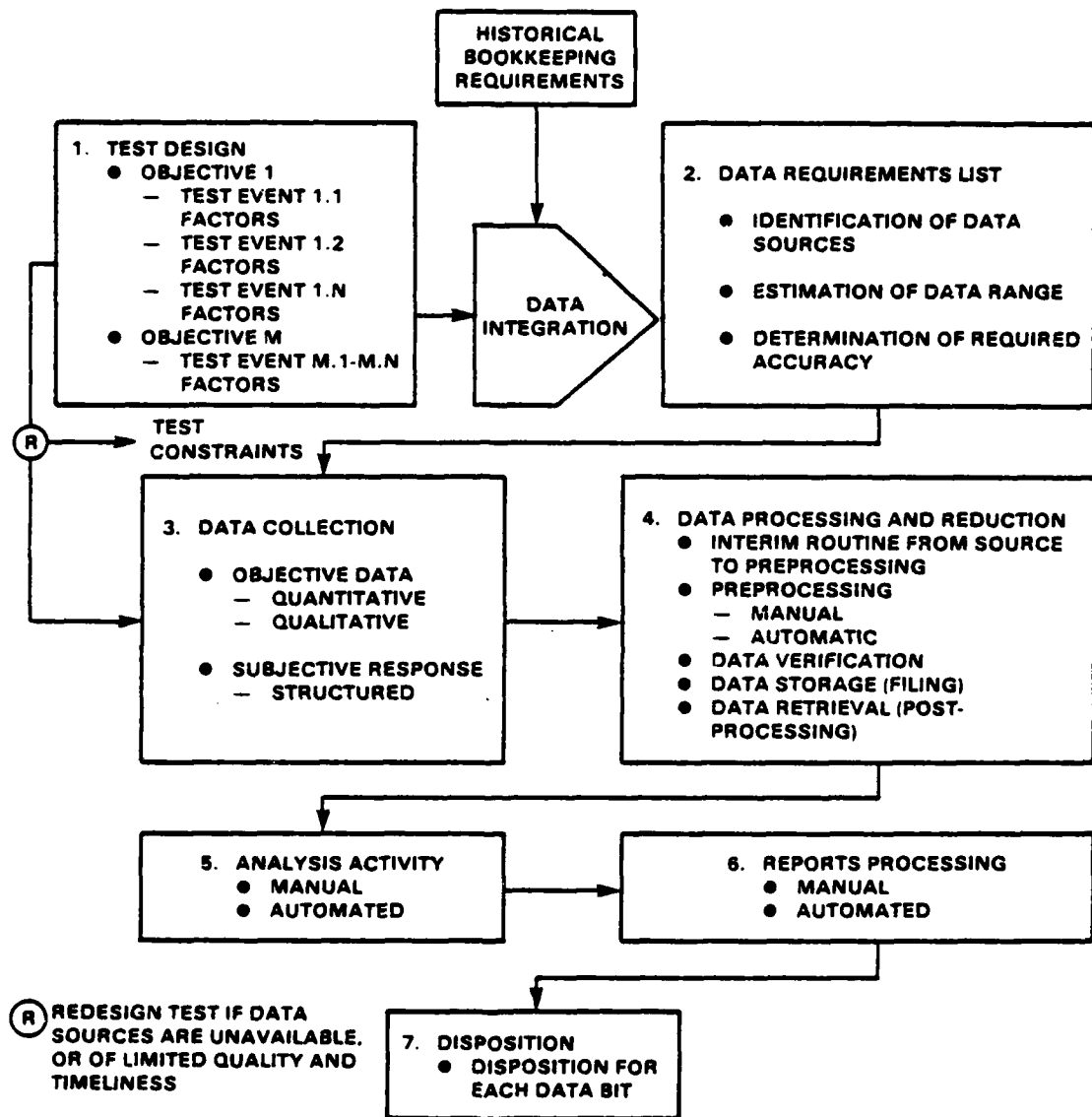
The Data Management Plan is a formal document which provides the complete, detailed, and integrated procedure for the time-phased task of identifying, collecting, processing, analyzing, reporting, and disposing of data which are relevant to the objectives of the joint test. The data management process, which is depicted in Figure III-1, is illustrative of the logic incorporated in test design. The process involves six distinct functions:

- Identification of the required data elements and sources and reliability/confidence assessment of data elements and sources
- Response collection to include design of forms and questionnaires
- Data processing and reduction to include verification of data quality and reduction algorithms
- Data analysis and assessment
- Report processing
- Data disposition.

b. Content

At a minimum, the Data Management Plan must:

- Detail the flow of processing of data
- Outline specific responsibilities for collection and management of data



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Figure III-1. Data Management Process

- Determine data collection procedures which require specialized training
- Provide data formats
- Estimate the amounts and types of data
- Specify required measurement accuracies
- Provide for the identification and validation of additional measures of effectiveness
- Provide a plan for data storage and retrieval
- Size the data management system
- Provide formal procedures for data quality control.

Identification and protection of data are primary requisites of the data management system. Provisions must be made for prompt labeling and dating of collected data. Back-up copies must be made of all data. The flow of data should be directed by routing instructions which indicate where the data will go, who will process it, and which specific analysis or evaluation is to be performed. In addition to the normal data flow, a capability must be provided for quick look analysis as a check against invalid data or unanticipated difficulties. All data flows should be through a single data control function charged with the responsibilities of protection, quality control, copying, and archiving.

c. Software Development

To produce an effective automated data management system, a software development plan must be adopted and followed in a systematic manner. Regardless of the software development plan chosen it must specify:

- Problem definition
- Detailed specifications
- Design period
- Implementation phase
- Software test integration
- Acceptance.

Throughout the software development cycle the use of milestone reviews is recommended. The most critical data management task is the early detection

and correction of slips in the software development schedule. Milestone reviews constitute an excellent technique for exercising this control. Delays can be and often are the result of perturbations in seemingly unrelated areas of the project. It is imperative that all task managers be aware of all scheduling problems. They must evaluate and report on how apparently unrelated problems may affect their particular areas.

d. Lessons Learned

Since a good Data Management Plan is critical to the success of a joint test, some situations which have occurred in previous tests are listed below so that future JTDs may benefit from these "lessons learned."

- The requirements for manual data collection and processing are always underestimated. Data system rehearsals help to better identify requirements.
- Strict control over the test data by data test team members should be maintained. This ensures correct handling of the data within the guidelines of the approved data management plan.
- Turnaround times for data processing should be established and contracted with any outside agency supporting the test, such as test equipment maintenance, film processing laboratories, and data recording tape reloading crews. This ensures that data are collected and made available in a timely manner.
- Quality control guidelines should be established for those Service Agencies not under direct control of the test team.
- Mission success evaluation criteria with respect to effective versus noneffective mission/tests should be determined early in the test program.
- Early consideration should be given to the impact of workload on an operator's ability to log in-test/in-flight data notes.
- The test team should anticipate data losses occurring during early use of the data management system. Therefore, nonrepeatable test events should be scheduled only after the data management system has been fully exercised. Data system rehearsals are a must.

- Whenever possible, consideration should be given to the retention of data useful to other agencies. Outside agency requirements should be submitted early to the test team.
- The purpose of the test is to meet test objectives and not to fill out data forms. If data forms are not applicable, delete their use. Collect only the data which is absolutely necessary. The collection of unnecessary data costs money and time.
- Computer communication, availability, and reliability should be major concerns in the decision to use an automated data base management system. The quality of phone lines and the obligations of the computer center may involve weeks or months of lead time before the entire system is ready for use.
- Detailed documentation of the data sources, types, and formats to be used by the test team is essential before the onset of the test. Interface between the instrumentation equipment manufacturers, test range groups, and test team users should be established before any procedures for data acquisition and reduction are established.
- The data manager should anticipate physical storage space and handling restrictions inherent with large amounts of data.
- Transportation needs for both data teams and data from the collection to the processing point should be thoroughly addressed and documented.
- Quick-look analysis for individuals other than the test team must be a part of the planning process.
- Data should be prioritized in terms of data item importance and the achievement of test objectives. This is important if time compression occurs (for example, earlier than expected requirements for data analysis).

7. Instrumentation Plan

The satisfactory completion of any test program requires the availability of adequate instrumentation and range facilities. The appropriate location for the planned test depends on the type of instrumentation

required which is, in part, determined by the environment desired for the test (terrain, weather, etc.) as well as availability, logistics, economy, size, and other factors. The unique nature of joint tests often requires specialized instrumentation, further complicating the selection of appropriate range facilities. In addition to affecting the selection of test facilities, the availability of instrumentation can have a direct impact on the ability to perform required measurements as specified in the Test Design. Early planning for and coordination of instrumentation will ensure the availability of necessary instrumentation at the correct time.

The size and complexity of the task for the JTD can be strongly influenced by the mission and capability of the test center or range selected. Test centers (such as Eglin AFB or Naval Weapons Center, China Lake) have ranges which are normally instrumented to gather quantitative data on time, space, and position (TSPI) and on system/subsystem performance. The U.S. Army Combat Developments Experimentation Command (CDEC) is a test center with instrumentation and data processing designed specifically for operational tests. It has a strong capability for supporting two-sided tests. On the other hand, training ranges (such as Nellis AFB or Ft. Irwin) have very little instrumentation. There may be training equipment (such as the Air Combat Maneuvering Instrumentation) which provides TSPI, but it is generally limited in coverage or capability. Based on the data requirements contained in the Test Design, the JTD should review with the Service points of contact the availability of various test center/range facilities, their suitability for the test, and the instrumentation available at each facility. If all required instrumentation can be made available at a specific range (or ranges), then instrumentation planning becomes a mere scheduling problem to ensure that the range and required instrumentation are available for the test. The planning is complicated, however, if specialized instrumentation is required. For test-unique instrumentation, the JTD should identify:

- Nomenclature, manufacturer, and model number
- Number required

- Required location
- Source
- Repair and calibration responsibilities
- Date and required duration of use
- Utilization (e.g., data recording, telemetry package, system checkout, etc.)
- Procurement/development schedule, as required
- Cost estimate.

Test unique instrumentation is the responsibility of the JTD. If unique requirements exist, the JTD and his staff must specify the equipment, budget for it, and arrange for its procurement.

In any case, the JTD should submit test descriptions, schedules, and requirements to the range at the earliest possible date to ensure adequate lead time for integration into range scheduling. If the existing range instrumentation is not adequate, the JTD should coordinate his acquisition of test unique items with the range to assume that they can be successfully integrated. It is possible that a cooperative instrumentation program between the JTD and a range can be undertaken. This provides the JTD with a procuring agency and is a natural solution to the problem of materiel disposition.

8. Logistics Support Plan

Logistics support consists primarily of services and facilities at the military installation where the test is being conducted. Many logistics requirements can be identified and a determination concerning their availability made during the test planning phase. The JTD should pay particular attention to defining the logistics support necessary for TDY personnel, equipment, vehicles, and aircraft and oversee the development of a Logistics Support Plan. This plan may be separated into the two major areas of materiel and base support and must always specify both the dates needed and the quantity required.

a. Materiel

This section of the plan should include requirements for supplies, supply accounts, and special procedures. Any non-standard items

which the installation will be responsible for procuring, stocking, or handling should be identified. Requirements for POL, gases, and other chemicals, as well as any hazardous handling or storage aspects must be considered. Munitions, armament maintenance, and explosive ordnance disposal support requirements must be stated along with requirements for storage, handling and delivery.

b. Base Support

Base support requirements include items such as field maintenance, organization maintenance, shop services, billeting, food service, transportation, postal services, accounting and finance, TDY funding policies, medical support, and recreation services. Any special physical security measures or courier service required during the test must be identified. Requirements for administrative and technical facilities should be specified, along with descriptions of necessary floor area, door opening dimensions, lighting, and other utility requirements if they are known.

c. Lesson Learned

A means of controlling logistics support during active testing which proved effective for a previous JTF was the establishment of a Joint Logistics Control Center. The center was staffed by three types of logistics personnel (maintenance, supply, and transportation); it provided centralized control and kept time delays in locating and receiving needed parts and supplies to a minimum.

9. Simulation Plan

Simulations can be useful in many phases of the joint testing process, e.g., from early preliminary planning to analysis of data. In the information gathering phase, a simulation can be extremely useful as an instrument to learn more about the system to be tested. Various aspects of the system's response to different stimuli can be explored as well as the determination of the degree of interaction that may occur when several parameters are varied simultaneously.

In the categorization of variables during the early phase of test design, a helpful estimate of the importance of various independent

variables can be obtained by using a simulation to examine the sensitivity of the dependent variables to changes in the independent variables. In this way unimportant independent variables can be dropped from consideration, and the limited resources available to the JTD can be used on more interesting and productive items. The simulation can also be used to establish the range of interest for the variables. In this way the levels or settings for the primary factors can be ascertained for the test design.

Once the preliminary test design has been set, the test conditions can be "dry run" by use of the simulation to look for any unexpected results that might limit the scope, range, or usefulness of the test. In certain cases (e.g., IFFN) the simulation might be the main instrument of the test with the physical tests providing inputs to the simulation and being used to validate the model at several specific points. The validated simulation can then be run to provide more continuous data over a large number of test conditions. This approach should not be attempted without full consideration of the precautions and disadvantages discussed below.

During the conduct of a test, simulations can serve two fundamental purposes. First, they can be used to simulate testable events as a planning tool and to assist in the evaluation of unanticipated events. Second, simulation can be used to fill untestable gaps (such as SAM fly-outs). The latter simulations can be used to extend the evaluation to conditions/environments beyond those provided in the test. Also, this simulation of untestable events must be used if the test is structured for Real-Time Casualty Assessment. However, these simulations are seldom based on empirical data.

Simulations can contribute to a better understanding of the capabilities and limitations of the items under test. They provide several advantages. Simulations can be accomplished in a relatively short time--given the existence of the computer program, personnel who know it, and/or documentation to fully explain it. The cost of accomplishing the simulation under these conditions can be substantially less than the cost of performing comparable physical tests. The number of test conditions that can be explored is very great. Finally, future conditions can be explored

which today cannot be reproduced physically. For example, a missile's performance may be explored against a future enemy target whose altitude and/or speed capability cannot be physically reproduced within the present state of the art.

Simulations are, however, not without disadvantages. To be successful with simulations one must pay close attention to assumptions which may rule out the use of the simulation for the purposes desired. Frequently the assumptions made are more for mathematical convenience than for realism. Simulations are most useful if they have been adequately validated. In most cases, the range of validation may be limited, and the information in previous test plans and test reports on conditions surrounding the data acquisition may be sparse. If large models must be used, the key to control is continuity of analyst personnel. In addition, the simulation should be user/analyst-oriented (not computer programmer-oriented). It should have a good post-processor to tabulate desired results and optimally should have an operationally-oriented graphical output. Finally, appropriate validated simulations are not readily available for most JT&E purposes. The JTD should contact the Service and JCS Studies and Analysis agencies for expert advice on simulations.

Simulations can be useful in many phases of JT&E; however, caution is advised in checking on inherent assumptions, as well as on the range of validation the simulation has attained. If, after due consideration of its advantages and disadvantages, the decision is made to use simulations, their utilization and integration into the test must be carefully planned. A Simulation Plan must be prepared to address the two broad areas of simulation development and simulation application. Simulation development can be separated into three phases: design, programming, and implementation. The design phase will determine how and what to simulate, data requirements, the general logical structure of the simulation, and output requirements. The programming phase will include the coding, testing, and debugging of the computer programs. Finally, in the implementation phase, the simulation will be installed on the computer on which it will be run.

The implementation phase can be lengthy or short, depending on the nature of the model(s) to be used in support of the test. If existing simulations are to be used, the design and programming phases are eliminated, leaving only the requirement to implement the existing model on a particular machine. However, if new simulations are required, the development aspect of simulation support could be a critical path in overall test execution. Even relatively straightforward simulations can require considerable time to design and program. In any event, the JTD should allow sufficient lead time to have the simulation support available when the test requires it.

Planning for the application of the simulations is especially critical if the simulations are used to support decision-making for subsequent test phases. The Simulation Plan should specify which test data will be required for input to the simulation and should provide enough "turn-around" time for the simulation to be useful. The plan should also describe any "massaging" of test data required to put the data in a form which can be used by the simulation. This aspect of the simulation plan should also be reflected in the Data Management Plan.

C. TEST EXECUTION

1. Program Planning and Control

The process of managing time and money is known as Program Planning and Control. Many tools and techniques have been developed to assist managers in this process. One of the most complex and detailed is the DoD Cost/Schedule Control System (C/SCS) which establishes very specific methods and protocols for measuring the progress of large programs. Other much less complex systems are in widespread use throughout government and industry. All successful program control systems, whether complex or simple, have several features in common. These are:

- Management backing
- Formal plan

- Performance measurement
- Periodic reporting of deviations from plan.

These features are mandatory. Lack of any one renders the system useless as a management tool.

a. Schedule Control

The complex nature of joint tests necessitates a highly structured mechanism for program planning and control. Proper program planning and control provides the discipline and organizational framework through which activities ranging from test planning to resource commitment, instrumentation, data processing, analysis, and reporting can be coordinated. With proper planning and control, potential pitfalls can be identified, schedule risks highlighted, and protracted delays avoided.

It is recommended that very early in the program the Joint Test Director select an individual to function as a resource manager. The responsibilities of the resource manager should include the development of a master program plan which reflects the milestones which must be met if the test is to begin at the scheduled time. The plan should be capable of illustrating in a series of briefing charts the overall program status as well as progress in individual areas such as test planning, operational plan development, data planning, site selection and preparation, commitment of personnel and materiel, training, instrumentation, software development, data processing, analysis, and reporting. A set of representative program planning and control briefing charts which have been successfully used by a Joint Test Force may be found in Appendix A.

After the master program plan with its milestones has been developed, regular program status review briefings should be conducted to track these milestones. These briefings serve many useful functions. First, they keep the Joint Test Director and his staff well informed concerning program developments. Second, they highlight areas requiring special attention, sometimes in the form of "action" items. Third, they provide the discipline needed to keep individual staff members from the natural tendency to procrastinate when the test is still a "long way off." Fourth, they readily demonstrate how a slip in one part of the schedule

impacts on other areas. Fifth, they provide an excellent forum for the open discussion of problem areas.

The program status review charts are useful tools for historical documentation. It is recommended that the charts contain not only a record of the milestones as they were or were not met but also an "events listing." This listing should contain the significant briefings and meetings conducted both within the JTF as well as with external organizations. Such a listing is useful as a reference for the current JTF. At the conclusion of a test, copies of the program status review charts should be made a part of the JT&E library maintained by the DDTE. The charts can then serve the function of "roadmaps" for future Joint Test Forces.

b. Financial Planning and Control

(1) Background

The JTD is responsible for the management and supervision of all aspects of the JT&E. One very important aspect is the establishment and maintenance of a sound financial management system. The JTD must control and account for all OSD funds and monitor Service expenses related to the JT&E. At the same time, funding requirements must be developed, maintained, updated, and submitted to the DDTE and the Services, as appropriate.

(2) Funding Responsibilities

Early in the seventies, Congress supported the Blue Ribbon Committee findings by establishing an appropriation for JT&E. OSD subsequently established a program element (65804D) which funds the unique costs of directing, planning, and executing JT&E. In addition to funding JT&E, this program element supports improvement efforts at major ranges and test facilities, as well as independent tests and evaluations directed by Congress or the SECDEF.

All current, completed, or cancelled JT&E have been funded from this program element. In addition to the JT&E-unique costs funded from this program element, there are Service O&M costs incurred for items such as personnel, operation, and maintenance. Because of the dual funding of joint tests, the budgeting and programming process is a

cooperative effort which involves OSD, the Lead Service, and all other Services which are participating in a joint test. The DoD Budget Guidance Manual (DoD 7110-1-M) states:

Funding for DDTE-directed JT&E is under the Director of Test and Evaluation, Defense appropriation (program element 65804D). The costs incurred under this program element are for the direction, supervision, and performance of JT&E and will be for those areas which are unique to the needs of the JT&E. In the accomplishment of DDTE-directed joint tests, the Components will be reimbursed from these RDT&E funds for any unique costs associated with the directed tests with the exceptions of normal military pay, O&M expenditures, and the hardware utilized for the test. When directed as Executive Agent for a particular JT&E, the Component will be responsible to the Secretary of Defense for ensuring that all resources necessary for the successful accomplishment of the JT&E are available to the Joint Test Director (JTD). This includes administrative management support and facilities for the JTD. The Components' support costs (O&M, Procurement, and RDT&E) are to be programed and budgeted for in accordance with their established budgetary procedures.

Thus, costs which are incurred solely as a result of conducting a JT&E and which cannot be regarded as providing long-term mission-oriented benefits (such as training or readiness) are normally funded by OSD in Program Element 65804D. However, the precise line between costs which are the responsibility of one of the participating Services and costs which should be funded or reimbursed by OSD is not always easy to define. In many circumstances, the propriety of the fund source may have to be decided by a Comptroller opinion. Nevertheless, the guidelines provided in Table III-1 provide a sound basis for establishing budget requirements.

(3) Financial Management System

(a) Introduction

As previously noted, an experienced financial manager is an essential element of the JTD staff. He is responsible to the JTD for establishing and maintaining a complete financial program with an updating/tracking system. The remainder of this section of the manual is

TABLE III-1. JT&E FUNDING RESPONSIBILITIES

CATEGORY	COST	FUNDED BY	
		OSD	LEAD SERVICE & PARTICIPATING SERVICES
1. JTD AND STAFF	A. TRAVEL	X	
	B. PER DIEM	X	
	C. NEW CIVILIAN HIRE	X	
	D. WORD PROCESSOR (RENTAL OR PURCHASE)	X	(1)
	E. OFFICE EQUIPMENT		X
	F. SUPPLIES		X
	G. OFFICE FACILITIES (BUILD, LEASE, ALTER)		X
	H. VEHICLE RENTAL/LEASE	X	
	I. TECHNICAL ADVISORS	X	
2. CONTRACTOR	A. DESIGN DEFINITION, TEST DESIGN, INDEPENDENT ANALYSIS & TECHNICAL SUPPORT	X	
	B. SIMULATION	X	
3. TRAINING	A. TEST ROE AND DATA COLLECTION TRAINING FOR WHITE CONTROLLERS	X	(1)
	B. TEST UNIQUE C ³ DOCTRINE AND TACTICS TRAINING FOR RED PLAYERS	X	(1)
	C. TEST UNIQUE TACTICS TRAINING FOR BLUE PLAYERS	X	X
	D. OTHER TRAINING—TECHNICAL—JTD STAFF	X	(1)
4. FACILITIES	A. BUILDINGS — CONSTRUCTION, LEASE, ALTERATION	X	X(5)
	B. TRAILERS — LEASE AND PURCHASE	X	(1)
	C. HARDWARE/ADP	X	
	D. RANGE COSTS	X	(2)
	E. INSTRUMENTATION	X	
	F. SURROGATES	X	
	G. SITE PREPARATION	X	
	H. BASE OPERATING SUPPORT		X
	I. PLAYER COMM SUPPORT		X
	J. UTILITIES COST		X
	K. OFF SITE LEASING	X	
	L. PLAYER VEHICLE LEASING		X
	M. PHOTO/VIDEO SUPPORT		NEGOTIABLE
	N. OPSEC SURVEY		X
	O. ENVIRONMENTAL IMPACT STUDY	X	
	P. PLAYER SUPPLY ACCOUNTS		X

TABLE III-1. JT&E FUNDING RESPONSIBILITIES (CONTINUED)

<u>CATEGORY</u>	<u>COST</u>	<u>FUNDED BY</u>	
		<u>OSD</u>	<u>LEAD SERVICE & PARTICIPATING SERVICES</u>
5. TEST SUPPORT			
A.	RED AND BLUE FORCE TRAVEL AND PER DIEM		X
B.	WHITE FORCE TRAVEL AND PER DIEM		X
C.	TEST VEHICLE MODIFICATION, DEMOMODIFICATION & TRANSPORTATION	X	
D.	SURROGATE MODIFICATION, DEMOMODIFICATION & TRANSPORTATION	X	
E.	FLYING HOURS		X
F.	VEHICLE HOURS		X(4)
G.	FUEL		X
H.	PARTS (TEST VEHICLES) AND TRANSPORTATION		X
I.	MUNITIONS		X
J.	TRANSPORTATION OF MUNITIONS	X	
K.	DATA COLLECTION, ANALYSIS AND STORAGE	X	
L.	EQUIPMENT LOSSES		X
M.	PROPERTY DAMAGE		X
N.	INDUSTRIALLY FUNDED FLIGHT HOURS	X	
O.	SIMULATION COSTS, MODIFICATION, DEMOMODIFICATION, AND TRANSPORTATION	X	(3)

NOTES

- (1) EXISTING AND SUITABLE SERVICE RESOURCES, FACILITIES, ETC., WHICH CAN BE MADE AVAILABLE WILL BE PROVIDED; HOWEVER, ADDITIONAL RESOURCES, COSTS, ETC., WILL BE FUNDED BY OSD.
- (2) EXISTING AND SUITABLE SERVICE RANGES/TEST FACILITIES WHICH CAN BE MADE AVAILABLE WILL BE PROVIDED; HOWEVER, ANY REIMBURSEMENT COSTS WILL BE FUNDED BY OSD.
- (3) EXISTING AND SUITABLE SERVICE SIMULATION CAPABILITIES WHICH CAN BE MADE AVAILABLE WILL BE PROVIDED; HOWEVER, OTHER ADDITIONAL COSTS INCLUDING MODIFICATION, TRANSPORTATION AND MAINTENANCE WILL BE FUNDED BY OSD.
- (4) IN CASES OF EXTREME AND UNUSUAL DEGRADATION OF VEHICLE LIFE, THE RESULTANT FUNDING OF THESE COSTS WILL BE NEGOTIATED.
- (5) EXACT PARTITION OF FUNDING FOR CONSTRUCTION, LEASE OR ALTERATION IS DEPENDENT ON WHETHER THE WORK IS SPECIFICALLY FOR THE JT&E.

not intended to be a detailed tutorial, but rather a brief description of a successful financial program content system. Any system will fail if it is not methodically and rigorously enforced. Although particular tests may differ in detail from the standard described, the general principles outlined are sound and must be followed.

The JTD should note from the outset that, although he may control the OSD funds and track and account for Service expenditures, he will be dependent upon supporting finance offices for their actual administration. This is analogous to a unit commander or program manager who, while controlling commitments and obligations, depends on his installation finance office to disburse the funds. What is not analogous is that the JTD is a temporary entity without long-standing ties to a finance office. Therefore, the JTD and his staff must establish new and effective relationships for each JT&E.

A fictional JT&E, "ABCVAL" will be used to illustrate the implementation of a representative JT&E financial program. The scenario for ABCVAL is summarized in Figure III-2.

(b) Financial Program

The JTD and his staff will create and update, whenever appropriate, a complete financial program. The main breakdowns in the financial program will be as follows:

(1) Appropriation

- (a) RDT&E
- (b) O&M
- (c) Procurement

(2) Program Element (P.E.)

- (a) 658040
- (b) XXXXXF
- (c) XXXXXA Service P.E.s as required and authorized
- (d) XXXXXN by the Services

(3) Fiscal Year

(4) Functional Tasks.

"ABCVAL"

- ABCVAL
- AN OSD-DIRECTED JOINT TEST AND EVALUATION INVOLVING ARMY, AIR FORCE, AND MARINE FORCES.
 - NOMINATED IN 1979
 - BUDGET BOGIE FROM NOMINATION \$15M
 - FEASIBILITY STUDY COMPLETED JUST AFTER JAN 80 PRESIDENT'S BUDGET SUBMISSION
 - FEASIBILITY STUDY SHOWS A REFINED RESOURCE ESTIMATE OF \$20M
 - FINANCIAL PLAN SHOWS JAN 80, JUL 80, NOV 80 AND JAN 81 BUDGETS
 - "TIME" IS NOW LATE 1981 - A NEW BUDGET UPDATE IS BEING PREPARED, NOT YET COMPLETE
 - SMALL GROWTHS HAVE OCCURRED IN SOME ELEMENTS BUT ARE OFFSET BY REDUCTIONS IN OTHER ELEMENTS.
 - OBLIGATIONS FOR FY 82 FUNDS HAVE BEGUN.

Figure III-2. A Scenario for Financial Planning Example

In the large majority of joint tests, the only funds directly controlled by the JTD are those provided by the DDTE out of P.E. 65804D. The following section uses 65804D RDT&E funds in the sample charts. If other funds are placed under the direct control of the JTD, the same techniques are directly applicable and require only that separate tracks be maintained for each source of funds. The essential elements of financial planning and control are listed in Figure III-3. A brief summary of each element follows. The numbers cited are keyed to those in the figure.

- 1.0 Current Financial Program: The totality of all management actions required to request, control, and account for funds.
- 1.1 Financial Tracking Plan: Provides a current top-level view of funds required and funds available. It also provides a track from the first budget submission through each change to the present. It is updated with each budget submission or approved program.
- 1.2 Program Budget: The latest submission of the budget for the Program Element/Fund Category. If requirements significantly exceed the former budget submission, an update should be made. When replaced by a new update, the old program budget becomes the latest entry in section 2.0. It is updated with each budget submission or approved program.
- 1.3 Total Obligations: Provides a breakout of funds obligated by functional task and by fiscal year. It is updated as obligations occur.
- 1.4 Current Fiscal Year Spending Plan: Covers two fiscal years for RDT&E funds, three for procurement, and one for O&M. This plan is more detailed than the budget. Each entry is a distinct type of end-item or service. It is updated monthly or more often as required.
- 2.0 JTF Budgets: A track leading from the first budget submission to the present. These entries consist of the Program Budgets (Item 1.2) after they have been superseded. The list of JTF budgets mirrors each entry in the Financial Plan Track but in greater detail. Each budget should be accompanied with explanatory notes regarding the budget changes.

FINANCIAL PROGRAM

- 1.0 CURRENT FINANCIAL PROGRAM**
 - 1.1 FINANCIAL TRACKING PLAN**
 - 1.2 PROGRAM BUDGET**
 - 1.3 TOTAL OBLIGATIONS, BY FISCAL YEAR**
 - 1.4 CURRENT FISCAL YEAR SPENDING PLAN**
- 2.0 JTF BUDGETS**
 - 2.1 7/80**
 - 2.2 11/80**
 - 2.3 (AS REQUIRED FOR FUTURE UPDATES)**
 - 2.4**
 -
 -
 -
- 3.0 FUND RELEASES FOR EACH FISCAL YEAR**
 - 3.1 FY 81**
 - 3.2 FY 82**
 - 3.3 FY 83**
 - 3.4 FY 84**
 - 3.5 (AS REQUIRED TO COMPLETE PROGRAM)**
 - 3.6**
 -
 -
 -
- 4.0 OBLIGATIONS FOR EACH FISCAL YEAR**
 - 4.1 FY 81**
 - 4.2 FY 82**
 - 4.3 FY 83**
 - 4.4 FY 84**
 - 4.5 (AS REQUIRED TO COMPLETE PROGRAM)**
 - 4.6**
 -
 -
 -
- 5.0 EXPENDITURES AND DISBURSEMENTS FOR EACH FISCAL YEAR**
 - 5.1 FY 81**
 - 5.2 FY 82**
 - 5.3 FY 83**
 - 5.4 FY 84**
 - 5.5 (AS REQUIRED TO COMPLETE PROGRAM)**
 - 5.6**
 -
 -
 -

Figure III-3. Essential Elements of Financial Planning and Control

- 3.0 Fund Releases: Records of funds released by fiscal year, by fund category, and by program element. The record is organized by release date and includes the allotment (or Military Interdepartmental Purchase Request--MIPR) identification, the receiving finance office, the end-items/services for which the money was allotted, and the amount. They are updated as fund releases occur.
- 4.0 Obligations: A track by fund category and program element of obligations in a fiscal year. This record is kept by contractual instrument since a contract or a supplemental agreement is the method of obligation. It is updated as obligations occur.
- 5.0 Expenditures and Disbursements: A record of the funds expended by and funds paid to individual contractors. It is updated monthly.

A more detailed discussion of the individual elements of the financial plan along with suggested formats for recording the relevant information follows.

1. The Financial Tracking Plan

It is essential for the JTD and his staff to create and update, whenever appropriate, a Financial Tracking Plan. At the end of a test, the initial Financial Tracking Plan and its subsequent versions (tracks) should be a complete, top-level, financial history of the test funds under the control of the JTD. It will, of course, include 65804D funds, but should also provide a record of any Service funds placed under the management authority of the JTD. Figure III-4 shows the progress of the Financial Tracking Plan from the first "bogie" through the update resulting from the feasibility study, and a better, more realistic estimate after detailed test planning was begun. The JTD should ensure that his resource manager has an accounting of why significant changes in the plan have occurred.

2. Current Program Budget

Having constructed the top-level budget estimate for submission to OSD and inclusion in the Financial Tracking Plan, the next management tool to consider is the current budget for the entire test, broken out to functional task level. Figure III-5 displays

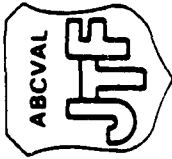
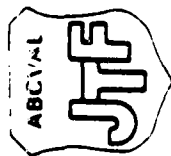
 FINANCIAL TRACKING PLAN (\$ IN THOUSANDS)								FUND CATEGORY RDT&E
								65804D
								AS OF 5 JAN 81
ITEM	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86	TOTAL	
JAN 80 BOGIE	70	3000	6000	5000	1000		15070	
JUL 80 BUDGET	70	3430	8000	3700	3800	1000	20000	
NOV 80 SUBMISSION	70	3429	8125	4640	2730	1000	19994	
JAN 81 BUDGET	70	3429	8125	4640	2730	1000	19994	
1.1								

Figure III-4. Financial Tracking Plan



**CURRENT PROGRAM BUDGET
(\$ IN THOUSANDS)**

CURRENT PROGRAM BUDGET
(\$ IN THOUSANDS)

FUND CATEGORY RDTE							
SOURCE 65804D							
AS OF 5 JAN 81							
ITEM	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86	TOTAL
● TEST DESIGN & ANALYSIS	50	253	400	620	380	300	2003
● DATA MANAGEMENT		197	400	900	500	500	2497
● INSTRUMENTATION		210	300	600	400	0	1510
● THREAT SURROGATES		2630	6615	1070	650	0	10965
● RANGE OPERATIONS		0	200	1250	550	0	2000
● TRAVEL, TRANSPORTATION, & ADMINISTRATION	20	129	210	200	250	200	1009
TOTAL	70	3419	8125	4640	2730	1000	19984
CUMULATIVE TOTAL		3489	11614	16254	18984	19984	

1.2

1.2

2006/80W

Figure III-5. Current Program Budget

the current program budget. Again, budgets must be prepared for each fund category and program element. Each budget submission reflected in the Financial Tracking Plan should have a complete program budget prepared. Further, each functional task entry should be tracked from the previous budget. The program budget provides an overview of the structure of the program by major functional tasks and provides a summary of how the funds are spread over the length of the program. Review of the budget provides feedback as to the consistency of the test plan. Some attributes are obvious. The threat simulators/surrogate vehicles must be funded early on (front-end loaded) to ensure their availability for the test. Some of the other elements (such as data management) peak much later, but still demand early commitment of funds to guarantee that the full capability will be available for the actual test.

3. Total Obligations-to-Date

Another long-term financial document is the Total Obligations-to-Date. (See Figure III-6.) In content and in form, the Total Obligations-to-Date documents are parallel to the Program Budget Form. These charts represent the status of obligated dollars, that is, dollars which have been legally obligated by completing an appropriate contractual instrument or by a fund transfer to a different department of the Government. Obligation of dollars is a most important milestone since Defense-appropriated dollars have fixed lifetimes. If the dollar lifetime (for example, two years on RDT&E money) expires before obligation occurs, the money is returned to the U.S. treasury and is no longer available. Thus, for an RDT&E account as is normally the case for JT&E unique funds, the obligations must be complete in two fiscal years (as shown in the figure). In other words, only the two most recent fiscal years should show obligations less than the approved program for that particular year. Actual expenditures (e.g., payments to contractors) can extend beyond the two-year limit. Further, contracts can be incrementally funded, that is, the cognizant finance office can transfer funds into the contract at prescribed intervals during the course of the programs. Incremental funding does not affect the obligation unless money from more than one

TOTAL OBLIGATIONS TO DATE (\$ IN THOUSANDS)							FUND CATEGORY	
							RDT&E	
							SOURCE	
							65804D	
							AS OF	
							30 DEC 81	
ITEM	FY 81	FY 82	FY	FY	FY	FY	TOTAL	
APPROVED PROGRAM	70	3419						
AMOUNT RELEASED	70	2909						
<u>OBLIGATIONS:</u>								
TEST DESIGN & ANALYSIS	50	250						
DATA MANAGEMENT	—	150						
INSTRUMENTATION	—	100						
THREAT SURROGATES	—	1830						
RANGE OPERATIONS	—	—						
<u>JTF TVL, TRANS & ADMIN.</u>	<u>20</u>	<u>—</u>						
TOTAL	70	2330						
CUMULATIVE TOTAL		2400						

1.3

Figure III-6. Total Obligations to Date

2006/80W

fiscal year is involved. In that case, the obligation may be for the total amount including future fiscal years, but the obligation for the future years does not take force until the Congress appropriates that fiscal year's money. The Obligations-to-Date chart should be updated at every budget update.

4. Current Spending Plan

The current spending plan (Figure III-7) is a shorter term management tool and should be updated monthly. As long as the total requirements remain within the bounds of the currently approved budget, no external update is required. However, if the spending plan indicates that the current budget will be exceeded in any fiscal year or a significant underrun will occur, the JTD should provide an updated budget to the DDTE. Again, for the RDT&E appropriation, any one spending plan will encompass the two fiscal years for which money is currently valid. The agency column contains the name of an agency through which the funds will be obligated. Items in this breakdown are finer grained than the budget or obligations breakdown. The committed column refers to funds which the JTF has directed the appropriate comptroller or finance officer to reserve for a given contractual effort. Commitment does not imply any legal requirement for government expenditure. Obligation occurs when a legal, binding contractual instrument is executed. The (Est) Actual date column in Figure III-7 is an estimated obligation date for committed funds and actual date for obligated funds. It is important to coordinate with the procuring agency on obligation dates to verify that the schedule envisioned is achievable.

The final elements of the current spending plan are the running totals of: Approved Program Funds, Released Funds, Obligated Funds, Committed Funds, and Uncommitted Funds. For RDT&E funds, good financial practice calls for all funds to be obligated during the fiscal year in which they are appropriated. However, the money is good for two years and small deviations from the goal can be tolerated. Procurement funds have a different obligation schedule and O&M as one year money must be obligated in the year appropriated.

CURRENT SPENDING PLAN—AS OF 12/15/81

ITEM	AGENCY	COMMITTED (\$ IN 1000s)	OBLIGATED (\$ IN 1000s)	(EST) ACTUAL DATE OF OBLIGATION
FY 81				
TEST DESIGN IDA	OSD		50	10/1/80
JTF/TVL/TRANS	BASE "A"		20	9/30/81
FY 82				
TEST DESIGN IDA	OSD		150	10/1/81
ANALYSIS COMPANY "X"	AFCMD		100	10/15/81
DATA MANAGEMENT COMPANY "Y"	AFCMD	150		(2/25/82)
INSTRUMENTATION RANGE "B"	FORT "B"		100	10/15/81
COMPANY "Z"	FORT "B"	100		(3/1/82)
THREAT SURROGATES				
SAM "YY"	AF/ASD		1630	10/30/81
TANK "ZZ"	USA/TARADCOM		800	10/30/81
JAMMER "QQ"	NAVELEX	200		(12/20/81)
JTF/TVL/TRANS	BASE "A"	129		(9/30/82)

SUMMARY (\$ IN THOUSANDS)

	<u>FY 81</u>		<u>FY 82</u>
PROGRAM	70	PROGRAM	3419
RELEASED	70	RELEASED	2909
OBLIGATED	70	OBLIGATED	2330
COMMITTED	0	COMMITTED	579
UNCOMMITTED	0	UNCOMMITTED	510

Figure III-7. Current Spending Plan - As of 12/15/81

5. JTF Budget Estimate

The budget estimate is the JTD's tool for formally communicating his fund requirements to the DDTE. Again the budget estimate must be broken down by fund category, program element, fiscal year, and functional task. The JTD should be wary of a too detailed submission to higher echelons. Unnecessary detail destroys the clarity of the budget submission and reduces the flexibility of the JTD and of the DDTE. The budget estimate is a crucial document for two reasons:

- It is the basic document which underlies the entire financial structure of the test.
- It is a clear message to the DDTE and OSD concerning the financial well-being of the test.

A sample budget estimate is shown in Figure III-8. The financial documentation should contain a copy of each distinct budget estimate submitted. As indicated in the Financial Plan (Figure III-4), a budget estimate will be permanently retained for the submissions of July and November 1980, with the latter annotated to indicate that the approved President's Budget submission left it unchanged.

6. Fund Releases

Another dimension to the problem of financial management in the JTF is that money must be released/allocated to the finance office which supports the procuring agency. Thus, funds must be tracked by Military Interdepartmental Purchase Request (MIPR) or allotments. Sample forms for FY81 and FY82 are shown in Figures III-9 and III-10, respectively. Note that the level of detail in these forms is essentially the same as the spending plan. These documents should be updated whenever a fund release occurs.

7. Obligations by Fiscal Year

For each fiscal year in which funds are expended, a updated record of obligations must be maintained. Figure III-11 provides an example for FY82.

JTF BUDGET ESTIMATE (\$ IN THOUSANDS)													
FUND CATEGORY RDT&E		SOURCE 65804D		AS OF 1 JUL 80									
						ITEM	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86	TOTAL
						● TEST DESIGN & ANALYSIS	50	250	400	500	500	300	2000
						● DATA MANAGEMENT		200	400	600	800	500	2500
						● INSTRUMENTATION		200	300	400	600	0	1500
						● THREAT SURROGATES		2650	6500	1000	850	0	11000
						● RANGE OPERATIONS		0	200	1000	800		2000
						● TRAVEL, TRANSPORTATION, & ADMINISTRATION	20	130	200	200	250		1000
						TOTAL	70	3430	8000	3700	3800	1000	20000
						CUMULATIVE TOTAL	—	3500	11500	15200	19000	20000	

2.1

2.1

Figure III-8. JTF Budget Estimate

2006/80W

 FY 91 FUND RELEASES FUND CATEGORY RDT&E SOURCE 65804D APPROPRIATION XXXXX.XX						CUM TOTAL
DATE	MIPR/ALLOTMENT	TO	ITEM	AMOUNT	MIPR TOTAL	
11/1/80	DDP 183	DA, WASH. DC	TEST DESIGN (IDA)	\$50,000.00	\$50,000.00	\$70,000.00
11/10/80	DTAM-10005	BASE "A"	JTF TRAVEL, ETC	\$20,000.00	\$20,000.00	
3.1						

FY82 FUND RELEASES						FUND CATEGORY RDT&E	
						SOURCE 65804D	
						APPROPRIATION XXXXXX > A	
DATE	MIPR/ALLOTMENT	TO	ITEM	AMOUNT	MIPR TOTAL	CUM TOTAL	
10/1/81	DTAM-20007	DA, WASH. D.C.	TEST DESIGN (IDA)	\$150,000.00	\$150,000.00	\$150,000.00	
10/1/81	DTAM-20008	FORT "B"	INSTRUMENTATION UPGRADE	\$100,000.00	\$200,000.00	\$350,000.00	
11/15/81	-A1	FORT "B"	POO MODIFICATION (COMPANY "Z")	\$100,000.00			
10/1/81	DTAM-20009	AFCMD	ANALYSIS (COMPANY "X")	\$100,000.00	\$250,000.00	\$600,000.00	
1/10/82	-A1		DATA MGMT. (COMPANY "Y")	\$150,000.00	\$1,630,000.00	\$2,230,000.00	
10/2/81	DTAM-20010	AF/ASD	SAM "YY"	\$163,000.00	\$800,000.00	\$3,030,000.00	
10/2/81	DTAM-20011	USA/TARADCOM	TANK "ZZ"	\$800,000.00			
10/3/81	DTAM-20012	BASE "A"	FIRST INCREMENT, JTF ADMINISTRATIVE	\$40,000.00	\$60,000.00	\$3,090,000.00	
11/15/81	-A2		2d INCREMENT	20,000.00	\$200,000.00	\$3,290,000.00	
12 10 81	DTAM-20119	NAVELEX	JAMMER "QQ"	\$200,000.00			
3.2							

2006/80W

Figure III-10. FY82 Fund Releases

FY82 OBLIGATIONS						FUND CATEGORY
						RDT&E
						SOURCE
						66804D
						APPROPRIATION
						XXXXXX.XX
ITEM	AGENCY	MIPR/ALLOTMENT	CONTRACTOR	CONTRACT NO.	OBL. DATE	AMOUNT
TEST DESIGN & ANALYSIS						
TEST DESIGN	DA, WASH, D.C.	DTAM-20007	IDA	MDA XXX XXX	10/1/81	150,000.00
(AS OF 12/30/81)						
4.2						

Figure III-11. FY82 Obligations

8. Expenditures and Disbursements by Fiscal Year

There are two aspects of expenditures which the JTD must track. First, he must know the rate at which his contractors are expending their contract dollars. This information should be provided on a monthly basis by the contractors directly to the JTD. Second, he must track the actual disbursement of funds from the Government office responsible for paying vouchers submitted by contractors. This information must be requested on a continuing basis since the paying office usually does not provide it automatically. This data will serve primarily as historical information since it is likely to be 3 to 6 months before disbursement information is available.

A sample format for tracking expenditures and disbursements is contained in Figure III-12. Note that the two categories are tracked on a single form so that an audit trail can be established linking obligations, expenditures, and disbursements.

9. Financial Reporting to the DDTE

Program Element 65804D funds are appropriated annually and available for obligation during the year of appropriation and the following year. Financial management criteria for the overall DDTE program include the amount of appropriated funds which are obligated and expended by the end of the first year. To better align the execution of PE 65804D programs with the appropriation process, the DDTE has established the following reporting procedures which must be followed:

a. PE 65804D Expenditure Requests

Each request to the DDTE for authorization to expend funds from PE 65804D (by MIPR, allotment, or request for contract services) shall comply with incremental funding procedures and include the following:

- Identification of materiel or services to be procured or other items to be supported by PE 65804D in accordance with the appropriation language and the DoD Budget Guidance Manual
- Justification of the need for such materiel, services, and other items

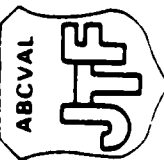
FY82 EXPENDITURES AND DISBURSEMENTS					FUND CATEGORY RDT & E
					SOURCE 65804D
					APPROPRIATION XXXXXXX
AGENCY: DA, WASHINGTON, D.C. CONTRACTOR: IDA FOR: TEST DESIGN					CONTRACT NO.: MDA XXX XXX TOTAL OBLIGATION: \$150,000 AS OF: 10/1/81
EXPENDITURE DATE	AMOUNT	CUMULATIVE EXPENDITURE	DISBURSEMENT	AMOUNT	
12/1/81	\$25,000	\$25,000			
1/1/82	\$25,000	\$50,000			
2/1/82	\$25,000	\$75,000			
3/1/82	\$15,000	\$90,000	3/1/82	\$25,000	\$25,000
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	6/1/82	\$65,000	\$90,000
5.2					

Figure III-12. FY82 Expenditures and Disbursements

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JOINT TEST AND EVALUATION PROCEDURES MANUAL (U)
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END

DATE

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9-82

DTIC

- Expected date of contract, contract amendment, or other obligating action
- Expected expenditure by quarter against the obligation.

b. Quarterly Report of Obligations and Billings

Each Joint Test Director or other user of PE 65804D funds shall submit to the DDTE quarterly a data sheet for each MIPR or allotment and for each contract. For contracts sponsored within ODDTE, the cognizant staff officer shall maintain similar data. The format to be used when submitting these quarterly reports is depicted in Figure III-13.

10. Summary

The Financial Plan and its component forms provide the JTD with a complete set of basic tools. The precise implementation may be varied to suit the size and complexity of the specific JT&E. However, the principles of constant review, updating when changes occur, and stringent tracking of transactions must be conscientiously applied. The resource management system must be oriented toward early identification and resolution of financial problems.

2. Test Conduct and Control

Joint tests, by their very nature, involve multidimensional functions and exploring the unknown or uncertain. Consequently, they always carry a degree of risk. The JTD should be prepared for this risk and attempt to reduce it with thorough planning and attention to detail. A test of only moderate complexity normally requires that the efforts of many individuals and items of equipment with different jobs and capabilities be combined to achieve a common goal: obtaining valid information in a form which permits analysis and the drawing of scientifically sound conclusions.

The demands imposed by the testing environment will require the JTD to make numerous technical and operational decisions. These decisions are ascendant over routine administrative and operational matters and must be weighed in relation to the impact on test design, test objectives and quality and validity of test data. Since joint tests vary widely in scope,

**DIRECTOR TEST AND EVALUATION, DEFENSE APPROPRIATION
PE 65804D**

QUARTERLY REPORT OF OBLIGATIONS AND BILLINGS

TYPE OF FUNDING
DOCUMENT

NUMBER

CONTRACTOR (WHEN APPLICABLE)

UPDATE PREPARED BY:

___ MIPR
___ ALLOTMENT
___ CONTRACT

DTAM

NAME: _____
PHONE: _____
ACTIVITY: _____
DATE: _____

	YEAR 1				YEAR 2			
	QUARTER				QUARTER			
AMOUNT AUTHORIZED BY FUNDING DOCUMENT (CUMULATIVE)	1	2	3	4	1	2	3	4
TOTAL AMOUNT OBLIGATED (CUMULATIVE)								
TOTAL AMOUNT OF BILLS SUBMITTED (CUMULATIVE)								

WITHIN 15 WORKING DAYS FOLLOWING THE END OF A QUARTER SUBMIT TO DDTE ONE COPY FOR EACH FUNDING
DOCUMENT ISSUED DURING THE CURRENT YEAR AND THE PRECEDING YEAR.

Figure III-13. Quarterly Report of Obligations and Billings

complexity, and urgency, it is not possible to describe precisely how the JTD should go about day-to-day test direction. There are, however, several precepts which have general application to all joint tests, and these are discussed below.

a. JTF Indoctrination

The JTD must indoctrinate members of the JTF concerning the background of the test program, test items, and how the test will be conducted. The indoctrination can be either on a group or individual basis, depending on circumstances. In either case, JTF members must be thoroughly familiar with:

- The concept of operations, including the way available resources will be used to meet test objectives
- Data requirements, and how data will be collected, processed, analyzed, evaluated, and recorded
- Milestones and target dates for all phases of the test
- Responsibilities of each support activity and how its efforts will affect the total test effort
- Individual responsibilities, and how they relate to one another, including responsibilities for preparing portions of the draft test report during and after testing
- The chain of authority for purposes of test conduct and procedures for interaction and coordination with other agencies, organizations, and commands.

b. Test Support Verification

Prior planning and coordination will have identified test support requirements. Once the JTF is situated at the test site, the JTD should verify the support each agency has been asked to provide and, if possible, meet with the head of that agency. He should ensure that all actions required to obtain that support have been accomplished prior to the scheduled start date of active testing. Problems with test support should be identified and resolved as early as possible.

c. Rehearsals or Dry Runs

A common mistake in joint tests is to assume that prior coordination of the Test Design and Field Test Plan has led to agreement as to what is to be done. Since each participating organization, agency, or Service has its own perception of its commitments, consideration must be given to the overall accomplishment. Consequently, the JTD should dry run the test as early as possible. Rehearsals down to the greatest detail possible should be conducted to avoid wasting valuable test items or resources.

In tests involving opposing forces, it is especially important to indoctrinate JTF members on the need to keep interaction between red and blue players to a minimum during nontest hours. Failure to do so could lead to inadvertent exchange of mission-related information, thereby invalidating trials during subsequent testing.

d. Maintenance of Records

Tests are conducted to obtain empirical data/information for subsequent analysis. Test data/information may be collected in many ways which may be electronic, electromechanical, or direct observation. When processed for analysis, the information will normally consist of numbers (quantitative) and words (qualitative). Data can be objective, i.e., a number obtained by a measuring device, or subjective, i.e., obtained from a person's estimate or rating. For example, a jamming signal could be objectively measured as X milliwatts or could be described subjectively as "severe" or "severity 5." It is very important that information be correlated, so that observations relating to an event are identified with it, time tagged, and cued to each action. Identification will require a system which labels each piece of information accurately.

e. Data Validation

Data validation is a primary responsibility of the JTD. Some joint tests (e.g., TASVAL and ACEVAL/AIMVAL) have made data validation a formal process. In this case, a data validation committee formally reviews the data against predetermined criteria (objective and/or subjective) prior to its inclusion in the data base. If the issues in the test

merit formal validation, the JTD must establish the committee and its rules early in the planning. The rules should be coordinated with the participating Services. Data validation should be supported by but be independent from the red and blue players. There is often a temptation to discard data which are obviously faulty or gathered in the course of a test phase which was incomplete. The JTD should adopt as an operational maxim the view that all data should be retained, regardless of the perceived quality. Even "bad" data can be analyzed, if for no other reason than to determine why they were deficient.

f. Calibration

All data sources, including instrumentation, player equipment and timing devices, must have an established calibration procedure which is followed before and after each test period. Implementation of this procedure will minimize data losses and anomalies which result from equipment fluctuations. For example, despite the theoretical simplicity of having everyone operate on the same time basis, tests are historically plagued by wide time variations among test players. An obvious result of inattention to this critical detail may be data which indicates that messages were received before they were sent or weapons were fired before a target appeared.

g. Changes During Testing

Before making changes in the test plan for any reason, test integrity must be considered, i.e., the original test design and the comparability and validity of test results may be affected. Unless it can be demonstrated that change is necessary to achieve valid results and useful conclusions, it is inadvisable to make substantive changes during the course of testing. If an alteration in the test plan is deemed necessary it must take the form of an addition to, rather than a major deviation from, a plan which has been carefully developed.

Historically, some of the most valuable findings of tests were not anticipated but became apparent in the course of testing. Such findings are essentially byproducts of the planned testing process. Unexpected test findings sometimes arouse unusual top-level interest and test

modification to investigate them is actively supported. Such a change should be made with an awareness of the additional effort it will cause. In some cases, a separate test -- with all the urgency the situation justifies -- may be considered.

There is a new concept currently under development called adaptive testing. While the concept is not fully developed, it embodies useful notions. In adaptive testing, change is planned for in advance. Specifically, the test matrix is planned with more cells than available resources can fill. As the test proceeds, information gathered during the test is used to structure the testing not yet complete. This may well be a useful concept, but at the time of this writing is not yet mature.

h. Data Management During Active Testing

The primary purpose of a joint test is the collection of data to support the overall test objective. Consequently, the JTD should closely monitor the data collection and processing effort to ensure that the reduced data will be of maximum utility. Successful data management begins with a good field test plan and a comprehensive data management plan (described in Sections B-5 and B-6 of this chapter). The growing complexity of joint tests has given rise to increasingly sophisticated techniques for automating the data collection process. The JTD should be aware of these techniques and use them where possible. If data collectors are to participate, specialized training for them must also be considered. The JTD should personally ensure that data collectors are adequately briefed prior to each trial and monitor all aspects of the data collection effort to the extent that he has a high degree of confidence that correct methods are being used and that valid data are being collected.

The JTD should be aware of the fact that data are being collected under dynamic conditions. It is not always possible to collect data in the manner or in the location intended. Consequently, the data should be audited continually for its accuracy, completeness, and timeliness. Based on the findings of these audits, procedures should be implemented to correct any deficiencies. The requirement for an audit is paramount whenever significant deviations occur (such as changes in test

location or personnel). The JTD should be aware that, once the test execution phase is underway, changes in the test should be carefully evaluated due to the serious ramifications they may have on the data management effort.

If the JTD must await validated and processed data, he will be unable to exercise timely control. Thus, all data management schemes, automated or manual, should have a quick look feature to permit preliminary assessments concerning test trial validity, test status, and overall trends. Used as a feedback to test control, quick look data, albeit not as high in confidence as final processed data, can alert the JTD to problems in players, tactics, rules of engagement, or other areas and enable him to act appropriately. Quick look can also minimize the time required for preparation of the final report.

i. Player Force Maturation and Learning Effects

In some tests, it is possible for significant positive learning, training, or maturation to occur. The player can be exposed to unfamiliar training conditions (for example, intensive jamming). Performing the test replications may have enough training value to significantly improve player performance. Such data should not be averaged, as the value of realistic training may be inferrable from the improvement in performance. It is equally possible that the dedication and competitive spirit of players can result in negative learning (or a propensity to "beat the test"). The JTD and his staff must be alert to these changes and keep the test structured so that it is realistic and impartial.

D. ANALYSIS

1. Requirements

Requirements for JT&E program analysis exist throughout the entire test process--from inception and initial planning to reporting of final results. Although JT&E programs are widely diversified and vary greatly in overall scope and objectives from program to program, analysis is involved in the main phases of any individual test program. In a broad

sense, the main phases of a test program include the Pre-Test Phase, Active Test or Execution Phase, and the Post-Test Phase. Each of these phases has its own relevant types of analysis requirements.

a. Pre-Test Requirements

As discussed in Section B of this chapter, the analytical techniques used to evaluate test results are closely tied to the statistical test design and the Data Management Plan. Thus, the pre-test analysis requirement is essentially to ensure consistency among the techniques to be used, the design of the test, and the data to be collected. A useful approach is to actually "dry run" all anticipated analyses using dummy data of the type expected during active testing. Gaps or weak assumptions should then become apparent before testing begins. This pretesting should apply to all data expected, qualitative as well as quantitative.

b. Active Test Requirements

During the active testing phase, the intended objective is to conduct, follow and complete test execution according to the test plan. However, unforeseen problems and difficulties may occur and decisions must be made. Each trial of a JT&E test will generally result in a large amount of data relating to vehicle positions, weapon events, fire control systems, and environmental conditions. It is important to the successful conduct of the test that a limited evaluation of an appropriate cross section of these data be performed as soon as possible for each trial and/or subsets of the trial. This evaluation is the quick-look analysis and is based on specific techniques prepared in advance.

Quick-look analysis provides for substantiation of a successful trial. In the case of failure, it identifies marginal operation and failure of specific items of equipment, and avoids costly processing of invalid data. When a trial results in failure, the quick-look analysis aids in minimizing the time to correct failure causes. The invalid trial can then be repeated. Additionally, quick-look analysis may show that actual system performance deviates considerably from that anticipated. If this should occur, the test design matrix can be modified, as appropriate, early during the test sequence to provide more useful data for the final analysis of the system undergoing test and evaluation.

c. Post-Test Requirements

The basic objective of analysis after program operations are completed is to quantify measures of performance and effectiveness for the scenarios/threats investigated and to indicate the degree of confidence in the reported quantities. Measurements taken during operations and the resultant data processing are the basis for subsequent analysis. Experience has shown that unexpected problems are often encountered in this area. Some types of data may or may not be recoverable. Decisions must be made at various stages. Decisions can range from wholesale dropping of some types of data because of lack of validity to total acceptance of all data for certain runs or trials. Since data processing is the beginning of confidence or lack of confidence in the final results, it is an inherent part of the analysis.

Processed data are analyzed according to statistical techniques generally contained in the test design and/or analysis plans with any appropriate excursions. The initial procedure in statistical analysis is to measure and adjust or standardize for extraneous effects such as changes in environment, the effect of learning or practice, and other factors. Formal statistical techniques are used to determine if a relationship among variables exists, what the relationship is, and the importance of the relationship. This is the basis for standardizing or normalizing the data for additional analysis.

In certain cases, it may be possible to combine data from different test scenarios. The approach is to begin with the smallest element, a single test scenario or test condition, and combine it with as many others as are valid. The basis for limiting the combination of the different sets is again formal statistical techniques. When these techniques indicate significant differences, a pooling or combining of the data is unwarranted, and separate values of performance and effectiveness measures are required for the different scenarios.

2. Techniques

Although no two tests are ever identical, data analysis problems can often be reduced to a relatively short list. Each test will have its

own problems, and in certain instances, the unique nature of the test design or the test data will require the statistician to employ specialized and seldom-used analysis techniques. However, there are usually a limited number of fundamentally different questions being asked: What is the value of some parameter believed to be? In what range will the value of some parameter probably fall? What is the relationship between values of one variable and values of another? What are the sources of the observed variability among trials? Does a parameter have the value claimed by the advocate or developer of the system?

At times these same questions can be turned around to ask about the probability of realizing certain conditions in the population of inference. What is the probability that a parameter is between two given values? What is the probability that the parameter is less than a given value? What is the probability that the same percent of the population values for a variable will be less than a given value?

A brief discussion of four major analytical techniques is presented in this section. While this discussion does not exhaust the list of potential analytical approaches, most of the problems the JTD can expect to encounter can be handled by the techniques discussed in this manual.

a. Statistical Estimation Techniques

There are several types of statistical estimation techniques which can be employed in the analysis of JT&E data. These can include point estimates, interval estimates, and interval estimates of content or tolerance intervals. This type of analysis involves the estimation of properties of a total population on the basis of the properties discovered about a random sample from that population.

b. Comparison Techniques

Often it is useful to compare the properties of one set of observations with those of an "ideal" or assumed set, or one or more sets of observations made under different conditions. Comparison techniques such as tests of significance, analysis of variance, and tests of independence are useful in such instances.

c. Graphic Techniques

In many instances, a great deal can be learned from test data when it is drawn on paper in "picture" or graphic form. As the amount of data collected grows, the process of assimilating the data becomes more difficult. A large table of numbers may be inconclusive and the statistical descriptors chosen to summarize the data may not tell the whole story. A visual presentation of the data, not totally dependent on numbers, may suggest trends and exceptions not immediately obvious from the raw data or statistical tests. It can be helpful both to the data analyst and to the user of a test report.

d. Nonparametric Techniques

Situations can arise in JT&E data analysis which preclude the use of parametric statistics. It could be the case that there is no knowledge of the distribution of the variable under examination; alternatively, it could be the case that the distribution is definitely not of the required type for applying the desired theory. It is also possible that some variables of interest will not be measured on an interval scale. For example, a target hit (or miss) is a dichotomous variable since it can only be characterized by a discrete value. Similarly, subjective rankings of various ECM or ECCM techniques comprise an ordinal scale and are not suitable for analysis using parametric techniques.

Certain techniques have been designed to replace standard tests when the assumptions and requirements of those tests such as normality and interval scales of measurements are not satisfied. These are nonparametric techniques since they do not test parameter values of known population types. Probably the most widely used nonparametric technique is the Chi-square test for independence and goodness of fit. Additional nonparametric techniques which can be employed in analysis of JT&E data include:

- Wilcoxon Matched-Pairs, Signed-Ranks Test
- Coefficient of Concordance (Kendall's W)
- Friedman Two-Way Analysis of Variance

- Kolmogorov-Smirnov Two-Sample Test
- Wilcoxon Rank-Sum Test.

The preceding list is by no means exhaustive since other nonparametric techniques exist. However, those listed are among the most likely for use in JT&E data analysis.

E. POST-TEST ACTIVITIES

1. Test Reporting

a. Introduction

The primary purpose of test reporting is to communicate the results of the test. While this might seem obvious at first, it is essential that all involved in preparing reports understand that the stress is placed on the single word--communicate. Not only must test reports be timely, factual, concise, complete, and accurate, they must also be written for their intended audience. Generally, this audience is nontechnical. However, it is essential that, while written primarily in nontechnical terms, test reports contain sufficient data and analysis to support the recommendations and conclusions.

At a minimum, the JTD is responsible for submitting the following reports to the DDTE for evaluation and approval: interim reports, special reports (as required), a JTD Management Report, and a JTF Final Test Report. These reports are discussed briefly in this section.

b. Interim Reports

Interim Reports are used to communicate important test findings, milestones, progress, or problems prior to the completion of the test. Consequently, no hard and fast rules exist for the number of Interim Reports to be submitted, nor for their content, format, or means of transmission. These will vary according to the complexity of the test, the interest shown in it, and the importance attached to the information it is expected to provide.

The JTD should exercise caution when preparing an Interim Report. Since the test will not be complete, there will probably be insufficient data on which to base valid conclusions. Yet, users--and even members of the JTF--might be tempted to "jump to conclusions" on the basis of an Interim Report, especially if the test is at all controversial. Caveats on the data presented are essential.

c. Special Reports

Occasionally, the JTD may prepare a Special Report concerning a major program milestone, significant data collected to date, or a critical testing problem which requires immediate attention. In addition, users may request data which have been generated up to a given point in the test. Similarly, the DDTE may require a special status report on the test. In any case, the JTD should exercise the same caution in preparing Special Reports that he would for Interim Reports and caveat all points where insufficient data and incomplete testing could lead to erroneous conclusions.

d. JTD Management Report

The JTD Management Report is an "after action" report of the test and its objectives. It is the vehicle for transmitting lessons learned, the potential utility of test results, and conclusions and recommendations. This report is used by the JTD to report on management, administrative, and testing issues which will be useful to other JTDs. It is broader in scope than the traditional "lessons learned" report since the JTD is also required to assess the overall utility of the test objectives and results and to report his own conclusions and recommendations.

The Management Report is submitted to the DDTE for inclusion in the JT&E information file and distribution to interested users. There is no fixed format; however, the following items should be covered:

- Overview of Test Report
- Assessment of test objectives
- Lessons learned
- Potential utility of test
- Recommendations and conclusions.

e. JTF Final Test Report

The Final Test Report is prepared by the Joint Test Force and provides the permanent record of the results of the test. This report documents the factual aspects of the test such as environmental test conditions, scenarios played, data collected, preliminary empirical results, test participants, and any related items or comments relevant to the assessment of test results. While the DDTE may contract for an independent evaluation, the JTF retains responsibility for conducting necessary analyses and providing the JTF's evaluation of test results.

The Final Test Report is submitted as a bound, final document to the DDTE for distribution to interested users. It will contain the following major sections:

- Purpose of the Test
- Method of Accomplishment
- Discussion and Analysis
- Conclusions and Recommendations
- Annexes:
 - Detailed Test Description
 - Test Environment
 - Test Methodology and Design
 - Test Data, Statistical Summaries, and Findings of Fact
 - Supporting Data and Analysis (including results of quick look analysis)
 - Test Organization
 - Test Operation
 - Maintenance
 - Logistics and Supply
 - Personnel
 - Training
 - Safety
 - Security
 - Funding
 - Materiel Disposition.

2. Materiel Accounting and Disposition

The conduct of joint testing sometimes requires procurement of unique instrumentation using funds from PE 65804D. Such investment in unique instrumentation or equipment has been and most likely will continue to be substantial. Therefore, a maximum return on this investment must be sought through proper utilization and effective management.

a. Policy

Unique instrumentation procured for joint testing may be of a highly advanced technical design, or may permit significantly improved evaluation of military systems and tactics. For these reasons, such instrumentation should be of considerable benefit to the military Services in the conduct of their own test and evaluation programs. It will be the policy of the DDTE to turn over custody of joint test instrumentation to the military Services once such instrumentation is no longer being used full time for joint test purposes. This policy applies to unique JT&E equipment as well.

It is necessary that an orderly procedure be followed in turning over joint test instrumentation and equipment to the Services. This orderly procedure will normally involve the following steps:

- Conduct of a Utilization Study to determine the best use for the instrumentation or equipment
- Development and signature of a Memorandum of Understanding between the DDTE and the custodian Service
- Development by the custodian Service and approval by the DDTE of a utilization plan for the instrumentation or equipment.

Once custody of joint test instrumentation and equipment has been turned over to a Service, it will remain the responsibility of the DDTE to verify that such instrumentation or equipment is properly and fully utilized.

b. Procedures

This procedure will apply to all major items of instrumentation and equipment procured or ultimately financed either fully or partly with funds from Program Element 65804D, Test and Evaluation. A major item

of instrumentation is defined as an equipment, or an aggregation of equipments to perform a single function, whose total procurement cost exceeds \$50,000. This procedure will be waived only with the concurrence of the Director Defense Test and Evaluation.

(1) Utilization Study

A utilization study for a particular item of instrumentation or equipment will normally be conducted approximately nine months prior to the estimated date of release to the Service. The purpose of the utilization study is to provide a basis for determining the best possible usage for the equipment. If necessary, the study could be conducted by an independent agency (e.g., IDA) with inputs from other organizations as required. The utilization study should accomplish the following:

- Develop a list of all potential applications for the instrumentation or equipment
- Consider the capabilities and limitations of other instrumentation or equipment for the same applications
- Determine the cost effectiveness of the instrumentation or equipment for particular applications
- Specify modifications or changes required for particular applications
- List possible applications in order of priority according to urgency of requirements and cost effectiveness for particular applications.

(2) Memorandum of Understanding

The principal mechanism for turning over custody of joint test instrumentation or equipment to a military Service will be a Memorandum of Understanding signed by the DDTE and an appropriate representative of the Service. The Memorandum of Understanding (MOU) will contain the following essential elements:

- Designation of the parties to the MOU
- Delegation authority
- Identification of a specific Service Agency to act as custodian for the equipment

- Detailed identification of equipment to be covered by the MOU
- Statement of priority for JT&E usage
- Statement of availability to all Services
- Statement of funding procedures
- Instructions on equipment modifications to be permitted
- Provision for submission of a utilization plan on an annual or more frequent basis if required
- Statement of conditions for deactivation of equipment
- Designation of effective date for MOU.

(3) Utilization Plan

The Service Agency having custody of the Joint Test equipment will prepare and submit annually a utilization plan for the equipment. The utilization plan shall contain the following:

- A listing of all requests received for equipment utilization
- A listing of currently programmed utilization tasks and dates for their accomplishment
- A description and schedule for programmed maintenance, modification, and update actions
- A description of equipment funding status.

c. Implementation

The Director Defense Test and Evaluation will designate which Service is to assume custody for specific items of instrumentation or equipment and sign MOUs for specific items of instrumentation or equipment. He will also approve instrumentation or equipment utilization plans.

The Deputy Director Tactical Air and Land Warfare Systems (DDTE) will sponsor and administer MOUs and consolidate and submit annually for DDTE approval the utilization plan for JT&E instrumentation or equipment. The Deputy Director for Test Facilities and Resources (DDTE) will monitor funding arrangements and implement DDTE funding guidance for JT&E instrumentation or equipment covered by MOUs. In addition, he will provide technical assistance in developing and evaluating instrumentation alternatives and utilization of existing test resources.

Joint Test Directors will conduct utilization studies for instrumentation and equipment procured under their respective Joint Tests, as necessary. They will also prepare and coordinate MOUs for instrumentation and equipment procured under their respective Joint Tests, and in the case of instrumentation equipment assigned to a joint test, provide inputs for the annual update of the overall utilization plan.

3. Personnel Actions

The close-out of a JTF should be treated in the same manner as the deactivation of any military unit. If conducted properly, with care for the morale and general welfare of personnel, the closing out JTF will continue to function efficiently. The first rule is to plan early and thoroughly. As in unit deactivations, good plans and follow-through will anticipate the important close-down activities and schedule personnel departures so that major events are not disrupted. In order to assure that awards planning is conducted properly, an awards and decorations officer should be appointed. Specific timing will vary from test to test, but in general the bulk of the award packages should be prepared before the final phase-down begins.

Planning must include interaction with Service personnel activities to assure release dates that are consistent with professional close-out of the JTF and not prejudicial to the personnel themselves. As the pace of close-out picks up, coping with all of the necessary milestones without a thorough plan can lead to chaos. More important, for the personnel who have made the JT&E a success, a smooth close-out should be the culmination of a unique and stimulating assignment.

4. Data Repository

At the conclusion of any test, a major problem is the disposition of the large quantity of raw data and the official data file. If a comprehensive data management plan was implemented, data disposition and handling will have been addressed. The data will be well organized and labelled and documentation will exist which specifies how the various data elements can be retrieved. Thus, the disposition problem can be reduced to one of arranging for proper long-term storage from which the data can be accessed with minimal difficulty.

Data will have been collected by many different means and will be in many different formats. Thus, there will be forms, computer tapes, punched cards, reports, and other physical forms which must be stored. The complexity of the repository problem will vary with the size of the test. Further, there will be a problem associated with assigning the burden of storing the data to one or more DoD components.

Generally, the Lead Service will be responsible for maintaining the OSD-funded data repository. The JTD should identify as early in the test cycle as possible the organization within the Lead Service which will provide the storage and retrieval facilities. These facilities will range from several file drawers to environmentally controlled computer tape storage, to on-line storage in a computer center. The JTD should, on the basis of his data management plan, anticipate the kinds of storage facilities required and initiate preliminary arrangements early in the test.

If more than one storage point will be required, the location and method of access to each should be documented and made part of the JTF Final Test Report and the JTD Management Report. In some cases, data will be stored in more than one location by more than one Service or Agency. The JTD should anticipate the long lead time needed to resolve the coordination problems inherent in such a storage arrangement so that procedures for accessing the data can be documented by the time the test is over and the repositories are created. In cases where a Service or Agency other than the Lead Service will have some or all data repository responsibilities, the DDTE should be involved in all discussions and agreements concerning the establishment of the repository.

Whatever the physical form(s) and location(s) of the repository, the JTD must document the following information for all users:

- The form of the data
- How the data are classified
- Where the data are stored
- How the data can be accessed
- Restrictions/problems in the use of the data
- How long the data will be stored.

CHAPTER IV SPECIAL TOPICS

A. SERVICE SUPPORT MECHANISMS

1. Introduction

The process of nominating, selecting, chartering, designing, planning, and executing a Joint Test & Evaluation involves many participants. In each test, the JTD must establish good communications with the DDTE, the Lead Service, and each supporting Service. In this section, the Service organizations are described so the JTD may see the framework of the formal organization through which he and his staff must operate.

For the new JTD, the formal points of contact will provide an initial entry into Service Headquarters. However, in every case of a successful test in the past, the JTD and his staff established informal relationships which served to supplement and enrich the formal contacts. Successful establishment of working relationships will provide the JTD with the means of obtaining necessary Service support.

2. United States Army

a. Test Schedule and Review Process

The Test Schedule and Review Committee (TSARC), established by the Army Chief of Staff (CSA), provides high-level centralized resource management for user testing in the Army. This centralized management maximizes the use of limited resources and minimizes the adverse impact on operational readiness. Composition of the TSARC is shown in Table IV-1.

The TSARC meets in June and December, although the Chairman may call special meetings to address problems which require more immediate attention. Test resource allocations are developed within existing budget and program constraints in accordance with Army priorities for the current and budget years. These allocations and planning guidance for the out-years are published in a tasking document known as the Five-Year Test Program (FYTP). All new entries and proposed changes in the FYTP are submitted by TSARC members to the U.S. Army Operational Test and Evaluation

TABLE IV-1. TSARC COMPOSITION

CHAIRMAN: CG OPERATIONAL TEST AND EVALUATION AGENCY (OTEA).

GENERAL OFFICER REPRESENTATIVES:

- DCS/RESEARCH, DEVELOPMENT AND ACQUISITION
- DCS/OPERATIONS AND PLANS
- DCS/LOGISTICS
- DCS/PERSONNEL
- COMPTROLLER OF THE ARMY
- ASSISTANT CHIEF OF STAFF AUTOMATION/COMMUNICATIONS (ACSAC)
- THE SURGEON GENERAL
- CHIEF STUDY PLANS MANAGEMENT OFFICE (SPMO)
- TRAINING AND DOCTRINE COMMAND (TRADOC)
- MATERIEL DEVELOPMENT AND READINESS COMMAND (DARCOM)
- FORCES COMMAND (FORSCOM)
- COMMUNICATIONS COMMAND (USACC)
- INTELLIGENCE AND SECURITY COMMAND (INSCOM)

OTHER REPRESENTATIVES:

TRADOC MAY PROVIDE REPRESENTATION FROM

- COMBAT DEVELOPMENTS EXPERIMENTATION COMMAND (CDEC)
- COMBINED ARMS CENTER (CAC)
- TRADOC COMBINED ARMS TEST ACTIVITY (TCATA)
- LOGISTICS CENTER (USALOGC)

DARCOM MAY PROVIDE REPRESENTATION FROM

- TEST AND EVALUATION COMMAND (TECOM)

OTHER ARMY STAFF AGENCIES AND COMMANDS (BY INVITATION OF THE CHAIRMAN).

NOTE: THE TSARC WILL BE SUPPORTED BY AN O-6/O-5 (OR EQUIVALENT DA CIVILIAN) WORKING GROUP WITH REPRESENTATION FROM THE COMMANDS AND AGENCIES REPRESENTED ON THE TSARC.

SOURCE: U.S. ARMY REGULATION 71-3
8 MARCH 1977

Agency (OTEA) for TSARC approval. Deviations in resource allocations resulting from program or budget decisions are reported to OTEA and disseminated to the commands represented on the TSARC. Approval of the FYTP by the Deputy Chief of Staff for Operations and Plans (DCSOPS) is required before its publication.

Definition of test resource requirements is provided by the Outline Test Plan (OTP). For a Joint Test and Evaluation with Army participation, the OTP is prepared in draft by the JTD and his staff and finalized by OTEA.

To summarize, the responsibilities of the TSARC apply to all phases of Army participation in JT&E. Those responsibilities are to:

- Review and recommend coordinated OTP for inclusion in the FYTP
- Review and recommend test priorities for user testing
- Review and coordinate resources for support of user testing
- Resolve conflicts between test requirements and other missions
- Review funding for user tests
- Review and recommend approval of the FYTP to the DCSOPS.

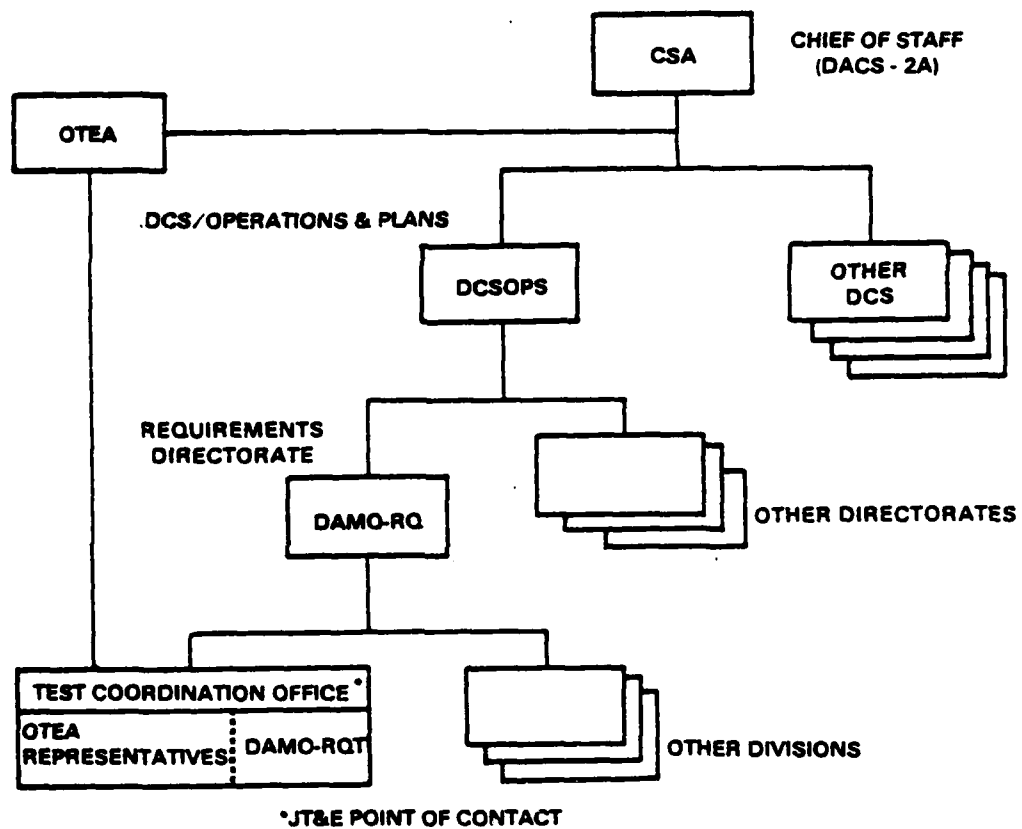
b. Specific Responsibilities

(1) Headquarters Level

The point of contact within the Headquarters, United States Army, is the DCSOPS. An abbreviated Department of the Army (DA) Staff organization chart is shown in Figure IV-1. Within the DCSOPS there is a Test Coordination Office (DAMO-RQT) which has both a HQDA Staff officer and an Operational Test and Evaluation Agency (OTEA) liaison officer. Considerable interaction takes place between the HQDA Staff and OTEA regarding JT&E matters.

The Requirements Directorate (DAMO-RQ) of the ODCSOPS is the point of contact for JT&E matters in the HQDA Staff. As such DAMO-RQT:

- Staffs Army JT&E nominations
- Coordinates on feasibility studies, test designs, and test plans
- Provides USA liaison to OSD/DDTE on issues of JT&E policy and resources



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Figure IV-1. Department of the Army Staff Organization

- Provides a USA member to the JT&E Planning Committee and Senior Advisory Council
- Staffs approval of the FYTP
- Staffs nomination of Army JTD and selection of Army DTD
- Staffs resource issues for JT&E
- Coordinates personnel allocations for JT&E
- Coordinates on letters of instruction to Army JTD/DTD.

(2) Field Level

OTEA is the Army's independent test agency which reports to the Chief of Staff. It is located in Falls Church, Virginia, and is the Army's center for user testing (operational T&E, JT&E, force development test and experimentation). Within existing policy and resource constraints, OTEA has overall Army management responsibility for JT&E and is the Army point of contact with OSD for specific JT&Es. As such OTEA:

- Staffs and prepares the Army position on test documents (feasibility studies, designs, plans)
- Staffs the tasking of Army commands and agencies conducting or supporting JT&E
- Recommends the Army proponent, i.e., the organization responsible for providing doctrinal and technical expertise required to support the test
- Provides a USA member to the JT&E Planning Committee and Senior Advisory Council
- Prepares letters of instruction for the Army JTD/DTD. (Outlines specific Army responsibilities, reporting channels within the Army, points of contact, and necessary administrative instructions)
- Recommends for DCSOPS approval, Army JTD/DTD (drawn from Army-wide resources).

3. United States Navy

a. Chief of Naval Operations (CNO) Staff Level

The Navy Point of Contact for JT&E is located in the Office of Research, Development, Test, and Evaluation (OP098). One major subdivision of OP098 is OP983, the Test and Evaluation Division. The

Commander of the Navy's independent operational test agency, the Operational Test and Evaluation Force (OPTEVFOR), in Norfolk, Virginia, is also the Director of the Test and Evaluation Division (OP983). The JT&E point of contact is OP983E (see Figure IV-2) who provides liaison with OSD in JT&E matters. However, for a specific test with Navy participation, the CNO staff selects an appropriate sponsor. Generally, the sponsor will be from that part of the CNO staff which has the major functional interest in the test. For example, a test involving Naval Aviation resources would probably be sponsored in OP05, the DCNO (Air Warfare). Therefore, in the CNO staff, the actions, responsibilities, and staffing locations are shared between OP983E and a sponsor for each test with Navy participation. OP983E is responsible for across-the-board JT&E actions. Specifically, OP983E:

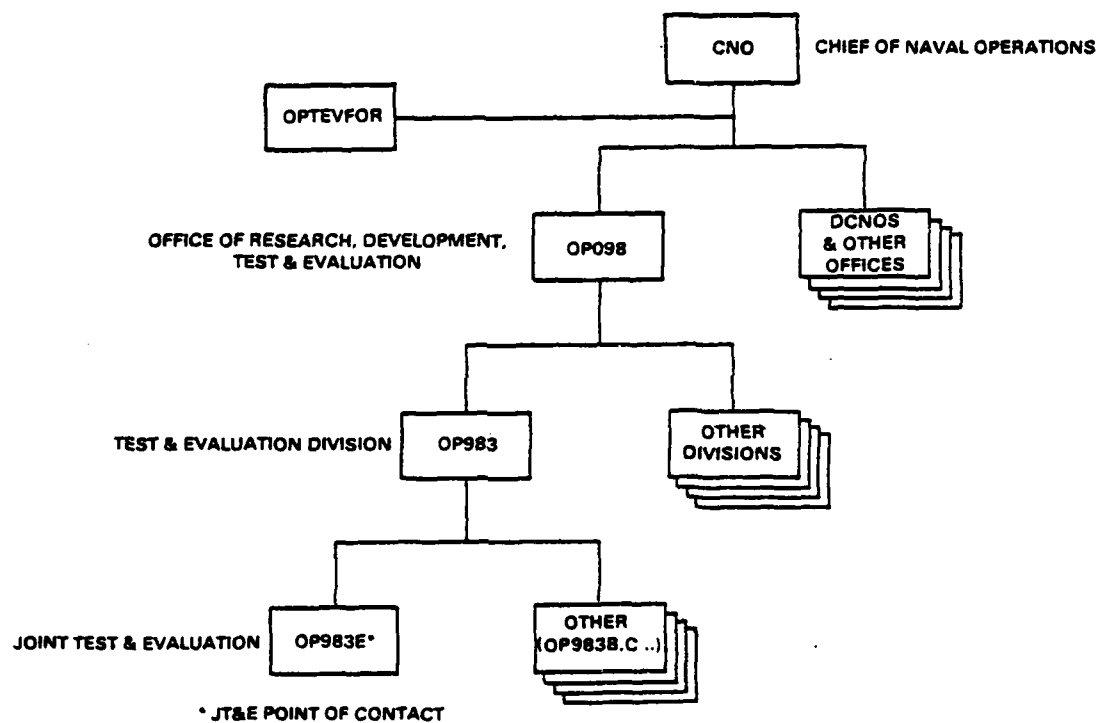
- Staffs Navy JT&E nominations
- Coordinates/reviews feasibility studies, test designs, and test plans
- Provides USN liaison to OSD on JT&E policy issues
- Provides USN member of Planning Committee
- Is the initial USN contact for all JT&Es
- Staffs the selection of a sponsor from the CNO staff for each test with Navy participation.

The sponsor for a particular JT&E reviews the feasibility study, test design, and test plan for each joint test; staffs allocation of resources for the test; and requests manpower billets and requisitions personnel for JTD/DTD and the JTF staff.

This system provides a team approach where the JT&E point of contact is knowledgeable concerning the entire spectrum of JT&E activity while the sponsor(s) provide(s) specific functional expertise to support individual tests.

b. Field Level

OPTEVFOR, the independent operational test agency for the Navy, reports directly to the CNO. The mission of OPTEVFOR is operational



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Figure IV-2. CNO Staff Organization

test and evaluation of specific weapon systems, ships, aircraft, and equipments, including procedures and tactics where required. When directed by the CNO, OPTEVFOR assists development agencies in the accomplishment of necessary development test and evaluation. Up to the present time, OPTEVFOR has not been involved extensively in Navy support of JT&E. However, OPTEVFOR is a valuable source of expert testing advice or assistance for a Navy JTD/DTD. Also, OPTEVFOR or its subordinate elements may provide or administer player forces. OPTEVFOR has a JT&E point of contact in OPTEVFOR Code 02D. In brief, the Navy has a very flexible approach to JT&E designed to treat each individual JT&E as a unique case. The field element which will support the JTD/DTD is selected to meet the requirements of a particular test.

Normally, the CNO staff sponsor will staff the selection of the field level lead Navy agency by the time the Navy JTD or DTD is approved. Therefore, the JTD, whether Navy or from another Service is provided the field level structure by the CNO staff sponsor.

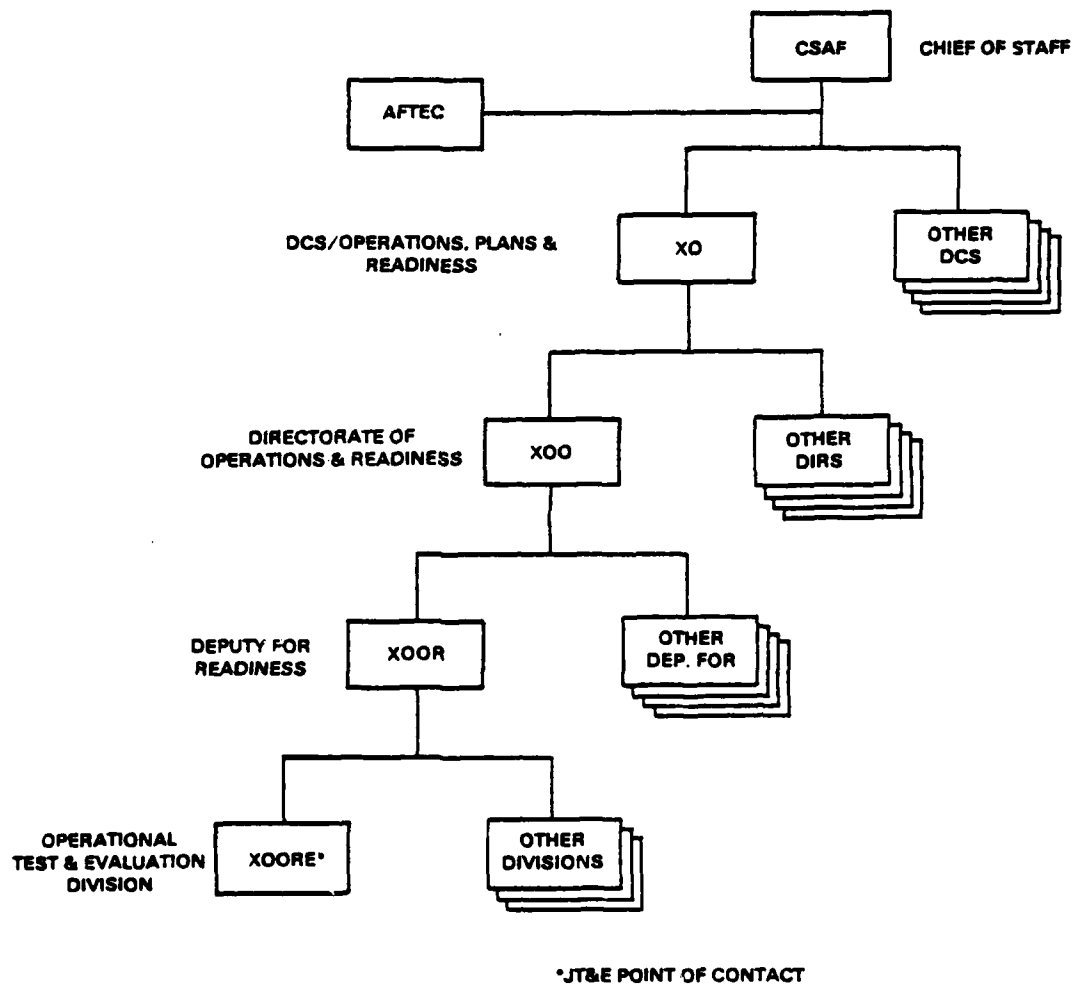
One note of caution is appropriate. In contrast to the Air Force and Army where the responsible field agency has definite responsibilities and authorities related to JT&E, the Navy selects and delegates authorities and responsibilities on a case-by-case basis. The JTD should establish a clear understanding of his relationships and what support will be committed from the field agency.

4. United States Air Force

a. Headquarters Level

The Headquarters, United States Air Force, point of contact for JT&E is in the DCS/Operations, Plans, and Readiness (AF/XO). The abbreviated Air Staff chart shown in Figure IV-3 depicts the JT&E point of contact (AF/XOORE) position in the Air Staff. This office is knowledgeable on all joint tests. However, there will be interested and responsible persons elsewhere on the Air Staff for particular joint tests. For example, there might be action officers for a particular joint test in:

- DCS/Research, Development, and Acquisition (AF/RD)
- DCS/Logistics and Engineering (AF/LE)
- ACS/Studies and Analysis (AF/SA).



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Figure IV-3. Air Staff Organization

These action officers handle the specialized problems associated with a particular joint test. The AF/XOORE JT&E point of contact is cognizant of those actions and remains the single formal point of contact.

When the JTD or DTD requires Air Staff action for personnel or resource allocations, the AF/XOORE action officer is the primary staffing agent. Relationships among the Air Staff elements and between the Air Staff and elements in the field are documented in AFR 80-20 "Managing the OSD Joint Test and Evaluation Program."

In summary, for joint tests the Air Staff point of contact:

- Serves as interface with OSD on JT&E matters
- Publishes Air Force test directives on USAF participation
- Staffs resource issues related to joint tests
- Keeps field agencies informed of JT&E developments
- Coordinates personnel allocations for JTD/DTD and JTD staff positions
- Staffs USAF JTD nominations and DTD appointments and forwards them to OSD
- Staffs JT&E nominations
- Provides USAF member of JT&E Planning Committee
- Coordinates on JT&E test design
- Requests USAF precedence rating in accordance with AFR 27-1
- Consolidates USAF comments on JT&E test plans and forwards them to the JTD.

b. Field Level

(1) AFTEC

Planning support and operational testing expertise related to joint testing is centered in the Air Force Test and Evaluation Center (AFTEC), the USAF independent test and evaluation agency at Kirtland AFB, New Mexico. AFTEC reports to the Chief of Staff and has a joint testing directorate which supports the Air Staff as follows:

- Leads USAF efforts in interfacing with the DDTE Support Agent during test feasibility and design

- Provides JT&E resource estimates (documented in Joint Test Program Outlines--JTPO)
- Participates in Joint Test Director (JTD) and Deputy Test Director (DTD) nomination/appointment
- Assists USAF JTD in organizing his staff and developing his test plan
- Tracks all USAF test costs
- Provides a focal point for manpower and personnel support to the JTF
- Administers OSD funds when USAF is Lead Service
- Provides management guidance to USAF JTDs/DTDs
- Provides staff support to USAF DTDs.

(2) Major Commands (MAJCOMs) and Separate Operating Agencies (SOAs)

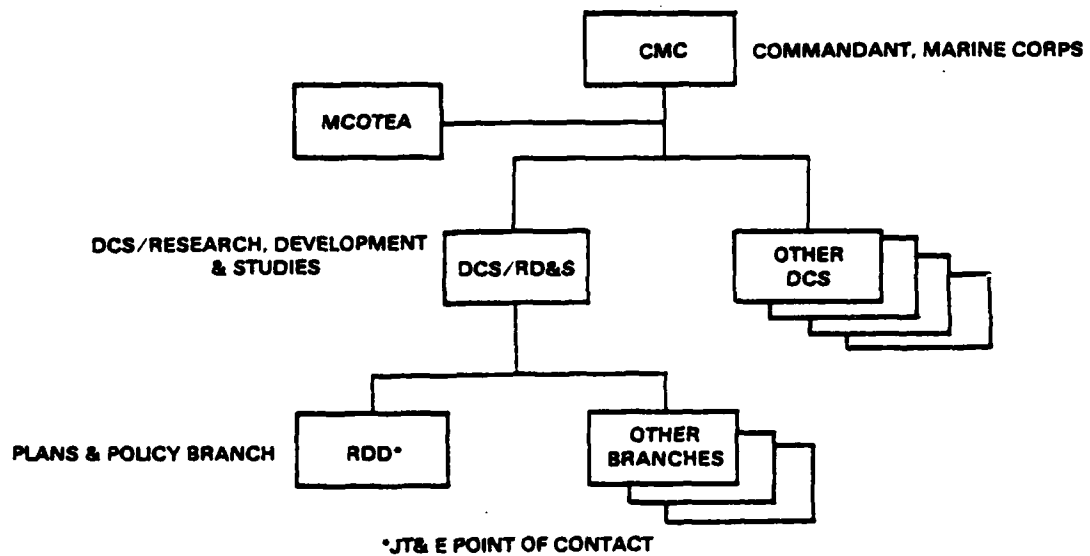
The MAJCOMs (e.g., TAC, SAC) and SOAs provide most test resources and players. Each MAJCOM/SOA maintains a permanent point of contact for joint testing. JTDs can obtain point of contact information from the AF/XO or AFTEC JT&E points of contact. In general, the MAJCOMs/SOAs assist joint testing by:

- Supporting AFTEC in interfacing with the DDTE Support Agent
- Programming resources against approved JTPOs
- Providing personnel and equipment as tasked in the USAF Test Directive
- Tracking test-incurred costs (for provision to AFTEC)
- Participating in nominations of JTD/DTD
- Evaluating JT&E impacts on operational capabilities.

5. United States Marine Corps

a. Headquarters Level

In the Marine Corps, the liaison and coordination of JT&E matters is performed by the Special Assistant for Operational Test and Evaluation, in the DC/S Research, Development, and Studies (Code RD - See Figure IV-4). The staff element within the Headquarters which is most closely related to the test functionally will be selected to act as the



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Figure IV-4. Headquarters Marine Corps Organization

test sponsor. For example, the sponsor of a JT&E involving primarily aviation resources would probably be located in the DC/S for Aviation.

The Headquarters, USMC, Code RD supports the JT&E process by soliciting USMC JT&E nominations and providing USMC liaison to OSD on issues of JT&E policy. The USMC Headquarters sponsor selected for a particular JT&E supports that JT&E by providing JTD/DTD nominations and recommending Fleet Marine Force units to meet the requirements of the JTD and DTD.

b. Field Level

Significant authority has been delegated to the Marine Corps Operational Test and Evaluation Activity (MCOTEA) at Quantico, Virginia. MCOTEA reports to the Commandant of the Marine Corps and was chartered in early 1978 as the Marine Corps' independent operational test and evaluation agency. Until now, USMC participation in joint testing has been limited. Thus, an evolution in roles, responsibilities, and functions may take place. However, at present MCOTEA:

- Staffs the USMC position on feasibility studies, test designs, and test plans
- Publishes Test Planning Document for USMC participation
- Recommends to the Commandant the selection and tasking of the Fleet Marine Force for conduct or support of JT&E, if the USMC Headquarters sponsor has not
- Provides technical support to USMC JTD/DTD in test planning, direction, and reporting
- Conducts an independent evaluation if desired.

B. TRAINING

The majority of personnel assigned to a Joint Test Force (JTF) should be fully qualified in their areas of specialization. Additional training, whether formal or informal, can serve to update previously acquired skills and can also assist JTF members in transferring their expertise to the joint testing environment.

1. Quadri-Service Indoctrination Course

There is currently only one formal course which is directed specifically toward joint test and evaluation. This course was developed late in 1979 by a four-service OT&E working committee staffed by representatives from OTEA, OPTEVFOR, AFTEC and MCOTEA. It seeks to familiarize JTF members at the middle and upper management levels with the T&E organization and methodology of each of the four Services. The course is offered twice a year and can be presented at any location as required. Each Service operational testing agency maintains a point of contact for the indoctrination course.

2. Formal Training

The formal training assets available within DoD may prove useful, although the lengthy waiting time required may initially make such courses appear impractical. If necessary, JTF members must be prepared to be placed on waiting lists for some courses in order to take advantage of cancellations by other students.

A comprehensive list of short (1 day to 4 weeks) courses offered within the Department of Defense is contained in DoD 5010.16-C, the Defense Management and Training (DMET) catalog. This book lists the courses offered along with the twenty sponsoring organizations. Courses are divided into broad categories ranging from automatic data processing through financial management and systems analysis techniques. Short courses in data management, contract administration, and procurement are particularly relevant to joint test and evaluation. Representative courses in these areas contained in the DMET catalogue are listed in Table IV-2.

3. Informal Training

The Joint Test Director and the Deputy Test Director must remain aware of opportunities to supplement formal training with informal training. Many Service development agencies conduct informal training for upgrade or refresher courses for their personnel. JTDs or DTDs should contact their respective development agencies for information on training available in the particular area and time of interest.

TABLE IV-2. REPRESENTATIVE SHORT COURSES RELATED TO JT&E

<u>COURSE TITLE</u>	<u>LOCATION</u>	<u>DURATION</u>
COMPUTER ORIENTATION FOR INTERMEDIATE EXECUTIVES	DEPARTMENT OF DEFENSE COMPUTER INSTITUTE (DODCI) WASHINGTON NAVY YARD, D.C.	2 WEEKS
ADP SYSTEMS ANALYSIS AND DESIGN	U.S. ARMY MANAGEMENT ENGINEERING (AMETA) TRAINING ACTIVITY ROCK ISLAND, ILLINOIS	2 WEEKS
INTRODUCTION TO COMPUTER TECHNOLOGY	DODCI	1 WEEK
MANAGEMENT DEVELOPMENT SEMINAR	AMETA	1 WEEK
CONTRACT ADMINISTRATION FOR ENGINEERS	USAF AIR TRAINING COMMAND AIR FORCE INSTITUTE OF TECHNOLOGY SCHOOL OF SYSTEMS AND LOGISTICS (AFIT-LS) WRIGHT-PATTERSON AFB, OHIO 45433	10 DAYS
DEFENSE CONTRACTS MANAGEMENT FOR TECHNICAL PERSONNEL	HEADQUARTERS NAVAL MATERIEL COMMAND WASHINGTON, D.C.	1 WEEK
CONTRACTING OFFICERS' REPRESENTATIVE COURSE	U.S. ARMY LOGISTICS MANAGEMENT CENTER (ALMC) FORT LEE, VIRGINIA	2 WEEKS
TEST AND EVALUATION MANAGEMENT	ALMC	8 DAYS
TEST AND EVALUATION MANAGEMENT	AFIT/LS	10 DAYS

Since each JTD faces similar problems, it may prove useful to send observers to ongoing JT&Es to pick up practical information on planning and conducting tests. The management reports from preceding tests also contain a wealth of lessons learned. Copies of these reports should be available from DDTE.

C. JT&E PROTOCOL

1. Introduction

Joint testing involves a sensitive and test-specific tasking process. To be effective, the JTD should understand the tasking process and how it can affect his ability to meet test objectives. The basic underlying authority for JT&E and for this manual is DoD Directive 5000.3, "Test and Evaluation." Test-specific authority for the JTD, the Lead Service, and participating organizations is provided by the DDTE in the charter which establishes the Joint Test Force. Memoranda of agreement/understanding are also used to provide essential details on tasking, reporting and support responsibilities. These memoranda are, in general, bilateral agreements between the JTD and other organizations involved in the test. Finally, this manual provides guidance for the entire JT&E process.

2. DoD Directive 5000.3

This Directive provides very general guidance on the responsibilities, authorities and relationships of joint testing. In paragraph D.13.c, the Directive states that:

"Control and OSD sponsorship of JT&E will be exercised by the DDTE. The DDTE, in coordination with the JCS, will task the selected lead service or, through the JCS, the selected CINC to conduct the test, incorporate the test into joint exercises as appropriate, appoint a Joint Test Director, develop the test plans, and provide reports, as required."

Paragraph D.12 states that:

"Responsibility for managing the practical aspects of each JT&E will be delegated to a specific DoD Component, and supported by forces and material from participating Components."

The thrust of these two paragraphs is that the DDTE retains all responsibility and authority with respect to test objectives and policy while delegating to the Lead Service the responsibility for the actual management and conduct of the test. However, the Directive is silent on the authority which the Lead Service has over "forces and material from participating Components." Further, the Directive does not describe the role, responsibilities, and authorities delegated to the JTD. These two important aspects of JT&E protocol are addressed in this manual and in the JTD Charter.

3. JTD Charter

For each test, the DDTE will prepare a Charter establishing the Joint Test Force. The charter describes the mission of the JTD; designates the Lead Service and participating Service; and provides tasking authority, authority for the JTD to conduct the test within the guidelines of this manual, and authority to establish direct communication with supporting Services/Agencies.

The Charter also specifies the channels through which the JTD will report. The JTD is usually directed to report through the Lead Service on matters related to Service resources and implementation of test schedules. For matters related to DDTE funding, test policy, test results, and direction, the JTD reports directly to the DDTE. Finally, the JTD Charter authorizes and encourages the JTD to communicate directly with all organizations participating in or associated with the test.

While the Charter contains specific tasking and grants general authorities, it does not provide the JTD with details on how to create the network of relationships between the JTF, the DDTE, and participating Services/agencies. For this, the JTD must rely on memoranda of understanding.

4. Memoranda of Understanding

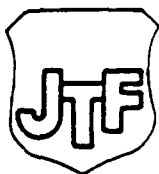
It is imperative that the JTD formally establish the "ground rules" of relationships with all organizations with which he must interact during the course of the test. This is best accomplished by executing memoranda of understanding to specify responsibilities, reporting channels, points of contact, critical dates, and other important test-related information. Failure to formally agree to mutual responsibilities could lead to serious problems later in the test (e.g., late delivery of critical resources, insufficient resources, etc.). All memoranda of understanding should be reviewed and revised as testing proceeds and requirements change. At a minimum, the JTD should execute agreements with:

- All Service operational test agencies
- Lead and participating Service agencies designated to support the test
- The Independent Evaluation agency/contractor
- Major potential users of test results
- Ranges/test sites to be used during testing
- The DDTE Support Agent which prepared the Feasibility Study and Test Design
- Procurement offices which will be used for contracting activity.

5. Summary

JT&E remains a challenging process, demanding leadership and management skills from all concerned, but most especially the JTD. The JTD operates in a unique position. He is responsible to the DDTE for conduct of a JT&E which is invariably an event with significant visibility in DoD, his Service, and the Congress. This manual has synthesized the experience of present and former JTDs to provide the fundamentals of the JT&E process. The manual contains enduring guidance which will apply in general to all JT&Es. Unique requirements, responsibilities, and authorities not covered in the manual should be included in the JTD charter. To ensure its usefulness, the manual will be a dynamic document which is amended and expanded as more knowledge, experience, and information becomes available. JT&E makes a significant contribution to improving and strengthening the Defense posture of the United States. It is imperative that all who participate understand and support the JT&E process.

APPENDIX A
PROGRAM STATUS REVIEW
BRIEFING CHARTS



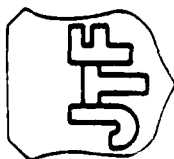
AGENDA

PROGRAM STATUS REVIEW

DATE

- 1. EVENTS LISTING**
- 2. ACTION ITEM STATUS**
- 3. TEST SCHEDULE STATUS**
- 4. CONTRACT(S) STATUS**
- 5. SPECIAL TOPICS**
- 6. JOINT TEST DIRECTOR'S REMARKS**

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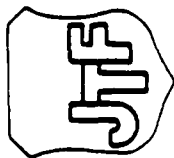
EVENTS LISTING

DATE

TOPIC

LOCATION

OPR



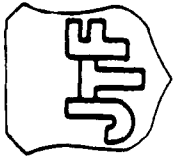
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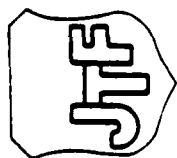
NUMBER	SUBJECT	OPR	ECD*	ACD**

*ESTIMATED COMPLETION DATE

**ACTUAL COMPLETION DATE

2006/80W

		ACTION ITEM	
NO. _____	SUBJECT _____		
ISSUE _____			
ACTION TAKEN _____			
ACTIONS REMAINING _____			
ACTION OFFICER	DATE ASSIGNED	RESOLVE BY	



SCHEDULE TREE PROTOCOLS

KEY:



EXAMPLES:

3 ▽ 10 ▽

12 ▽ 20 ◇

12 ◇ 18 ▽

▽ _____

MILESTONE NOT YET COMPLETED (ORIGINAL SCHEDULE)

MILESTONE COMPLETED (ORIGINAL SCHEDULE)

MILESTONE NOT YET COMPLETED (REVISED SCHEDULE)

MILESTONE COMPLETED (REVISED SCHEDULE)

ORIGINAL SCHEDULE

REVISED SCHEDULE

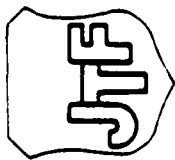
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MILESTONE SLIP, NOT YET COMPLETED (REVISED SCHEDULE)

EARLY COMPLETION

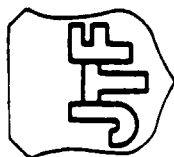
ACTION STARTED, THEN TERMINATED

2006/80W



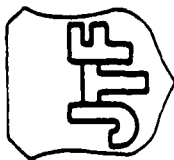
TEST SUMMARY

CY 81		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1.1 TEST PLAN		15				28							
1.2 OPERATIONS		16						15					
1.3 DATA PLANS			12					3					
1.4 SITE SELECTION		9.26.80											
1.5 SITE PREPARATION		13						2					
1.6 TEST PARTICIPANTS			8					28					
1.7 TRAINING		16		23				2					
1.8 TEST ITEMS			8					28					
1.9 TEST INSTRUMENTATION		6						28					
1.10 DATA PROCESSING			30							26			
1.11 TEST REPORTING									4				14
1.0													6.2.81



TEST PLANNING

CY 81		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
METHOD OF ACCOMPLISHMENT • DRAFT • REVIEW • APPROVAL TEST PLAN • ACTION OFFICER INPUTS • OTHER INPUTS • DRAFT FOR JTD/STAFF RVW • COMMENTS DUE • RESOLVE CHANGES • FINAL TO JTD • JTD APPROVAL • PRINT • DISTRIBUTE		15 ▼ 12 ▼ 19 ▼ 2 ▼ 6 ▼ 19 ▼ 22 ▼ 23 ▼ 27 ▼ 28 ▼ 6 ▼ 20 ▼ 5 ▼ 7 ▼ 11 ▼ 11 ▼ 25 ▼ 28 ▼							
1.1		6.2.81							



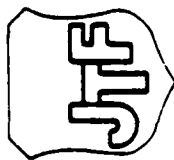
TEST PLANNING

CY 81	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
ARMY RESOURCES ● OTP TO OTEA ● OTP UPDATE ● UNITS TASKED ● UNITS RESPOND ● MONITOR OTEA RESPONSE AIR FORCE RESOURCES ● REQUEST TO AF ● MONITOR AF RESPONSE ● UNITS TASKED ● UNITS RESPOND	▼ 9.29.80	28 ▼ --- ◆ 20	30 ▼ --- ◆ 1 25 ▼ ---	30 ▼				
1.1.1			15 ▼ --- ◆ 16	16 ▼			2 ▼	20 ▼
6.2.81							9.1 ▼	9.1 ▼

2006/80W



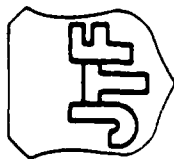
1.3



SITE SELECTION

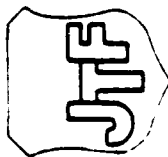
CY 81	APR	MAY	JUN	JUL	AUG	SEP
SELECTION CRITERIA						
IDENTIFY CANDIDATES						
DATA COLLECTION						
● OPSEC						
● GEOMETRY						
● TERRAIN						
● BASE SUPPORT						
● COST						
● AVAILABILITY						
● SURVEYS						
ANALYSIS						
SELECTION	▼ 9.26.80					
APPROVAL	▼ 9.26.80					
1.4	6.2.81					

2006/80W



TEST PARTICIPANTS

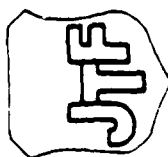
CY 81	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
RED — THREAT FORCE ● COMMITTED BY ARMY ● ARRIVE SITE ● RELEASE BLUE — FRIENDLY FORCES ● COMMITTED BY ARMY ● ARRIVE SITE ● RELEASE BLUE — TACS/ABCCC/FTR ● COMMITTED BY AF ● ARRIVE SITE ● RELEASE WHITE — CONTROL/COLLECT ● COMMITTED BY ARMY ● COMMITTED BY AF ● ARRIVE SITE ● RELEASE	8 ▽							
					24 ▽	28 ▽		
			8 ▽		27 ▽	28 ▽		
				20 ▽	27 ▽	28 ▽		
			8 ▽					
				20 ▽	27 ▽	28 ▽		
1.6								
6.2.81								



TRAINING

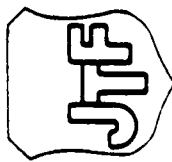
CY 81	APR	MAY	JUN	JUL	AUG	SEP
JTF TRAINING PROGRAM	16 ▽	23 ◆	15 ▽			
RED						
● PROGRAM			4 ▽	3 ▽		
● SITE					25 ▽ 30 ▽	
● CONDUCT	▼ 9.26.80					
BLUE						
● PROGRAM			4 ▽	3 ▽		
● SITE						
● CONDUCT	▼ 9.26.80				28 ▽ 30	
WHITE						
● PROGRAM			4 ▽	3 ▽		
● SITE						
● CONDUCT	▼ 9.26.80				28 ▽ 2	
1.7						
6.2.81						

2006/80W



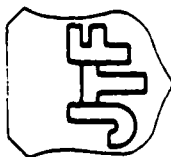
TEST ITEMS

CY 81		APR	MAY	JUN	JUL	AUG	SEP
COMMUNICATIONS							
● TEST CONTROL							
● DIV COMMO							
● TACS							
AIRCRAFT							
● ARMY UTILITY							
● ARMY HELO							
● AF STRIKE							
● AF FACS							
● AF ABCCC							
1.8							
6.2.81							



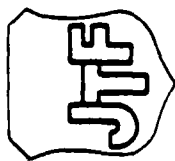
INSTRUMENTATION

	CY 81	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
DEVELOP REQ'TS		6							
REVIEW		28		12					
COMMIT			13		10				
DEMONSTRATE					17				
TEST DATA VALIDATED						31			
SHIP TO SITE						17			
ARRIVE SITE							25		
SETUP/CHECKOUT							26	30	
READINESS								31	2
RELEASE									28
1.9	6.2.81								



DATA PROCESSING

CY 81	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
SOFTWARE DEVELOPMENT		30 ▽					19 ▽		
SYSTEM INTEGRATION						6 ▽ 29 ▽			
SYSTEM READY						30 ▽			
READINESS CHECKS						31 ▽ 2 ▽			
OPERATIONAL							2 ▽	26 ▽	
1.10									
6.2.81									



ANALYSIS/REPORTING

CY 81	JUL	AUG	SEP	OCT	NOV	DEC
DATA ANALYSIS				4 ▽ 23 ▽		
QUICK LOOK REPORTS			5 ▽ 26 ▽			
FINAL DRAFT				1 ▽	30 ▽	
BRIEFING READY					9 ▽	7 ▽
APPROVE REPORT						10 ▽ 14 ▽
PUBLISH						
1.11						
6.2.81						

APPENDIX B
GLOSSARY OF ACRONYMS USED

GLOSSARY OF ACRONYMS USED

AFTEC	Air Force Test and Evaluation Center
AFXO	Air Force Deputy Chief of Staff for Operations, Plans, and Readiness
AFXOO	Air Force Directorate for Operations and Readiness
AFXOOR	Air Force Deputy for Readiness
AFXOORE	Air Force Operational Test and Evaluation Division
CAC	Combined Arms Center
CDEC	Combat Developments Experimentation Command
CINC	Commander-in-Chief
CNO	Chief of Naval Operations
COMSEC	Communications Security
COTR	Contracting Officer's Technical Representative
CSA	Army Chief of Staff
C/SCS	Cost/Schedule Control System
DA	Department of the Army
DAMO-RQ	Department of the Army - Requirements Directorate
DAMO-RQT	Department of the Army - Test Coordination Office
DAR	Defense Acquisition Regulation
DCSOPS	Army Deputy Chief of Staff for Operations and Plans
DDTE	Director Defense Test and Evaluation
DMET	Defense Management and Training
DoD	Department of Defense
DTD	Deputy Test Director
FCRC	Federal Contract Research Center
FY	Fiscal Year
FYTP	Five-Year Test Plan (DDTE)
FYTP	Five-Year Test Program (U.S. Army)

IFFN	Identification Friend, Foe, or Neutral
JCS	Joint Chiefs of Staff
JTD	Joint Test Director
JT&E	Joint Test and Evaluation
JTF	Joint Test Force
JTPO	Joint Test Program Outline
MAJCOM	Major Command
MCOTEA	Marine Corps Operational Test and Evaluation Agency
MIPR	Military Interdepartmental Purchase Request
MOE	Measure of Effectiveness
MOU	Memorandum of Understanding
ODDTE	Office of the Director, Defense Test and Evaluation
OJCS	Office of the Joint Chiefs of Staff
O&M	Operation and Maintenance
OMB	Office of Management and Budget
OPSEC	Operations Security
OPTEVFOR	U.S. Navy Operational Test and Evaluation Force
OSD	Office of the Secretary of Defense
OT	Operational Test
OT&E	Operational Test and Evaluation
OTEA	U.S. Army Operational Test and Evaluation Agency
OTP	Outline Test Plan
PE	Program Element
POM	Program Objective Memoranda
PPBS	Planning, Programming, and Budgeting System
R&D	Research and Development
RDTE&E	Research, Development, Test and Evaluation
ROE	Rules of Engagement

SAC	Senior Advisory Council
SAM	Surface-to-Air Missile
SECDEF	Secretary of Defense
SOA	Separate Operating Agency
TAB	Technical Advisory Board
TAG	Technical Advisory Group
TCATA	TRADOC Combined Arms Test Activity
TECOM	Test and Evaluation Command
TEMPEST	Control of Compromising Emanations
TRADOC	Training and Doctrine Command
TSARC	Test Schedule and Review Committee
TSPI	Time Space Position Information
USALOGC	U.S. Army Logistics Center

APPENDIX C

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