

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

AD-A033 872

THE COSTS OF INDEPENDENCE
OPERATIONAL TESTING IN
DOD SYSTEMS ACQUISITION

DEFENSE SYSTEMS MANAGEMENT SCHOOL
FORT BELVOIR, VIRGINIA

MAY 1976

005087

DEFENSE SYSTEMS MANAGEMENT SCHOOL

ADA 033872



PROGRAM MANAGEMENT COURSE INDIVIDUAL STUDY PROGRAM

THE COSTS OF INDEPENDENCE:
OPERATIONAL TESTING IN DOD
SYSTEMS ACQUISITION

STUDY PROJECT REPORT
PMC 76-1

Wayne K. Messner
Lt Col USAF

FORT BELVOIR, VIRGINIA 22060

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

SEARCHED INDEXED
SERIALIZED FILED
MAY 1976
FBI - MEMPHIS

ACCESSION BY	
NTIS	
DATE	
BY	
AVAILABILITY CODES	
AVAIL. AND/OR SPECIAL	
A	

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) THE COSTS OF INDEPENDENCE: OPERATIONAL TESTING IN DOD SYSTEMS ACQUISITION		TYPE OF REPORT & PERIOD COVERED Study Project Report 76-1
7. AUTHOR(s) Wayne K. Messner		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS DEFENSE SYSTEMS MANAGEMENT COLLEGE FT. BELVOIR, VA 22060		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS DEFENSE SYSTEMS MANAGEMENT COLLEGE FT. BELVOIR, VA 22060		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE 76-1
		13. NUMBER OF PAGES 43
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
16. DISTRIBUTION STATEMENT (of this Report) UNLIMITED		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> DISTRIBUTION STATEMENT A Approved for public release; Distribution Unlimited </div>		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) SEE ATTACHED SHEET		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) SEE ATTACHED SHEET		

DEFENSE SYSTEMS MANAGEMENT SCHOOL

STUDY TITLE:

THE COSTS OF INDEPENDENCE: OPERATIONAL TESTING IN DOD SYSTEMS ACQUISITION

STUDY PROJECT GOALS:

To learn more about the causes for and results of OSD direction requiring the establishment of independent test agencies in the services. Compare those agencies and identify significant costs associated with their implementation and operation.

STUDY REPORT ABSTRACT:

The objective of this study was to investigate, describe and analyze the key factors surrounding the establishment of the Air Force Test and Evaluation Center (AFTEC), the Operational Test and Evaluation Agency (OTEA) and the Operational Test and Evaluation Force (OPTEVFOR).

Data sources used were of two types. First, a literature search was conducted to obtain as much background information on the subject as possible. Secondly, interviews were conducted with key personnel of the independent test agencies and various DOD Program Management Office personnel, some of which are attending the Defense Systems Management School.

The information obtained from all sources is presented and conclusions are drawn that current OT&E is extremely costly and that there may be ways to reduce these costs. Three significant recommendations are presented.

KEY WORDS: Operational Testing

MATERIEL ACQUISITION WEAPON SYSTEMS OPERATIONAL TESTING COST GROWTH
COST ACCOUNTING BLUE RIBBON DEFENSE PANEL

NAME, RANK, SERVICE	CLASS	DATE
Wayne K. Messner, Lt Col, USAF	P/C 76-1	May 1976

THE COSTS OF INDEPENDENCE:
OPERATIONAL TESTING IN DOD
SYSTEMS ACQUISITION

Study Project Report
Individual Study Program

Defense Systems Management School
Program Management Course
Class 76-1

by

Wayne K. Messner
Lt Col USAF

May 1976

Study Project Advisor
Carroll C. Rands, Lt Col, USAF

This study project report represents the views, conclusions, and recommendations of the author and does not necessarily reflect the opinion of the Defense Systems Management School or the Department of Defense.

EXECUTIVE SUMMARY

In the 1970-71 time period, President Nixon's Blue Ribbon Defense Panel (BRDP) and the U.S. Congress became deeply involved in DOD weapon system test and evaluation (T&E) policy and independence. The independence they addressed was separation of the system tester from the developer and user, both of which they considered system advocates. Further, neither Washington group felt that sufficient testing was being accomplished prior to key acquisition decision points. As a result of this high level criticism, OSD directed the three Services to establish independent test agencies (ITA's) and to conduct more and improved T&E.

The purpose of this study was to learn more about the causes for and results of that OSD direction. The review included a survey of official government records such as the BRDP Report and sources containing Congressional testimonies. Significant excerpts from these documents can be found in Section II.

The Services established their ITA's during the period 1972-1974. Section III reports on the agencies themselves, including such factors as operational dates, organization structure and manning. Comparisons and contracts are made between the Army, Navy and Air Force ITA's. In addition, the current mission, number of major/non-major test programs and OT&E management policies of each agency are reviewed.

One initial and major objective of this project was to investigate and compare costs of OT&E before and after the introduction of ITA's. However, this objective was modified in "mid-stream" when it became apparent that actual T&E costs are just not available. Section IV addresses this cost accountability problem and provides a look at current ITA budgeting and funding. In addition, it introduces some of the non-dollar costs of operating under the ITA concept.

Sections V and VI summarize the study and conclude that current OT&E costs are very high. There is evidence of "over-testing" and loss of program control by the DOD Program Manager.

Three recommendations pertinent to reducing costs of OT&E are presented in Section VII.

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation for the assistance and guidance given me in the preparation of this paper by my Study Project Advisor, Lt. Col. Carroll C. Rands, USAF. His background and expertise in systems testing was invaluable in identifying project references; his positive attitude as student advisor was invaluable in keeping me "on track" and "on schedule".

Special thanks are also due to the Air Force, Army and Navy officers contacted at AFTEC, OTEA and OPTEVFOR, respectively, for providing insight into the various organizational history, manning, workload and funding areas which form the basis of this study.

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
3-1	OPTEVFOR Organization Chart	11-A
3-2	OTEA Organization Chart	13-A
3-3	AFTEC Organization Chart	14-A
4-1	ITA Funding (\$ M)	20

TABLE OF CONTENTS

EXECUTIVE SUMMARY ii

ACKNOWLEDGEMENTS iv

LIST OF ILLUSTRATIONS v

Section

I. INTRODUCTION 1

II. BACKGROUND 4

 Previous Operational Testing 4

 DT&E versus OT&E 4

 What Prompted ITA's? 5

 Informal Direction 7

 Formal Direction 8

III. SERVICES ESTABLISH ITA'S 10

 The Navy 10

 The Army 12

 The Air Force 14

 OSD Officials Comment 15

IV. ITA'S - SOME OF THE COSTS 17

 Identifying Dollar Costs 17

 Overtesting? 20

 Non-Dollar Costs 22

V. SUMMARY 25

VI. CONCLUSIONS 27

VII. RECOMMENDATIONS 28

APPENDIX A: Bibliography A-1

SECTION I

INTRODUCTION

In this Bicentennial year when all Americans are thinking of and frequently hearing the word "independence", it seemed befitting to address a recent major change to the U.S. military's systems acquisition process - Independent Test Agencies (ITA's).

Over the past half decade, much has been written, stated and directed on the need for and benefits of independent testing in the DOD systems acquisition process. Since the July 1970 Blue Ribbon Defense Panel Report, Test and Evaluation (T&E) policies of the military services have been significantly altered. Separate independent test agencies (ITA's) have been established by the Army, Navy and Air Force. These agencies, although organized somewhat differently in their individual Service's hierarchy, have one fundamental element in common; each maintains its testing independence from both the developer and the user, reporting directly to Service headquarters. The three ITA's vary considerably in size from the Air Force's organization of approximately 230 people to the Navy's OPTEVFOR which numbers over 1,400 officers, enlisted and civilian personnel.

It is extremely difficult to take issue with the theory that independent testing and reporting provides increased objectivity

to the systems acquisition process. Likewise, one would be foolish to disagree with the fact that objective testing and evaluation are essential to proper decision making throughout all phases of systems acquisition. The point in the process where test results appear to be most critical (in terms of dollar decisions and high level review) is at Defense System Acquisition Review Council (DSARC) III. It is from this review that the Secretary of Defense determines whether to approve or deny production go-ahead for the system. This decision, which normally follows the completion of full-scale development operational testing, draws heavily upon the demonstrated system performance data as reflected in the reports by the ITA's. These agencies exist today primarily because of the significance of the DSARC III decision in terms of the nation's defense posture and budget.

Because two of the three service ITA's are relatively young organizations and the third has just recently incorporated independent operational testing, their contributions to date are difficult to measure. No "track records" are available since no weapon systems have yet been deployed for which the ITA's have had full test management responsibility. Future analysis of their worth should address items such as: Are the systems being fielded by the services more dependable, better performing,

and/or less costly to operate and maintain? If they are, how much of the increased success can be attributed directly or indirectly to the activities of the ITA's? And finally, what has been the cost of the increased system effectiveness due to ITA involvement?

OSD, when directing Service ITA's, was convinced that independent testing was essential to the decision-making processes of weapon systems acquisition.

This paper reviews the issues and activities leading to that direction, discusses how each service implemented that direction, and addresses some of the resulting costs. The costs examined are not limited to those items that can be identified on a budget or other financial document. Just as important are those factors more difficult for a program manager to quantify such as system responsibility, program control and schedule.

SECTION II

BACKGROUND

Previous Operational Testing

Until quite recently, operational testing of new weapon and other military systems was conducted and reported on by the implementing (developer) and using commands. Now and into the foreseeable future, separate agencies within each service are and will be responsible for managing or monitoring all operational testing.

DT&E versus OT&E

Before proceeding with the causes for this drastic change in T&E policy and procedure, a brief differentiation between operational testing and development testing is in order. Development test and evaluation (DT&E) is concerned primarily with the engineering function of the system design.

DT&E is conducted to verify accomplishment of the development objectives; these include refining engineering design, verifying that design risks have been minimized, demonstrating that the system will meet specifications, and estimating the military utility. DT&E is essentially a detailed engineering analysis of a system's performance, beginning with individual subsystems and progressing through a complete system, where system design is tested and evaluated against engineering and operational criteria by the implementing command... (1)

On the other hand, operational test and evaluation (OT&E) focuses on the intended use of the system in its operational environment.

OT&E is conducted to estimate the system's military utility, operational effectiveness, operational suitability, and to identify deficiencies. In addition, OT&E provides information on organization, personnel requirements, doctrine, and tactics. OT&E, normally composed of initial OT&E (IOT&E) and follow-on OT&E (FOT&E), is essentially an operational analysis of a system's performance where the complete system is tested and evaluated against operational criteria by personnel with the same qualifications as those who will use, maintain and support the system when deployed. (1)

What Prompted ITA's?

During the period 1950-1970, defense system planners and developers received "little flak" from higher levels of the government bureaucracy on the methods being used to develop and test new systems. Until then, most controversy surrounded the actual need for the system in the Defense inventory and the cost of putting it there. Concern over whether a system was actually ready for production or performed to certain specifications was minimal outside DOD. This lack of concern is attributed to a general satisfaction within congressional and executive arenas that government Research, Development, Test and Evaluation (RDT&E) activities had been successful in maintaining U.S. military superiority, in winning the ICBM and space race and putting man on the moon. In addition, there were factors such as the Vietnam

Conflict which had caused DOD to defer many major weapon system acquisition programs. As the 1970's approached, economic conditions and domestic issues such as social programs and environmental improvement caused Congress to intensify its scrutiny of DOD expenditures, especially in the area of major weapon systems acquisition. As a result of this intensification on the part of Congress and the President, T&E policies of the military services would change dramatically.

The July 1970 Blue Ribbon Defense Panel Report (also known as the Fitzhugh Report) was the driving force behind this change. The panel, formed by President Nixon to examine the Department of Defense, made a searching review of DOD systems acquisition policies, including T&E. The following critical judgment concerned DOD Operational Test and Evaluation (OT&E) activities:

There has been an increasing desire, particularly at OSD level, to use data from OT&E to assist in the decision-making process. Unquestionably, it would be extremely useful to replace or support critical assumptions and educated guesses with quantitative data obtained from realistic and relevant operational testing.

Unfortunately, it has been almost impossible to obtain results which are directly applicable to decision or useful for analysis. Often, test data do not exist. When they do, they frequently are derived from tests which were poorly designed or conducted under insufficiently controlled conditions to permit valid comparisons. It is especially difficult to obtain test data in time to assist in decision-making. Significant changes are essential if OT&E is to realize its potential for contributing to important decisions, particularly

where the tests and the decisions must cross Service lines. (2)

The pressure continued. Witnesses appearing before 1971 Senate and House Committees testified that:

...funds for testing and evaluation were inadequate, and organizational responsibility was fragmented. At all levels of management within DOD, testers were not independent of the developers. (3)

Mr. G. W. Fitzhugh, Chairman of the Blue Ribbon Defense Panel (BRDP), addressing the operational testing problem at 1971 hearings before the Senate Committee on Armed Services, stated:

One of the most urgent needs for improvement of the entire weapon system acquisition process is more effective operational test and evaluation.

Everyone seems to agree that operational test and evaluation (OT&E) is very important; however, there are significant differences of opinion as to what it encompasses, what its proper objectives are, and what organizations and methods are necessary to accomplish it most effectively. (4)

Informal Direction

The driving force within DOD for changing T&E policies was Secretary Packard, Deputy Secretary of Defense under Melvin Laird. As a result of external studies and his own investigations, Secretary Packard issued a series of memoranda which directed expedited change to T&E procedures. A memorandum, dated 11 February 1971, directed the Services to arrange for OT&E to be managed and conducted by an agency separate from the

developing command and which reports the results of all operational test and evaluation directly to the Chief of the Service. The memo also directed the establishment of an OT&E focal point within the Service headquarters. In the same document, Mr. Packard established a Deputy Director, Defense Research and Engineering, to be the OSD focal point for T&E matters. (5)

Formal Direction

On 13 July 1971, the newly published DOD Directive 5000.1 officially tied OT&E to the DSARC III decision point.

Test and evaluation shall commence as early as possible. A determination of operational suitability, including logistic support requirements, will be made prior to large scale production commitments, making use of the most realistic test environment possible and the best representation of the future operational system available. The results of this operational testing will be evaluated and presented to the DSARC at the time of the production decision. (6)

Department of Defense Directive 5000.3, Test and Evaluation, dated January 19, 1973, provided additional and more specific T&E policy guidance than DODD 5000.1.

In each DOD Component there will be one major field agency separate and distinct from the developing/procuring command and from the using command which will be responsible for OT&E and which will:

- a. Report the results of its independent test and evaluation directly to the Military Service Chief or Defense Agency Director.
- b. Recommend directly to its Military Service

Chief or Defense Agency Director
the accomplishment of adequate OT&E.

- c. Insure that the OT&E is effectively
planned and conducted. (7)

Official OSD direction for ITA's had been published,
received and understood.

SECTION III

SERVICES ESTABLISH ITA's

Following the release of the Blue Ribbon Defense Panel Report in mid-1970, the Services took a more critical look at their past and present RDT&E activities with special emphasis on OT&E. Various studies were conducted based upon internal criticisms as well as those inefficiencies cited in the BRDP Report and several Congressional Hearing documents.

The Navy

The Navy's problem of coming up with a test agency independent of the developer and user was easier to solve than those of its sister Services. OPTEVFOR, which is headquartered in Norfolk, Virginia, had been in existence since 1944 when it was established for the purpose of studying the Japanese "Kamikaze" threat. Following World War II, its mission had been expanded in the area of tactics evaluation and by 1970 it was also conducting and supporting development agency and user testing, Navy-wide. To achieve the desired independence identified in the BRDP Report, meant basically a shift in emphasis to earlier program involvement by OPTEVFOR. This change in mission orientation was accomplished in the late-1971 to mid-1972 time period. While the reorientation did not involve an appreciable organi-

zation restructuring or increased manpower allocations, it did require a different and more expensive mix of personnel. The Navy's "hands on" operational testing concept demanded experienced operational officers and highly skilled NCO's familiar with current mission, tactics, policies and procedures. OPTEVFOR's current personnel strength totals 1,404 authorizations which includes 310 officers, 868 enlisted, and 45 Department of the Navy civilians. 315 positions of the 1,404 authorizations are located at OPTEVFOR Headquarters. The remainder are spread across subordinate commands, aircraft squadrons and detachments (see Figure 3-1). (8)

OPTEVFOR's stated mission in the area of operational testing is to plan, conduct and report on OT&E for all Navy acquisition programs. COMOPTEVFOR reports OT&E results directly to the Chief of Naval Operations (CNO) and provides Developing Agencies (DA) with all significant OT&E test data and analyses. OPTEVFOR is also responsible for coordinating/conducting joint T&E and operational testing for the USMC. Independent evaluation reports on USMC T&E are made directly to Commandant of the Marine Corps and to the CNO. (9)

OPTEVFOR is currently managing OT&E for 219 systems and is responsible for monitoring OT&E on an additional 209 CNO assigned projects. Furthermore, this ITA is providing DT&E assistance

COMMANDER OPERATIONAL TEST & EVALUATION FORCE STAFF ORGANIZATION



1 JANUARY 1979

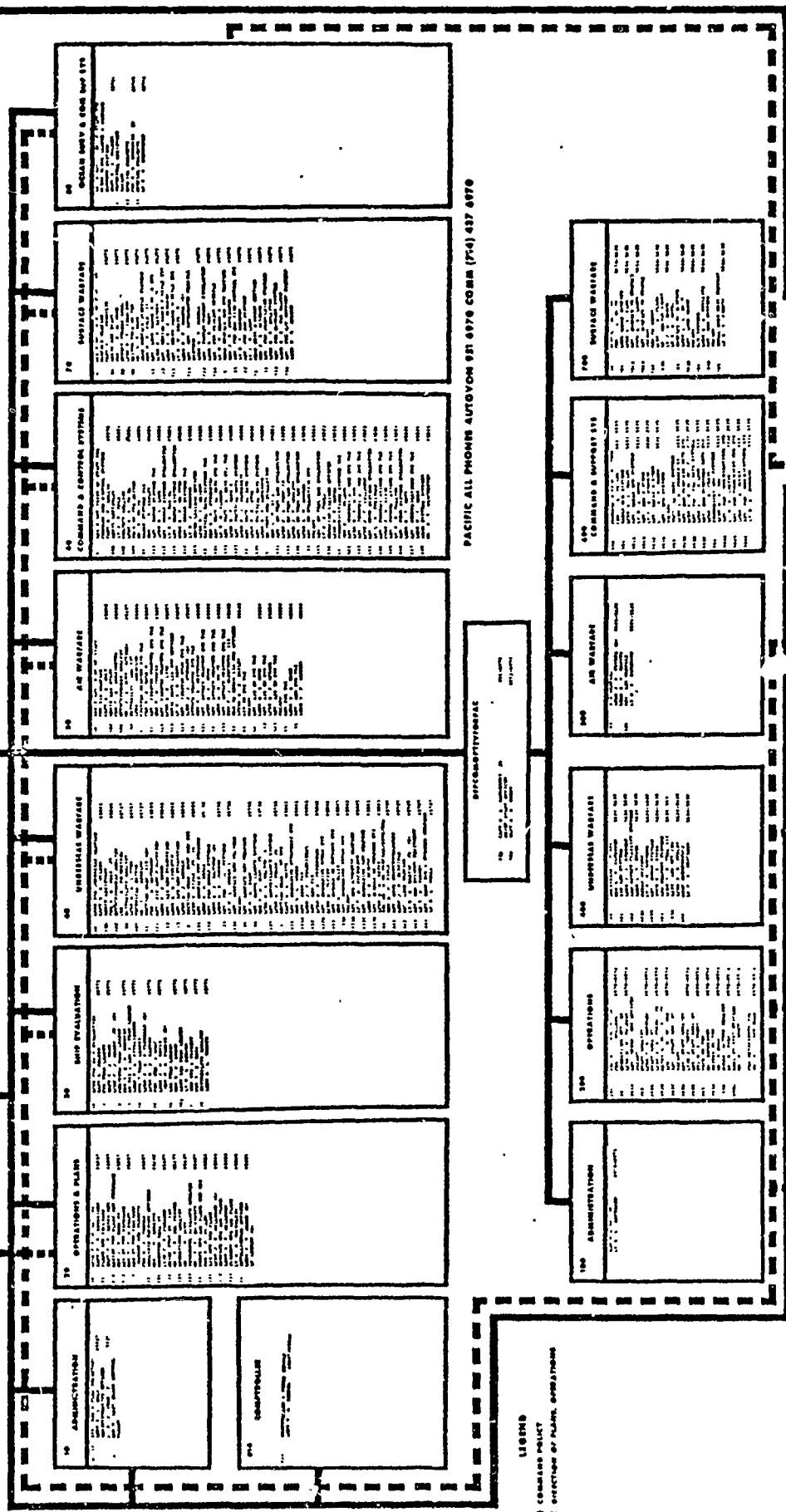
ADJ & ASST SECRETARY
 001

00 COMPTROLLER
 001

ADJ & ASST SECRETARY
 001

01 RECORDS & OPERATIONS
 001

CHIEF OF STAFF & ADM
 001



PACIFIC ALL PHONES AUTOVON 921 6976 COMM (754) 437 6870

010 COMPTROLLER
 001

100 ADMINISTRATION
 001

110 OPERATIONS
 001

120 UNMANNED WARFARE
 001

130 AIR WARFARE
 001

140 COMMAND & SUPPORT SYS
 001

150 MISSILE WARFARE
 001

COMBATIVITY
 001

COMBATIVITY
 001

COMBATIVITY
 001

COMBATIVITY
 001

COMBATIVITY
 001

COMBATIVITY
 001

LEGEND
 ■ COMBINED POLICY
 ■ SECTION OF PLANS OPERATIONS

Figure 3-1

to the DA's on approximately 150 development efforts. (10)

The Army

Pursuant to a letter from The Adjutant General, Department of the Army, 25 September 1972, the United States Army Test and Evaluation Agency (OTEA) was established effective that date at Fort Belvoir, Virginia. It was activated under the jurisdiction of the Assistant Chief of Staff for Force Development (ACSFOR) and a TDA was established with a personnel authorization of 120 spaces, which included 53 officers, 2 enlisted men, and 65 civilians. (11)

In 1973, OTEA was reorganized with a personnel authorization of 200 spaces made up of 103 officers, 19 enlisted, and 78 civilians. Changes in 1974 made OTEA a field operating agency under the Chief of Staff, Army, and increased total strength to 223. The most recent reorganization took place effective 15 March 1975, when strength was again adjusted upward to OTEA's present manning of 250 spaces, which includes 125 officers, 20 enlisted men, and 105 civilians.

The stated mission of OTEA is to support the material acquisition and force development processes by exercising responsibility for all operational testing and by managing force development testing (FDTE) and joint user testing for the Army. (12)

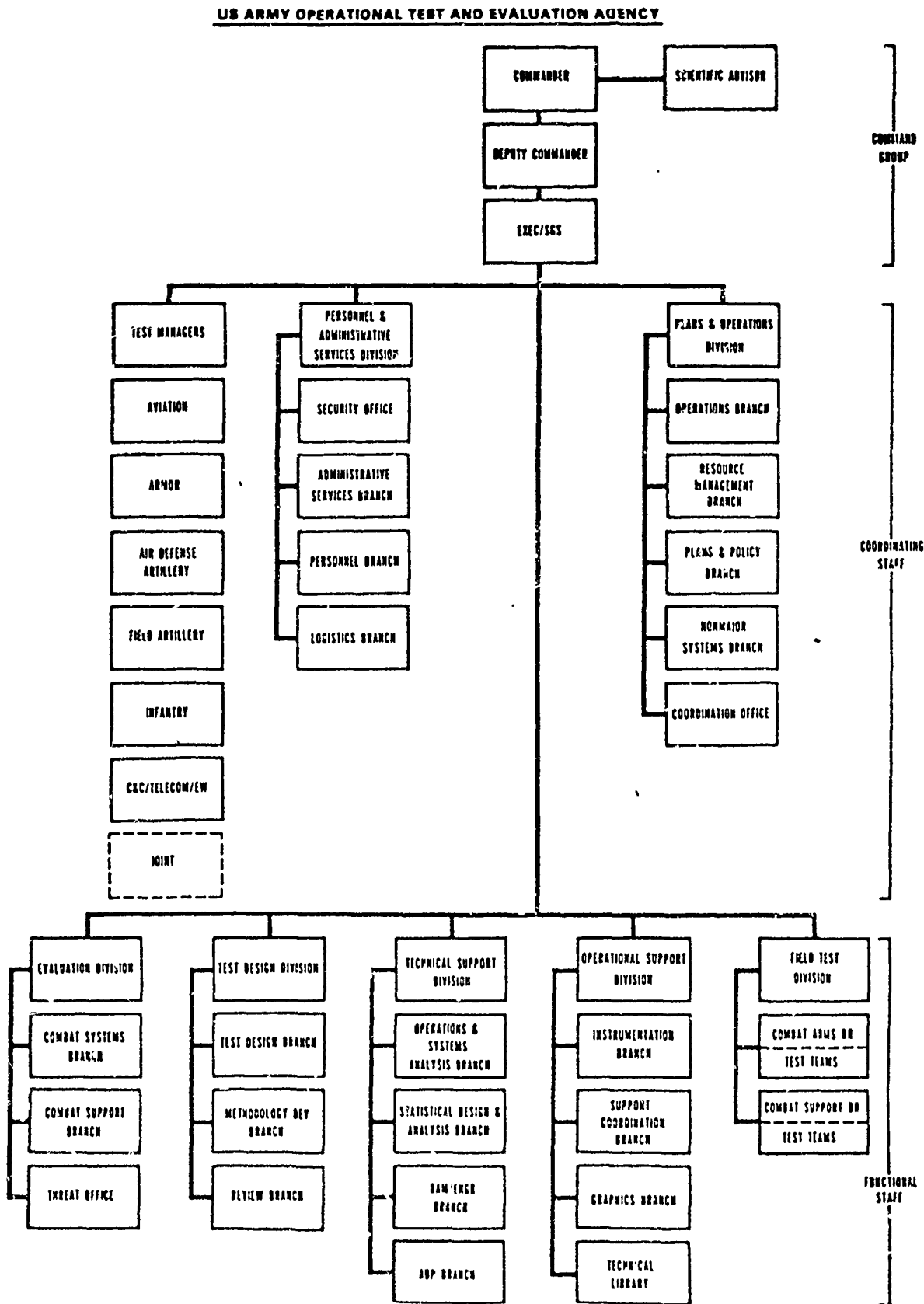
The OTEA organization includes a command group, a coordinating staff and a functional staff (see Figure 3-2).

OTEA is currently managing OT&E for 22 major and 17 Category I non-major systems. In addition, the agency is monitoring operational test activities on more than 250 lesser category non-major systems. Out of the pure OT&E environment, OTEA is involved in three major FDTE efforts and nine joint user testing exercises with other Services. (13)

The Air Force

The Air Force was last to formally establish their OSD directed ITA, doing so on 1 January 1974. Where the Army and Navy had earlier complied explicitly with the BRDP recommendation for separate, independent OT&E agencies (OTEA and OPTEVFOR), the Air Force initially attempted to achieve independence by placing full OT&E responsibility on the functional using commands (TAC, SAC, etc.). While this complied with the letter of the BRDP recommendations and in practice was a step in the right direction, it fell short of the intent and therefore was suspect and often subject to criticism. The Air Force designated its ITA the Air Force Test and Evaluation Center (AFTEC), located this field command agency at Kirtland AFB, New Mexico, with direct reporting to the Chief of Staff, Air Force.

Figure 3-2



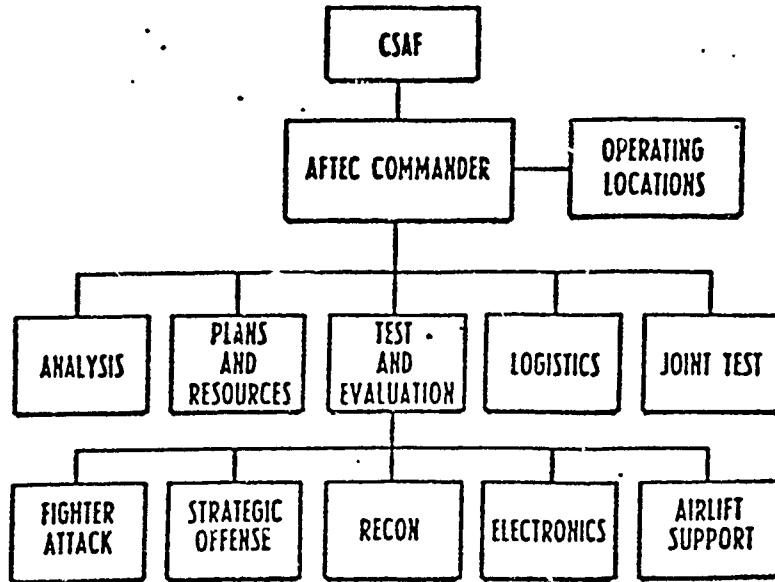
Since becoming completely operational in October 1974, AFTEC's manning has increased from an initial authorization of 208 to a present strength of 231. This includes 155 officers, 32 enlisted personnel and 44 civilians. AFTEC manning is projected to increase to 290 positions within the next year.

The stated mission of AFTEC is to manage the Air Force operational test and evaluation program and assess the military utility and operational effectiveness and suitability of major and designated non-major systems. The center will also actively monitor all non-major systems OT&E conducted by the major commands through review and approval of test plans and review of and comment on test reports. In its role as the manager for Air Force OT&E, AFTEC will provide policy recommendations for Hq. USAF approval and subsequent implementation by all major air commands. AFTEC will act as the Air Force spokesman to the DSARC on matters pertaining to OT&E and will support Congressional requests for OT&E information on weapon systems for which procurement funds are being requested. (14) The AFTEC organization, similar to the Army's OTEA, includes a command section and coordinating and functional staff elements (see Figure 3-3).

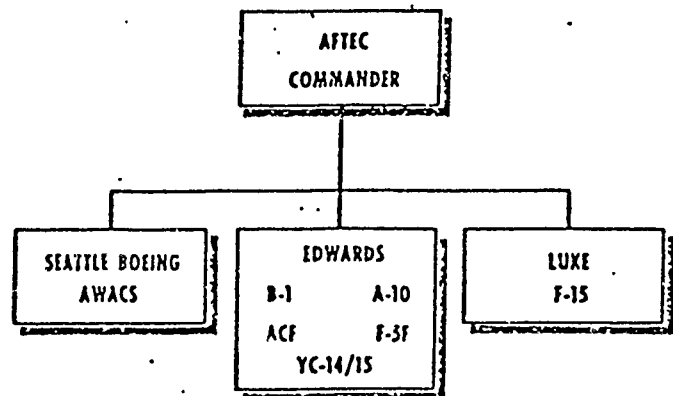
AFTEC is currently managing OT&E for 47 major and designated non-major programs. In addition, at the present time the center is monitoring 144 major command operational test efforts and is

Figure 3-3

ORGANIZATIONAL STRUCTURE



OPERATING LOCATIONS



involved in nine OSD-directed joint Service tests. (15)

OSD Officials Comment

Hence, the Services achieved independence in systems acquisition testing by late 1974. In a statement to Congress in March 1975, Lt. General Starbird, USA (Ret), then Deputy Director (T&E), DDR&E, remarked:

Each of the three Services now has a strong, mature and effective organization for the accomplishment of independent operational test and evaluation. (They are the Army's Operational Test and Evaluation Agency, the Navy's Operational Test and Evaluation Force, and the Air Force's Test and Evaluation Center.)
(16)

More recently, 3 February 1976, Dr. Malcom Currie, Director of Defense Research and Engineering, told Congress:

The past few years have seen significant improvements in DOD procedures for conducting T&E of major weapon systems. High level emphasis on T&E was assured initially by creation of the Office of Deputy Director of Defense Research and Engineering (Test and Evaluation). First under the direction of Lieutenant General Alfred D. Starbird, USA (Ret.) and now under Lieutenant General Walter E. Lotz, Jr., USA (Ret.), this office has closely monitored all major, and many less-than-major, weapons acquisition programs.

Further strengthening of DOD T&E has been achieved by the establishment of independent operational T&E agencies within each of the Services. These are the Navy's Operational Test and Evaluation Force, the Army's Operational and Test Agency and, most recently, the Air Force's Test and Evaluation Center. These agencies plan and conduct tests and submit their independent evaluations directly to the Chiefs of their respective Services. Their evaluations provide the objective assessment of the operational effectiveness

of new weapon systems which is essential to proper functioning of the weapons acquisition process. Creation of these agencies has had a significant impact on systems development and procurement as evidenced by the greater attention being directed to operational effectiveness within the Services and by the greatly improved quality of T&E data now being presented to the Defense Systems Acquisition Review Council (DSARC).

A significant fallout from the emphasis on T&E is a better definition of weapon system performance goals. The T&E agencies of the Services and the DD (T&E) are insuring that DCP's specify all essential performance characteristics and minimum acceptable values for these parameters in advance of undertaking tests. This requires an explicit definition of the design parameters in operational terms early in the acquisition cycle. Such definition not only provides a firm basis for planning the type and extent of testing but also provides a clear basis for the evaluation of the military utility of a new system. (17)

SECTION IV

ITA'S - SOME OF THE COSTS

Identifying Dollar Costs

Accurate identification of the dollar costs associated with the implementation and operation of the current system of independent testing (ITA's) is extremely difficult. It would be nice to be able to report that under the old policy, a system OT&E cost "X" dollars, while an OT&E of a comparable system today costs "Y" dollars. One reason for the difficulty is that all Services are still involved in somewhat of a transition period between the old and new procedures. However, the primary reason lies in the fact that T&E costs under the previous policy of joint developer/user OT&E are not that well documented. In other words, no firm baseline for comparison exists. The various OT&E costs were borne by different commands, different agencies within the commands, and utilizing different sources and types of funds. OT&E dollars are especially difficult to extract from development contracts with industry where costs are "hidden" in labor (e.g., direct and indirect), materials (e.g., prime system components, spares and test equipment) and overhead. Test range costs involve both military and commercial contractor support expenses. Significant T&E dollars are expended by supporting and partici-

pating organizations such as the using, maintaining, logistics and training commands. These costs are incurred over relatively long periods of time, beginning during the test planning phase and extending through actual systems testing and test report submission.

Under the new policy where a single independent agency is responsible for total management of OT&E, cost accounting should be a more manageable function. However, there is little indication at this time of any appreciable change. The true cost of OT&E remains to be somewhat of an unknown. There are, however, some facts and figures indicating that the ITA's do represent an increase in the cost of RDT&E.

The manpower of these new agencies is one very evident cost factor. People costs, since they currently account for over 50% of the national defense budget, must be considered when addressing the price of independence. There have been few manning trade-offs as a result of ITA management of OT&E. The current personnel strength of test functions within program offices, test ranges and using/supporting command elements do not appear to have been affected. In fact, from a systems program office viewpoint, additional manning might be justified on the basis that the ITA represents another agency for coordination and/or approval on all test related activities.

When OTEA and AFTEC were being established, the majority of the new personnel authorizations were to be achieved by a like reduction of authorized positions in the other commands. However, most of the manpower authorization trades resulted in units giving up the more expendable positions. The result of this was that many position conversions were required. For example, administrative and clerical positions had to be converted to laboratory and other scientific specialties. Likewise, many generalized enlisted positions were "given up" that required conversion to specialized officer authorizations. As has been previously mentioned, the Navy's OPTEVFOR OT&E structure required more senior and more experienced officer capabilities. Also, as previously indicated, there have been manpower increases for both OTEA and AFTEC since they were established. Three capably staffed OT&E organizations now exist but at a significant cost, personnel-wise.

In the case of the Army and Air Force, facilities for the new organizations had to be located. Once acquired, the attendant costs of outfitting and maintaining these facilities is a consideration.

The annual funds budgeted for and managed by the ITA's are as indicated in the following table:

TABLE 4-1
ITA FUNDING (\$ M)

	<u>OPTEVFOR</u>		<u>OTEA</u>		<u>AFTEC</u>	
	<u>FY 76</u>	<u>FY 77</u>	<u>FY 76</u>	<u>FY 77</u>	<u>FY 76</u>	<u>FY 77</u>
O&M	.57*	.64*	5.20	7.39	5.67	5.69
RDT&E	3.60**	4.00**	3.90	5.44	1.64**	5.64

*Hqs. only (Does not include A/C Squadrons & Detachments).

**Does not include project RDT&E funds.

Note: Table 4-1 does not reflect procurement or RDT&E costs for test equipment and unique instrumentation requirements (these costs are substantial - for example, OTEA's estimate is \$7-10 Million annually).

Overtesting?

A trend which is supported by many officials involved at all levels in the systems acquisition process is that of "more testing". This is particularly true in the area of OT&E. However, it is difficult to substantiate that this increased testing is due solely to the existence of ITA's. The extreme emphasis on testing prior to major OSD decisions has been applied since 1970 at every level across DOD. Additional systems testing is expensive and if it has, in fact, reached the point of "overtesting", dollars are being wasted. There are many military development command and certain OSD officials who believe and have stated that too much OT&E is now being conducted. One high OSD official recently remarked that, "it appears that the pendulum of opera-

tional testing has indeed swung too far". (18) There were many reports of systems overtesting. He continued that, "this overtesting results in an obvious waste of dollars and people when what is really needed is better conceived test plans". The latter would result in more effective system evaluation and at the same time save critical dollar and people resources. (18)

Overtesting not only impacts a systems program in dollar costs. It is quite obvious that more testing normally involves the procurement of additional test items and other materials. Likewise, increased testing clearly involves more time which equates to additional test range, using/supporting command and contractor personnel costs. However, the well used expression "time is money" does not go quite far enough for the systems program manager/director. Since he is the key individual in systems development, and totally responsible for a program from concept through operational deployment, "time is more than money!" The program manager has a commitment to the user to provide a fully tested weapon system by specific need times referred to as Initial Operational Capability (IOC) and Full Operational Capability (FOC) dates. The user in turn has a commitment to the Service and the Service to the U.S. citizen in terms of providing adequate national defense. The remainder of this section will discuss some of these non-dollar costs of

ITA's as seen through the eyes of a DOD program manager (PM).

Non-Dollar Costs

The introduction of ITA's into RDT&E has taken from the PM a significant portion of his control of the program. He still has total program responsibility, but no longer has the authority with which to control a major function of development, that of OT&E. He has lost the flexibility he once possessed through OT&E planning and budgeting. Trade-offs between testing and other phases of system acquisition can no longer be made within the program management office (PMO).

The ITA also represents another agency with which the PMO must interface. In the current transition period, it has been especially difficult and time consuming to bring the ITA's "up to speed" in order that they possess the necessary knowledge and capability to assume full OT&E management. For future programs, this problem should be minimal since the ITA would have been "on board" since the conceptual phase of the programs. However, the interfacing requirements will continue to be significant since the ITA represents not only another coordination agency, but also an action agency on all test plans and major decision documents that impact the DSARC reviews.

The existence of the ITA in its position of OT&E test manager has also resulted in the constriction of information flow

between the PMO and the user; said another way, between the developer and the customer. The PM regards this loss of important dialogue as another cost of control since the critical feedback loop has been severed or at least interrupted. A like situation has developed between the PMO and the actual test agency, be it a government or Service test range/facility.

The PM's of lesser priority programs feel that they stand to lose the most control due to the large, and what appears on the surface to be an unwieldy, number of programs being managed or monitored by the ITA's. They anticipate that the higher priority programs will receive more attention and by more senior and more experienced test managers.

Probably the most significant cost of control, or loss of PM control, exists because of the location of the ITA's in the military hierarchy. These agencies report directly to the Service Chiefs. In addition, and as one ITA mission statement reflects, "AFTEC is the official Air Force spokesman to the DSARC...and supports Congressional requests...on weapon systems for which procurement funds are being requested". (15) This represents an unprecedented loss of program control from the PM to what is in fact a higher level agency. In essence, the ITA activity can be regarded as a significant step backward in OSD's long-standing policy of decentralizing systems acquisition

management.

The costs included in this section by no means form a complete list. They do, however, represent areas that should be addressed when and if a formal reassessment of ITA's is accomplished.

SECTION V

SUMMARY

During the 1970-71 time period, a President's panel and Congress expressed the need for additional test and evaluation prior to DOD major decisions on weapon systems acquisitions. The need was further defined as being twofold in nature. First, there was a requirement for an increased quantity of system testing and associated test data. And secondly, there was a need for more objective testing by separating the tester from the developer and user. In response, OSD directed (DODD 5000.1 and 5000.3) the Services to establish independent test agencies to manage all weapon systems OT&E. In addition, it was directed that these agencies report OT&E test results directly to the Service Chiefs.

By 1974, all three services had ITA's operating and either managing or monitoring all OT&E programs. The Army and the Air Force agencies were and continue to be quite similar in size and mission. The Navy had a test agency in existence which was nearly independent of the developer and user; through mission re-orientation and some restructuring, it assumed the full OT&E management responsibility.

The costs associated with the implementation and operation of the ITA's are substantial. However, due to the lack of a

baseline for comparison, it is difficult to assess how much more costly the new ITA program is from the previous policy of joint developer/user testing. OT&E cost accounting was and remains very difficult because of the number of organizations involved in OT&E and the various types and sources of funding utilized.

There is evidence indicating that because of the emphasis placed on more testing by the BRDP, Congress and OSD, the Services have overreacted. The pendulum may have swung too far, to the point where additional testing has become non-cost effective.

As seen by a DOD Program Manager, costs resulting from the introduction of ITA's are more than just dollar oriented. As significant are the losses in control of his program, a usurping of his implied authority as the individual charged with total program management responsibility.

SECTION VI

CONCLUSIONS

Through the establishment of ITA's, the DOD systems acquisition process has incurred an abrupt change to the manner in which systems OT&E is managed, conducted and reported. With any abrupt change in policy, there is often a tendency on the part of the directing agency to overemphasize the change and the reasons for it. This overemphasis in turn leads to an overreaction by the organizations upon which the policy was directed.

It is quite possible that such a cause and effect relationship existed with the direction for more OT&E and the implementation of ITA's. Evidence supports the fact that the new OT&E policy has resulted in higher RDT&E costs. However, complete substantiation of this is only possible by first improving T&E cost accounting systems within all Services.

Last, but not least, the ITA concept has been costly to DOD program managers in terms of proper program management control.

SECTION VII

RECOMMENDATIONS

Three significant T&E issues have emerged as a result of this research. The issues are interdependent, as are the recommendations for their resolution.

The first issue is the inadequacy of the military services' T&E cost accounting procedures. This factor also makes the T&E budgeting processes themselves suspect. It is recommended that the services take a "hard look" at their T&E budgeting and cost accounting procedures, identify the weaknesses, and institute improved financial control.

The second issue is that of possible overtesting during system OT&E. The Services should analyze their current OT&E planning at all levels to insure that only the minimum necessary is being planned and accomplished.

The third and major issue is the need for ITA's. Recommend that OSD and the Services reassess and reverify the requirement for independent testing as it is currently conducted. This assessment could be based upon those system-oriented factors that the DOD Program Manager considers daily; namely, cost, schedule, and performance.

APPENDIX A

BIBLIOGRAPHY

1. Research and Development Test and Evaluation, AFR 80-14, Department of the Air Force, 10 February 1975, p. 2.
2. Blue Ribbon Defense Panel, Gilbert W. Fitzhugh, Chairman, "Report to the President and the Secretary of Defense on the Department of Defense," Washington, GPO, 1970, p. 59.
3. Department of Defense Systems Acquisition Management: "Congressional Criticism and Concern." Dissertation by J. J. Bennett, May 1974, p. 112.
4. U.S. Congress, Senate, Committee on Armed Services. Weapon Systems Acquisition Process Hearings before the Senate Committee on Armed Services, 92nd Congress, 1st Session, 1971.
5. Department of the Air Force, Air Force Systems Command, Air Force Test and Evaluation, Fifth Edition, August 1975, p. 9.
6. Department of Defense, DOD Directive 5100.1, Acquisition of Major Defense Systems, July 13, 1971, para. III, C. 6.
7. Department of Defense, DOD Directive 5000.3, Test and Evaluation, January 19, 1973, para IV, C. 1.
8. Telephonic interviews with OPTEVFOR officials (April-May 1976), CDR J. Roberts, Analysis Support Officer, OPTEVFOR. LCDR E. Daly, Flag Secretary, OPTEVFOR.
9. Department of Navy, OPNAVINST 3960.10, Test and Evaluation, 22 October 1975.
10. Telephonic interviews with U.S. Navy T&E officials (April-May 1976), LCDR R. Porter, OP-983, Washington, D.C., LCDR W. Riedel, Comptroller & Force Supply, OPTEVFOR.
11. Department of the Army, OTEA Memo 10-1, Organization, Mission and Functions Manual, 1 October 1975, p. 2-1.

12. Department of the Army, Army Regulation AR 10-4, U.S. Army Operational Test and Evaluation Agency, 30 December 1974, para. 3.
13. OTEA Fact Book and OTEA interviews (March-May 1976), Department of the Army, OTEA, U.S. Army Operational Test and Evaluation Agency, October 1975; Interviews, LTC R. Sugg, Chief, Plans and Policy Branch, OTEA, and LTC W. Campion, Chief, Programs & Budget Branch, OTEA.
14. Department of the Air Force, AFTEC Fact Sheet, Managing Air Force Operational Test and Evaluation, July 1975, pp. 4-5.
15. AFTEC Fact Sheet and telephonic interviews (March-May 1976): Department of the Air Force, AFTEC Fact Sheet, Managing Air Force Operational Test and Evaluation, July 1975; Interviews, Lt. Col. D. Archino, Chief, Program Management, AFTEC, and Major R. Flanagan, Budget Officer, AFTEC.
16. Department of Defense, The DOD Program of Test and Evaluation, FY 1976, FY 1977 and FY 1978, Statement by DD(T&E), DDR&E to House Armed Services Committee, 26 March 1975, p. 3.
17. Department of Defense, The DOD Program of Research, Development, Test and Evaluation, FY 1977, Statement by the Director of Defense Research and Engineering to the 94th Congress, 2nd Session, 3 February 1976, pp. X-1, 2 and X-4.
18. Statements made by a senior OSD official in a non-attribution environment. (Note: An attempt is being made by the author to receive approval of attribution.)