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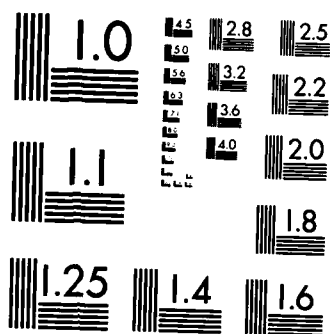
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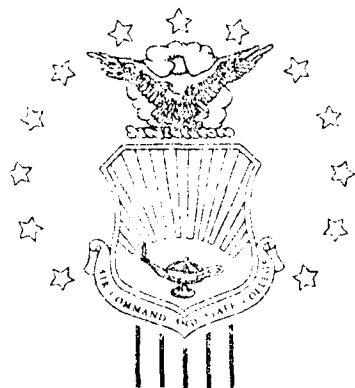
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# AIR COMMAND AND STAFF COLLEGE

## STUDENT REPORT

MANAGEMENT OF OPERATIONAL TEST  
AND EVALUATION (OT&E)  
IN STRATEGIC AIR COMMAND

MAJOR ALBERT A. FALCONE #85-790  
*"insights into tomorrow"*

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## PREFACE

This paper provides an historical summary and analysis of the Operational Test And Evaluation (OT&E) organization in Strategic Air Command (SAC). Chapter One presents a general introduction to the research study. In Chapter Two, a detailed analysis of how SAC has conducted OT&E through the years is provided. Chapter Three looks at current Test and Evaluation (TSE) regulations and how SAC adheres to the intent of the documents. Chapter Four provides a current organizational synopsis of the two main agencies actively involved in conducting OT&E: the Deputy Chief of Staff, Plans (XP), and the Deputy Chief of Staff, Operations (DO). Chapter Five provides an interim summary. Chapter Six presents findings and conclusions. Finally, Chapter Seven provides recommendations based on data analysis. The information provided is an attempt to clarify why SAC is so fragmented in providing a credible OT&E program. This paper is not all-encompassing and is only the beginning step in providing possible ways of eliminating the redundancy and inefficiency that exists in the present structure. The author gratefully acknowledges the help given by so many in putting this book together. Special thanks go to Lt Col Fred Offholter, Chief of the Aircraft and Weapons Test Branch at SAC, for all his reliable assistance.

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## ABOUT THE AUTHOR

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Major Albert A. Falcione prepared this study while a student at the Air Command and Staff College (ACSC), Maxwell AFB, Alabama. He holds a Bachelor of Science degree in Speech/English from Miami University, Oxford, Ohio, and received an MPA from Glendon State University in 1981. Prior to attending ACSC Maj Falcione spent two years at HQ SAC Offutt AFB, Nebraska as the Aircraft and Weapons Test and Evaluation Officer for the Short Range Attack Missile (SRAM), B43, B53, B61, B83 nuclear gravity weapon systems, and the FB-111 Avionics Modernization Program (AMP). His flying experience includes 96 combat missions in Southeast Asia as a F-4E Weapon Systems Officer, 200 hours as an F-4E Forward Air Controller (TIGER FAC), and 850 hours in the FB-111. Following ACSC Maj Falcione will be assigned to the 4201 Test and Evaluation Squadron (TESTS), Barksdale AFB, LA, to participate in the B-1B Follow-on Operational Test and Evaluation (FOOT) program. He and his wife Marilyn have two daughters, Amy and Beth.



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### REPORT NUMBER

85-790

### AUTHOR(S)

MAJOR ALBERT A. FALCIONE, USAF

### TITLE

MANAGEMENT OF OPERATIONAL TEST  
AND EVALUATION (OT&E) IN  
STRATEGIC AIR COMMAND

I. Purpose: To determine if the present decentralized OT&E organization is efficient and conducive to the impartiality necessary for objective weapon system assessment and reporting.

II. Problem: Although the weapon acquisition process has made significant improvements recently, serious deficiencies in the Testing and Evaluation (T&E) of the weapons the Air Force acquires still exist. As presently structured, the conduct of OT&E in SAC is fragmented with no fewer than 17 organizations participating in some area of the testing process. This study analyzes whether SAC methodology in performing OT&E is a solution to the problem, or whether it merely is exacerbating an already inefficient system.

III. Data: Since 1970, there has been a concerted effort within the Air Force to organize OT&E so it can provide cost-effective and reliable weapon systems. Management of complex OT&E programs were fragmented among the operational commands which resulted in no one having the authority to speak on and develop overall OT&E policy for the Air Force. In an attempt to favorably resolve the issue, MAJCOMs were tasked to reorganize. SAC in-house investigations revealed an OT&E program that was inadequate to meet the expanding requirements of OT&E. A centralized concept was proposed but a contrary view developed over who would control the new agency. A Directorate in charge of Testing (DDT) was

## CONTINUED

established in 1972. This new organization, however, was basically powerless as it had a voice only in OT&E matters that pertained to the Deputy Chief of Staff/Operations.

A power struggle among the XP, DO, and BM was the primary reason SAC did not centrally organize. The consensus was that such an organization would be best; however, all three looked at the ordeal as a zero-sum game, and as a result, the logical course of action to centrally organize never materialized. SAC did not want to change the present way of conducting OT&E; nevertheless, it was faced with the dilemma of not complying with current Air Force directives (AFR 80-14, AFM 55-43) if they chose to maintain the status quo. Shortly after the establishment of the Air Force Operational Test and Evaluation Center (AFOTEC), SAC took action which undermined the four previous years of attempts at reorganization. DOV was disbanded as a directorate. Still under pressure to establish a SAC focal point for all SAC OT&E, DOOV was officially listed as the SAC point of contact. This new division met the requirement of the regulation, but had no defined responsibilities and authority. In essence, SAC OT&E organization in 1976 differed little from the inefficient system first identified in 1970. There is no appreciable difference from the way SAC conducts OT&E today than the way it was accomplished in 1976.

IX. Conclusions: As presently structured, the conduct of OT&E in Strategic Air Command remains the fragmented organization first identified in 1970. The numerous organizations participating in OT&E and the lack of a decision-making agency to oversee the entire program makes the OT&E process inefficient. The existing system is uncoordinated in objective, responsibility, planning, testing, and reporting. Efficiency and effectiveness were sacrificed at the expense of retaining power, control, and organizational integrity.

X. Recommendations: OT&E is only one part of a dynamic system acquisition process. It requires constant review and the attention of OT&E managers at all levels to ensure that it is optimally performed. Change from the present way of doing OT&E at SAC must be pursued because it is in the best interest of the Air Force. To begin with, the Aircraft and Weapons Test Division should be reinstated as a directorate. This change will give more credibility and prestige to an organization that is supposed to be the SAC focal point for OT&E. A second option is for the

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## CONTINUED

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DCS/Operations to consolidate all its testing activities of major systems under the new directorate. A third alternative includes incorporating DCS/Plane ICBM testing with DC ICBM testing under the proposed new directorate. In this case the directorate would be under the supervision of Science and Research (NR). Finally, the last option would be the establishment of a centrally organized O&E agency under the authority of the SAC Chief of Staff.

## Chapter One

### INTRODUCTION

#### BACKGROUND OF PROBLEM

There have been great strides toward improvement in the Test and Evaluation (T&E) of the weapon system acquisition process in recent years; however, significant problems still remain. The General Accounting Office (GAO) reported in 1983, "...the U.S. is producing billions of dollars worth of weapons without knowing whether they can do the job because they have not been adequately tested" (2:1). The problem was more dramatically stated by Dr. John S. Foster, Jr., Director of Defense Research and Engineering, in August 1969, "Our past and present methods of acquiring weapons have lost us the confidence of the public and are threatening our country's future security. Unless we change our practices drastically, our future ability to deter war and fight can be seriously jeopardized" (30:1).

If one looks further back into the history of the acquisition process he sees that time and time again the Air Force is brought to task for its organization and ability to efficiently conduct test and evaluation. As early as 1934 Secretary of War Baker recommended the Air Corps establish a "separate branch for research and flight testing" (31:2).

The importance of testing and evaluation in the weapon acquisition process is not in question. The criticism borne by the Air Force for fifty years is not one of do we need it or not, but a question of, can we do it better? The Air Force has made dramatic moves to improve the system by establishing an independent test agency, now called the Air Force Operational Test and Evaluation Center (AFOTEC). However, with the advent of technologically sophisticated multi-million dollar weapon systems the T&E business is more complex than ever. No one agency, such as AFOTEC, can be expected to carry the burden to ensure the successful transition of a weapon system from acquisition to stockpile to target.

The using command has been given greater autonomy in Development Test and Evaluation (DT&E), and Operational Test and Evaluation (OT&E) of weapon systems which they have been assigned. The determination of operational capability is the right and responsibility of the using command since it is the

using command which is ultimately tasked with the mission of using the  
mission with these new weapons. Therefore, the user is a little reluctant to  
invest in the quality of a weapon system.

Moreover, user command (OT&E) of the program is not being  
generally criticized for intra-command production. The program is not  
experience. While the lack of experience is a little pointed out,  
parochialism and lack of objectivity is particularly true.  
Impartiality is necessary for effective and efficient testing. Both  
of these programs are excellent examples of poor OT&E management  
which resulted in aircraft modifications costing an additional 100  
million dollars. Even today, the L-54 is not quite as reliable  
performing as was intended. Operations are not as smooth as intended.  
Any little attention during the early phase of testing.

8:9:10

### EVALUATION CRITERIA

While 23-5 states that organizational structures must be  
adjusted to ensure maximum productivity and the best possible use  
of resources. It goes on to say that as missions and  
responsibilities change, structures geared to previous activity  
are often inefficient and do not adequately provide former  
of energy and effectiveness. An organization must be structured  
to allow rapid and effective decision-making. Excessive layering  
of subordinate organizational elements must be eliminated because  
it compounds the review process, and often encumbers  
decision-making. Organizational fragmentation along lateral  
lines should be avoided because it adds to the coordination  
process. The efficiency and effectiveness of SAC's T&E  
organizations must be evaluated in terms of the  
regulation's guidance (21:2).

As a result of the structure, the product of OT&E in strategic  
command (SAC) is fragmented with 17 organizations  
participating in some form of OT&E (12:3). This paper will  
analyze the effectiveness of decentralized organizations in efficient  
and effective for the impartiality necessary for efficient system  
development and reporting. The analysis will be based on the  
information reported in the report of DOD actions started in 1960 which  
was originally directed at SACs. Since command is a key factor  
in the effectiveness of T&E, SACs are a key factor in  
the effectiveness of the instrument in defense of the  
country. The study will compare with a  
study of the effectiveness of OT&E conducted in the report of the  
study of the effectiveness of OT&E. The study of the effectiveness  
of OT&E will be based on the findings of the study of the  
effectiveness of OT&E. It is not the intention of the study to  
address productivity, manpower, and other factors.  
The study will provide a manpower, and other factors.  
The study will be necessary as a result of the study of the  
effectiveness of OT&E.

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As a result of the above, the proposed new system is expected to be more effective than the existing system in the following aspects:

- (1) The proposed system is expected to be more effective in the early detection of the abnormality of the system.
- (2) The proposed system is expected to be more effective in the early detection of the abnormality of the system.
- (3) The proposed system is expected to be more effective in the early detection of the abnormality of the system.

## Chapter Four

### ICBM SA Base Organization

#### XPOT&E STRUCTURE

It is desirable that primary organizations conducting test and analysis of functional areas is necessary to define responsibilities. SACR 23.6 describes approved responsibilities of XP and OQ within HQSAC:

1. The Directorate of ICBM Requirements (XPQ) directs all ICBM systems acquisition from requirement through Initial Operational Capability (IOC). It oversees Initial and Qualification Operational Test and Evaluation (IOT&E) programs.

2. The Directorate of Test and Evaluation (XPTE) develops long range test and evaluation objectives, requirements, and manages IOT&E programs.

3. The Directorate of Operational Requirements (XPH) oversees research and development test programs and oversees updating changes. The Directorate retains headquarters responsibility during the life of the system while in the development phase, which also includes primary functional testing and Phase II modifications.

4. The Operational Analysis Division (XPHD) monitors DT&E and represents SAC to IOT&E.

5. The Operational Test Division (XPHB) monitors DT&E and represents SAC to IOT&E.

6. The Test and Evaluation Squadron (TES), Edwards AFB, provides operational control of DCS/Plans. It provides representation on operations and maintenance representation on programs involving SAC strategic weapon (21:--).

#### OQ OT&E STRUCTURE

The Directorate of Mobile Operations (DOM) is the primary support point for ICBM operations. It directs the mobile systems IAW AFR 20-14.

1. The ICBM Systems Test Division (DOMD) manages, executes, and conducts operational flight tests, verification tests, system tests, deployment tests, and special tests of ICBM systems to fulfill test requirements directed by the SAC staff (21:17-19).

2. The Directorate of Current Operations (DOCO) develops an



performing OT&E on a major scale has increased when compared to the man-year study addressed in the previous chapter. SACR 55-57 is designed to simplify the testing process and give guidance to the organizations performing OT&E. However, it also reaffirms that there is no one agency responsible for OT&E. A quick glance at the above data shows that both the XP and DO communities perform IOT&E, OOT&E, and FOT&E on various weapon systems and subsystems.

1. The Office of Primary Responsibility (OPR) is the Aircraft and Weapons Test Division (DOOA). The major thrust of this document is to clarify what organization is responsible for performing a particular type of OT&E. Below is a synopsis of SAC Directorates conducting OT&E as depicted in SACR 55-57:

1. DOA conducts OT&E of communication systems, subsystems, and equipment, including command communication systems.

2. DOE conducts OT&E of base facilities, including flight-fighting equipment, and off-base ICBM Real Property (Refined Equipment).

3. DCC conducts/supports IOT&E, and conducts FOT&E of command control systems, sub-systems, and equipment to include the Air Command Post.

4. DOW conducts FOT&E of aircraft and airborne missile weapons, nuclear and conventional gravity weapons, related aircraft monitor/control release systems, and Electronic Countermeasures (ECM) equipment for aircraft in the operational capability.

5. DWT conducts FOT&E/Qualification Test and Evaluation (QTE) and verification testing of ICBM weapon systems, sub-systems, and equipment.

6. DOT conducts OT&E of radar bomb scoring systems and associated equipment.

7. DDT conducts/supports IOT&E and FOT&E of aircraft target release systems.

8. DGM conducts OT&E of AGE when separate from major aircraft weapon system or subsystem OT&E.

9. DGH conducts OT&E of munitions AGE when separate from aircraft weapon system or subsystem OT&E.

10. DGB serves as the single point of contact within the LG for all OT&E taskings and reporting upon request.

11. DNR provides operational analysis support to SAC Test Division. Systems supported by NR for OT&E include aircraft, aircraft target release systems, airborne missiles, command control and target release systems, gravity weapons and ICBMs.

12. DSR conducts OT&E of security systems, sub-systems, and equipment.

13. DSV conducts OT&E of Space Surveillance and Missile Warning systems/equipment.

14. DRR conducts IOT&E of reconnaissance systems. Serves as the single point of contact for FOT&E as required by AFR 80-38.

15. DPL conducts IOT&E of aircraft, except command control and release systems, airborne command posts, and airborne missile weapons systems (excluding IOT&E of nuclear and conventional weapons systems), related aircraft monitor/control and release systems, and ECM equipment for aircraft in the operational capability. Conducts IOT&E and FOT&E of life support systems, including aircraft simulators.

16. DPO conducts IOT&E/FOT&E of ICBM weapon systems, sub-systems, and equipment (12:3).

An analysis of the above data suggests that the bulk of the OT&E performed at SAC is still performed by DCS/Planes and DCS/Weapons. However, the number of directorates actually

is the office of principal responsibility for the development of policies and procedures.

Under AFR 80-14, each DT&E unit shall be required to maintain a focal point for DT&E. In addition to the responsibilities assigned in AFR 80-14, these focal points will:

- 1) Serve as principal advisor to the command commander on DT&E matters.

- 2) Establish command-peculiar DT&E policies and procedures necessary to implement AFR 80-14 and AFR 92-23.

- 3) Serve as command point of contact for all DT&E matters.

- 4) Serve as point of contact for financial resource management for command DT&E matters.

- 5) Serve as the command point of contact for DT&E activities related to Congressional data sheets and Congressional requests. Provide DT&E inputs for the I&E section of these documents to AFOTSC for DODCOM managed tests (1113-4).

### AFR 80-14

AFR 80-14 states that there are two kinds of I&E in the system acquisition process: Development Test and Evaluation (DT&E), and Operational Test and Evaluation (OT&E). Either one can be performed during any phase of the life cycle of the weapon system or subsystem. DT&E is conducted to confirm that engineering design and development is complete and the weapon will perform as it was designed. The system designed is tested and evaluated against engineering and performance criteria the engineering command specifies (22:2). It appears the center of gravity of the process associated with this type of testing will be shown later in the study. DO personnel are actively involved in this area.

AFR 80-14 also says that OT&E is to be performed in as realistic a situation as possible. It is done to determine a system's operability, effectiveness, operational capability, and operational deficiencies. To test this criterion, simulation goes on to say, "OT&E uses personnel with the same kind of skills and experience as those who will operate the system and conduct the system when deployed." (22:2). The regulation implies that OT&E repeats the real test scenario. It appears that the center of DO's OT&E is connected with the test plan. However, that is not the case. For instance, in April 1987, a memorandum of agreement was signed by the staff from DT&E and about operational test plan for the AF 1409. Although the OT&E tests were performed on the fact of the day, they were not connected to AFSC's standards. Thus, the aircraft was then tested to the AF 1409 to ASP in accordance with the AF 1409 standard.

### AFR 92-23

AFR 92-23 is a letter to the principal of the AF 1409 further defining the responsibilities of the principal of the AF 1409 at

## Chapter Three

### OT&E REGULATIONS

#### DODD DOCUMENTS

With the SAC OT&E historical background complete, it is now possible to look at the present SAC organization and return to the issue as to whether OT&E is being efficiently and effectively conducted. This section will analyze OT&E documents and how they impact the current SAC testing organization.

There are numerous significant Testing and Evaluation (T&E) documents. DODD 5000.1 explains the role of T&E, "Test and evaluation shall commence as early as possible ...the most realistic test environment possible and an acceptable representation of future operational system will be used in the testing" (9:3-1). DODD 5000.3 addresses independent OT&E policy, "In each DOD component there will be one major field agency, separate and distinct from the developing and procurement command and from the using command, which will be responsible for OT&E" (9:3-1).

The Navy had such an organization, the Operational Test and Evaluation Force (OPTEVFOR), before the 1970 SECDEF memorandum. The Army complied with the memo in 1973 with the establishment of the Operational Test and Evaluation Agency (OTEA). The Air Force followed suit in 1974 with the establishment of the Air Force Operational Test and Evaluation Center (34:9-10). The Air Force has implemented DODD regulations through organizational assignments, AFM 55-43, and AFR 80-14. SACR 55-57 was written to supplement AFR 80-14 and delineates the tasks and responsibilities in conducting OT&E at the MAJCOM level.

#### AFM 55-43

Section C of AFM 55-43 states two general responsibilities of the MAJCOM in conducting OT&E, "Establish specific command procedures required to implement AFR 80-14, AFM 55-43, and associated Air Force regulations; and establish a command OT&E focal point" (11:3-4). The manual clarifies these two objectives.

a) The MAJCOM's, as required, may establish specific policies, command procedures, and guidelines necessary to implement AFR 80-14 and AFM 55-43. The command OT&E focal point

is the focal point at SAC for OT&E?", SAC shrugged its shoulders.

AFR 80-14 was complied with on 18 May 76 when the Aircraft Test Division (DOOV) was made the SAC focal point for OT&E (24:--). However, its responsibilities and authority were not defined. The division did not report directly to the Chief of Staff; did not attempt to conduct OT&E that was not within DOO charter; and was not responsible for the accuracy and acceptability of the planning, conduct, and reporting of OT&E which was not under the purview of DOO (33:--). Except for defining additional responsibilities through the implementation of SACR 55-57, the Aircraft and Test Division was the SAC test focal point on paper only.

In late 1976, the Secretary of Defense asked the Defense Science Board to determine if the Air Force was doing too much testing or testing inefficiently. Dr. Eugene Fubini, the chairman of the task force making the report, stated, "...little or no overtesting is being generated...the so-called test and evaluation gap continues..." (31:5).

The SAC OT&E organization has changed little since 1976, except for an attempt by the DO in 1983 to assume control of the 4200 Test Squadron. However, the volume and complexity of weapon testing has increased dramatically. Although the compromise to establish an OT&E focal point seemed to appease the Air Staff and DOO, much of the OT&E responsibility is scattered throughout the Command. SAC OT&E structure is more fragmented now than it was in 1970. The XP and DO have gone separate ways on what and how OT&E is performed.

A recent GAO study concluded that evaluations of weapon system performance were "too fragmented to provide a coherent and meaningful picture of a systems progress" (1:9-10). This same study proposed the establishment of an independent testing office within the Pentagon. The new organization was to have taken charge in November 1983, but only recently has the groundwork been laid for its establishment. The reasoning behind this initiative is the removal of a possible conflict of interest between the Pentagon and the industry officials who produce the systems (1:9-10). Although this agency will have little to do with MAJCOM OT&E, its establishment reemphasizes the importance Congress places on an impartial testing program, and secondly, it puts to rest the notion that conduct of test and evaluation programs are no longer under scrutiny.

## EMERGENCE OF AFOTEC

The above information, and the reports provided by other operational commands to the USAF OT&E Committee were said by Air Staff to have been the basis for the Chief of Staff's decision to form the Air Force Operational Test and Evaluation Center (AFOTEC). This organization now gave the Air Force a single agency to manage all major OT&E programs as originally directed by the Secretary of Defense in 1971. Although AFOTEC is the responsible operating agency for OT&E, the majority of the resources to conduct the tests come from the using and supporting commands. Using commands (SAC) retained OT&E responsibilities for non-major OT&E programs and therefore should have pursued SECDEF direction to reorganize (11:2-3).

Three major plans were proposed in late 1974 in a final attempt to resolve the reorganization dilemma. Option one was that all OT&E be placed under the control of a single manager; option two was a distinct separation between Initial Operational Test and Evaluation (IOT&E), and Follow-on Operational Test and Evaluation (FOT&E); option three was the separation of Aircraft and ICBM OT&E. In the last option the DO would conduct all OT&E of aircraft systems and the XP would conduct all OT&E of ICBM systems. All three plans apparently were never seriously considered since no additional studies were made to analyze their potential (35:--).

The emergence of AFOTEC solved the problem of not having an independent testing agency, but did little to ensure the Services would comply with the original plans to centrally organize their own test activities. In early 1975, the SAC/CS advised the DO that no further actions were to be pursued or implemented in the area of OT&E (36:--). This was a puzzle in light of the fact that the Service reorganization requested by the SECDEF in 1971 had still not been complied with.

The SAC/DO responded with surprising and unusual actions of his own. He decided not to put up the front of complying with AFR 80-14 and immediately disbanded DOV. His rationale was that if SAC was not going to organize for OT&E, then he would organize for operations. DDO and DOM Directorates were formed, and DOT was restructured. With the demise of the Directorate of OT&E came the realization that SAC would not comply with the intent of the regulation (36:--).

It was noted at the time "the disbanding of DOV was a giant leap backwards for centralized management of OT&E" (36:--). JCSAC got involved in December 1975 when he was informed of SAC's non-compliance with AFR 80-14. He immediately told the XP and DO to resolve their differences and bring about a reorganization that would comply with OT&E guidance (23:1). And so, four years after the problem first surfaced, SAC was still pondering over how to solve it. Every time someone asked, "who

As a follow-on to the briefings, the Commands were asked by the Air Staff Board to report the number of man-days involved in OT&E, and to identify the agencies in which they were located. The SAC report revealed that DOV accounted for 8% of the SAC total. Below is the estimated number of man-years devoted to OT&E (19:1):

a. AIRCRAFT SYSTEMS; DO 83, XP 92, LG 24, NR 2

DCS, Operations

DOV	36
4201st Test Squadron	32
DOC	6
DOK	2
1 CEVG	7

83

DCS, Plans

XPF	Some (?)
XPH	2
4200 Test Squadron	90

92

DCS, Logistics

LGM	1
LGW	2
2MMS/NTI	21

24

Science and Research

2

b. ICBM SYSTEMS: DO 13, XP 26, BM 26, 1STRAD 809

DCS, Operations

DOV	12
DOC	1

13

DCS, Plans

XPQ	14
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BM

26

1STRAD

809

dedicated to little more than XP authorization for the DO to conduct tests of his own branches under single management. Nevertheless, DOW was identified to the Air Staff as the SAC OT&E focal point (16:--).

AFR 80-14 was published on 12 May 1972, giving further guidance to the operating commands on conducting OT&E. It emphasized the requirement for the establishment of a single agency to be responsible for all OT&E. A SAC DO to XP letter referenced the JCS Commander's (JCINCSAC) direction for the XP to have a manpower team study the feasibility of incorporating Ballistic Missile Evaluation (BM) into the OT&E organization (16:--).

In the meantime, the Chief of BM prepared a message to the Air Staff, for SAC/CS release, inquiring if the evaluation and reporting of ICBM operational tests were considered OT&E under AFR 80-14 (17:--). Although ICBM testing was the subject of special treatment in the new regulation, with Joint Chiefs of Staff (JCS) directives bearing heavily upon the conduct and reporting, the Air Staff did not exclude missile testing from being part of the test and evaluation activities listed in AFR 80-14 (18:--). In light of this new information, SAC/CS convened a meeting of the senior staff to consider incorporating BM into the OT&E organization. Agreement was reached by all present, except for BM. However, no additional steps were taken to change the current structure (17:--).

It was well known at the Air Staff that SAC had not formed a single OT&E agency; therefore, SAC along with other operating commands was tasked to brief the OT&E Committee of the Air Staff Board on its command OT&E program and organization (18:--). Arguments again surfaced within the command on what the contents of the briefing should be, since any briefing presented would lack the information the Air Staff wanted to hear. The JCINCSAC made the decision to brief what existed at SAC. No effort was made to cosmetically transfer functions or manning to accommodate the briefing. In May 1973, the briefing was given at the Pentagon. The major responsibilities reflected were:

- a. XP is responsible for all IOT&E, except for ECM.
- b. XP is responsible for all OT&E of Life Support Systems Equipment.
- c. DO is responsible for all OT&E, less Life Support, and IOT&E of ECM.
- d. BM is responsible for the evaluation of ballistic missiles.
- e. NF is responsible for the analysis and evaluation of aircraft systems.
- f. 4200 Test and Evaluation Squadron, under XPH, is responsible for the IOT&E of the B-1.
- g. 4201 Test Squadron, under DOV, is responsible for OT&E of the Short Range Attack Missile (SRAM).
- h. 1st Strategic Aerospace Division is responsible for launch operations of ballistic missile OT&E (10:4-5).



the DO or the XP. The apparent loss would infringe on the right for territorial rights. Those who favored proceeding with the study pointed out that OT&E is an integral part of the acquisition process, and therefore is in the most advantageous position to conduct timely and cost effective OT&E projects. On the other hand, by definition, OT&E projects were to be accomplished by operational personnel. There was widespread opinion that the most closely fit the operational definition and therefore were more able to comprehensively and objectively determine operational suitability. The SAC/DO stated, "Requirements and planning for weapon systems are rightfully the XP charter and testing and operating the systems lies within operational jurisdiction" (32:1). Nevertheless, leaving ICBMs out of the newly proposed OT&E organization violated the basic principle for the recommended reorganization. Considerable parochialism and emotion were generated on both sides of the consolidation argument. Apparent lack of guidance from the Air Staff complicated the issue.

The matter was temporarily shelved until 9 June 1971, when a series of DO to XP letters called attention to General Ryan's stated deadline of 1 July 1971 to have OT&E restructured and under single management within the operating commands:

I think our people have deliberated sufficiently on the complexities of establishing a Directorate for Operational Test and Evaluation. It seems we are in general agreement that such an organization is essential but disagree only on the "hair splitting" issues of what functions are OT&E and which fall into the category of engineering design and development. I realize we are bucking some heavily entrenched tradition. However, all the XPQ arguments against the OT&E Ad Hoc Committee proposal only resulted in a position that essentially maintains the status quo in missile test and evaluation. I submit that if the current redundancy and fragmentation of efforts in missile testing was the best system we would not have any basic argument here, the Air Staff, or DOD (20:1).

A subsequent HQ USAF staff visit to HQ SAC on 4 January 1972 revealed that SAC had not formally responded or complied with the request of establishing an Assistant for OT&E within the headquarters with responsibilities to review, provide guidance, approval, and report on OT&E (10:3).

Two weeks later, 16 January 1972, Lieutenant General Starbuck, Deputy Defense Director for Research and Engineering (DDRE), visited SAC to inquire into the OT&E organization. He was briefed on the reorganization study, and the proposal for the new OT&E organization. The DO and XP came to a compromise and the new Directorate for Operational Test and Evaluation was formed on 15 April 1972. The new directorate (DOVE) combined DOVEB and DOVEA under single management. This reorganization action

(3:--).

On 20 February 1971, Air Staff officially tasked Air Force Major Commands (MAJCOMs) to reorganize. SAF memo to SECDEF assured actions would be implemented by 1 July 1971:

Dr. Lucas, General Ryan, and I have discussed at length your memorandum on the "Conduct of Operational Test and Evaluation." We agree completely that improvements in our weapon system acquisition process and particularly in testing, can and should be implemented. I assure you that Air Force actions to improve testing will be implemented by 1 July, 1971, and that our system acquisition and testing methods in the immediate future will meet your requirements and standards (15:--).

SAC response resulting from the 16 February 1971 Test Review Board was the formulation of an Ad Hoc Committee to present a coordinated SAC position on the recommended actions. The meeting was chaired by the Deputy XP (DCS/Plans) to explore the means of complying with the Air Force Chief of Staff directive. The committee determined that operational test and evaluation within SAC was divided between XP and DO (DCS/Operations), that the lines of responsibility for weapon system test programs were vague and overlapping, and actual test efforts were overlapping and redundant. After considerable deliberations the committee recommended by majority opinion that an OT&E Directorate be established under DCS/Operations with responsibility for all SAC OT&E weapon systems and subsystems. The consensus was that for effective management, all the major elements of OT&E should be pulled together under one agency. An immediate controversy, concerning intercontinental ballistic missile (ICBM) functions, developed between the XP and DO community. At that time many of the missile operations functions and projects were duplicated and overlapped in the XPQT and DOTM divisions. Combining these two divisions, as was suggested by the committee, would have eliminated some of the confusion on testing responsibilities; however, XPQ did not concur with the committee findings (16:--).

From the onset of the OT&E argument, XPQ essentially stood alone in resisting the integration and consolidation of missile test efforts. As the MINUTEMAN Program Element Monitor (PEM) for SAC, XPQ was reluctant to relinquish its organization and resources to a consolidation, despite the OT&E Committee recommendations. It was apparent that there was no simple, noncontroversial solution. But the argument that consolidation of the ICBM OT&E would have resulted in loss of "expertise" and program direction was not valid. The plan was to use the same people in the consolidated organization, although some "empires" would have been reduced (14:--).

It must be noted that the problems surfaced because there was the difficult choice of whether to locate the activity under

program (27:1). Criticism continued to mount in July, 1970, when a Weapon System Evaluation Group (WSEG) study of air-to-air missiles, Project Dead Eye, again pointed out some serious problems in OT&E, "These deficiencies are not just peculiar to the operational testing of air-to-air missiles, but cut across the spectrum of weapon systems. The process does not include comprehensive and continuing evaluations of the complete weapon system" (29:1). In August, 1970, an Air Force Ad Hoc Study Group reported problems of overlap, duplication, test support, adequacy of procedures and funding, all deriving from an unclear OT&E policy (4:--).

A Secretary of the Air Force (SAF) memo, 8 January 1971, recommended the Air Force develop a program which would integrate essential OT&E requirements and would serve as the basis for the direction and control of AF OT&E. The memo also said the program should clarify and align AF OT&E regulations and designate the Deputy Director of Operations as the Assistant for OT&E to the Deputy Chief of Staff, Plans and Operations (5:--).

On 11 February 1971, the SECDEF established a new OT&E policy to the Service Secretaries based on the studies that had been ongoing:

Although each Service now has a somewhat different way of organizing for operations test and evaluation, it is apparent to me that this function can be best performed by an agency which is separate and distinct from the developing command and which reports the results of its test and evaluation efforts directly to the Chief of the Service. Moreover, within the Service Headquarters staff, there needs to be an office with a clear OT&E identification to provide staff assistance directly to the Service Chief and to provide a headquarters focal point for the independent OT&E field agency. Accordingly, each Service is requested to restructure its organization for OT&E along the lines specified above. As a second step, I am establishing a Deputy Director for Test and Evaluation with across-the-board responsibilities for OSD in test and evaluation matters. This office will review and approve test and evaluation plans prepared by the Services and will provide an assessment of the results obtained (26:--).

On 16 February 1971, a Test Concept Review Board was held at HQ USAF with the specific purpose to define the objectives for Air Force test policy; to determine the deficiencies that existed with the present program; to determine the adequacy of the present system in accomplishing Air Force test objectives; to explore alternative test concepts in accomplishing test goals; to determine the practicability and desirability of establishing an Air Force field agency for conducting OT&E; and finally, to provide recommendations for the improvement of Air Force testing

## Chapter Two

### HISTORICAL LOOK AT SAC OT&E

#### EVOLUTION OF OT&E

To understand SAC's OT&E organizational structure and how it was derived, it is necessary to trace the evolution of OT&E policy within the Office of the Secretary of Defense (OSD), United States Air Force (USAF), and SAC.

Operational Test and Evaluation (OT&E) of aircraft and air weapons systems has been ongoing since the Wright Brothers were awarded a contract in 1908. OT&E evolved gradually in the Air Force. However, a systematic approach to testing didn't materialize until after WWII when the Air Proving Ground Command (APGC) was established to conduct OT&E. This organization quickly fell from power when it was criticized for not providing the results to the using commands in a timely manner. As a result, the business of OT&E became the responsibility of the using commands in 1958. This shift in the allocation of power was a decision the Air Force soon regretted. The loss of centralized guidance on OT&E matters produced chaos and unsatisfactory results for the next twelve years (11:2-1).

A Blue Ribbon Defense Panel report published in July, 1970 severely criticized and provided recommendations regarding OT&E in the Services. This negative report brought to the subject the attention of Congress and prompted Secretary of Defense Laird to send a memo to the Service Secretaries on 13 July, expressing his concern:

A review of matters concerning operational test and evaluation in DOD causes me concern about the objectivity, quality, thoroughness, and relative priority of OT&E within the individual Services. I believe the Services should assume the responsibility for addressing the situation and taking corrective measures as necessary (28:1).

In response to the SECDEF memo, HQ USAF convened a Study Group on OT&E (Bolender Committee) in late July, 1970. The report contained a series of recommendations which formed the basis for changes in the USAF test and evaluation program, and influenced changes in the overall Department of Defense (DOD)

and other of major systems and subsystems. The author of this report is the SAC test Director for the B80 test program and makes the following observations. The SAC portion of B80 advanced multiple capability weapon DT&E was conducted with DO aircraft, DO test director, and DO resources. The DO provided direct support to Air Force Systems Command (AFSC) and the Sandia National Laboratories, Livermore. NPH was the responsible agency for producing the weapon, but was not involved in the developmental testing. The transition of the B80 into the operational test phase and FOT&E was relatively unencumbered because the DOs conducted the DT&E. There was no change of control from the DOs to another when a weapon test phase was completed.

In another instance, the ALB 172 countermeasures DT&E was conducted by a DO test director. The system is now in FOT&E. The testing of the B-52 cyphonic flare is also conducted by the DO (37:--). On the other hand, XP is currently planning to conduct QOT&E of the Avionics Modernization Program (AMP) on the F-111. A testing detachment will be formed at McClellan AFB to conduct the test activity. If all objectives are not met during this phase, the objectives will be finished during the FOT&E phase. XP expects the DO to assume responsibilities for the test but no formal provisions have been made to consider the manpower or resources required (37:--).

In addition to its conjunction with the AMP flight test at McClellan, a test component is required to be ground tested prior to flight. HQSAC/LCG went to the SAC test focal point (D00A) to request assistance for a test site and procure the resources to perform the test. D00A refused to participate because XPHN was responsible for the DT&E of the AMP program. In turn, XPHN refused on the grounds that testing of the equipment was the responsibility of the DO community. The situation was resolved when the 4235th Training Squadron, Carswell AFB, became the responsible organization. The 4235th, which is under the command of HQSAC/D00, established a detachment at McClellan AFB to perform the ground tests (37:--).

Other important test activities are, then, DT&E of the Open Loop and Engineering Systems conducted by HQSAC (4200 TES/XPH); FOT&E of D00A; is listed as the official HQ SAC test monitor. HQSAC/D00A and the 4201 TESS are responsible for the FOT&E of the FMU-130/B and FMU-139/B conventional weapons weapon fuzes (4201:--).

Both operations and DOs Plans are involved throughout the entire spectrum of the I&E test cycle. It appears that DT&E is not accomplished on divided or functional lines. SAC DT&E is conducted by numerous organizations with no apparent logic as to what agency performs what type of testing. There is no focal point for all of the testing activity, although D00A is listed as being so. XPH is listed as the SAC focal point for development testing. D00 is the SAC focal point for ICBM testing. XPH represents SAC for ICBM and XPHB represents SAC

for B-1B IOT&E. Apparently, the type of OT&E conducted is not a factor in determining which organization does it or who should do it.

## Chapter Five

### SUMMARY

#### RELUCTANCE TO ORGANIZE

The push to reorganize OT&E in the Air Force came about because the existing process was deemed inefficient in providing cost-effective and reliable weapon systems. A significant problem seemed to exist. Management of complex OT&E programs was fragmented among the operational commands which resulted in no one having the authority to speak on and develop overall OT&E policy for the Air Force. In an attempt to favorably resolve the issue, MAJCOMs were tasked to reorganize.

SAC in-house investigations revealed a testing program that was inadequate to meet the expanding requirements of OT&E. A centralized concept was proposed but a controversy developed over the control of the new agency. DOV was established as the SAC OT&E focal point in April 1972. This agency, however, was powerless. It had a voice only in matters that pertained to DO OT&E.

A power struggle between the XP, DO, and BM was the primary reason SAC did not centrally organize. The consensus was that a central organization would be best; however, both organizations looked at the ordeal as a zero-sum game and, as a result, the logical course of action to centrally organize never materialized.

Early in 1975, shortly after the establishment of AFOTEC, the SAC/CS and DO took actions to undermine the four previous years of attempts at reorganization. The CS advised the DO that there were to be no further attempts at reorganization. As a result, the DO decided to disband DOV as a directorate. Apparently, the emergence of AFOTEC had lifted some of the pressures to reorganize internally.

In May 1976, DOOV was officially listed as the SAC focal point for OT&E with no defined responsibilities and authority. In essence, SAC OT&E organization in 1976 was no different than it was in 1970. There has been no appreciable change in OT&E organization between 1976 and 1985.

## Chapter Six

### FINDINGS/CONCLUSIONS

As presently structured, the conduct of OT&E at Strategic Air Command remains the fragmented organization first identified in 1970. The numerous organizations participating in OT&E, and the lack of a decision-making agency to oversee the entire program makes the process inefficient. The system is not conducive to the impartiality required for objective weapon system assessment and reporting. The existing process is uncoordinated in objective, responsibility, planning, testing, and reporting.

From 1976 to the present, SAC has had no Air Staff pressure to reorganize, although the DO has made futile attempts to incorporate the 4200 TES under his control. This lack of concentrated effort does not imply that all the problems have been magically solved. On the contrary, in light of the emphasis that system acquisition and testing is receiving in Congress, and the publicity over fraud and integrity that seem to exist in the acquisition and testing of multi-million dollar weapons of today, reorganization at SAC must once again be brought into the open for serious discussions and implementation. The objectives of an efficient and effective OT&E program in Strategic Air Command were sacrificed at the expense of retaining power, control, and organizational integrity.

As shown by SACR 55-57, SAC conduct of OT&E is more fragmented today than it was in 1970. The division of OT&E responsibilities between the XP and DO seems to be based not on functional lines, but based on arbitrary decisions. This is clearly shown by the fact that XP and DO are involved throughout the entire T&E process. The XP argument that IOT&E is closer to the functional responsibilities of DCS/Plans is valid, but if that is true, why then is not all IOT&E under the purview of the XP? The DO argument that OT&E best fits the functional lines of DCS/Operations is also valid. Why then is it also involved in OT&E of nuclear gravity weapons and ECM equipment, which seems to be closer aligned with the functional lines of XP?

SAC is technically complying with appropriate OT&E directives, but not with the intent. For instance, although listed as the SAC focal point for OT&E, DDOA has little influence in OT&E planning and reporting of matters performed by DOM, XPQ, XPH, or LGM. All of the organizations performing OT&E as listed in SACR 55-57 do not report their OT&E findings to DDOA, or ask for recommendations. Not until 1983 was XP even required to coordinate aircraft related 4200 TES programs with DDOA. Simply



put, the Aircraft and Weapons Division does not function as AFR 80-14 intends.

Aside from not optimally organizing and performing OT&E, SAC is not living up to the standard specified in SACR 23-6. This document is the focus for SAC organization policy and guidance, and the present OT&E structure at SAC is not tailored "to ensure maximum productivity and the best possible use of resources" (2)(1).

When the SECDEF established a new OT&E policy in 1971, he had two objectives. First was the establishment of a single AF OT&E agency that was separate from the services that could conduct independent testing and reporting. His second aim was to have the services centrally organize their OT&E functions to better assist this new test agency. AFOTEC was established and fulfilled the requirement of the first objective; however, to this date SAC has refused to centrally organize. Past efforts to do so were valid. The plans were dismissed because of parochialism and narrow point of view that resulted from a power struggle within the command. The major players agreed the change was justified, warranted, and beneficial. The problem identified in 1970 still exists today, and the SAC dilemma remains. If a consolidation is implemented, under who's authority do you put it? This question must be put to rest before a significant change in how SAC conducts OT&E can be realized. There are several considerations that must be addressed before the issue of reorganization can surface again.

Arguments over who is responsible for what kind of OT&E can go on indefinitely because the guidance provided is unclear and subject to interpretation. What must be put in the forefront is that the purpose of OT&E is to estimate the military utility of a system, subsystem, or item of equipment. Is the present way of doing business the best way? This study has shown that it's not. The irony is that very few will argue that it is. Parochial views must be put aside for any meaningful chance of reorganization to occur. The opportunity is here to voluntarily change for the better because it will only be a matter of time before SAC will once again be brought to task for their present inadequate OT&E system.

## Chapter Seven

### RECOMMENDATIONS

In looking at possible ways of improving SAC's OT&E structure, it must be emphasized that SAC's program is inefficient. OT&E management requirements are increasing dramatically as evidenced by the numerous organizations now involved in OT&E. Action to consolidate certain OT&E functions was required in 1970 and it is required now. One of the recommendations made by the Ad Hoc Committee in 1971 was to maintain the status-quo. It was adopted. Unfortunately, the choice of doing nothing then has made the adoption of a coherent OT&E policy more difficult today. Nevertheless a change must be pursued because it is in the best interest of a more objective and thorough OT&E program. OT&E is only one part of a dynamic system acquisition process. It requires constant review and the attention of OT&E managers at all levels to ensure that it is optimally performed. The following suggestions are possible alternatives to SAC's way of doing OT&E.

As a first step, the Aircraft and Weapons Test Division (DOWA) should be reinstated as a directorate. This change will give more credibility and prestige to an organization that is supposed to be the SAC focal point for OT&E. This action will provide more autonomy, independence, and efficiency in conducting and reporting test results. DOWA's responsibilities have grown immeasurably since it was disbanded as a directorate in 1975. It maintains direct control of SAC Project Office at Eglin AFB and the Electronic Countermeasures Laboratory at Offutt AFB; it is responsible for the 4201 TESTS at Parksedale, and the B-1B Detachment Squadron at Bess AFB. Additionally, the 4201 TESTS has grown significantly with the incorporation of the 28MW Munition Maintenance Squadron (MMS) Instrumentation Team, as well as additional manpower to accommodate an increasing testing program. Moreover, the functions of the division are unique enough to be separate from the directorate it is presently under. DOW is mainly responsible for implementing contingency war plans, writing SAC tactical doctrine, planning for ADVON deployment, managing SAC participation in exercises, operating the Red Flag Liaison Office, and providing representation to the Support Battle Staff. The establishment of an OT&E directorate in 1972 was fully justified and needs to be reinstated. In conjunction, the control of 4200 TES should be transferred to this directorate. As was shown, the majority of the tests conducted by the 4200th are essentially on the same weapon systems/subsystems in which the DO participates, the difference being that the 4200 TES conducts IOT&E and the DO conducts FOT&E.

The transfer from IOT&E to FOT&E can be simplified and result in less overlap, and may remove the total gaps that now exist in accomplishing the T&E mission.

Another alternative is for the DCS/Operations to consolidate all its testing activities of major systems under the proposed new directorate. This would include the ICBM activities now performed by DOMV. In essence, this structure would be similar to the one disbanded in 1975.

A third option includes incorporating XP ICBM testing with DO ICBM testing and placing the new OT&E functions under the proposed new directorate. To resolve the dilemma of which DCS would control this new agency, this plan would place the proposed new testing directorate under the control of Science and Research (NRP), which presently provides technical and analytic assistance in the design and analysis of OT&E. This small consolidation would provide a more independent SAC FOT&E focal point that can provide guidance and direction to the rest of the SAC organizations performing OT&E. Given the power and authority to cross staff lines, this new agency can fulfill the intent of the current OT&E regulations.

A fourth option is to place the new directorate under the authority of the SAC Chief of Staff. XP, DO, LG, and all major participants in weapon system testing functions conducted within the headquarters would be included in this new agency, thus eliminating the continuing XP/DO arguments over territorial rights of OT&E. This action would identify a single executive manager for OT&E and would satisfy OT&E directives, manuals, and regulations. Such a realignment will consolidate functions, reduce overlap of responsibilities, and may reduce manpower requirements within SAC. It should decrease administrative workload and increase communications efficiency. However, implementation would require extensive study and time. Although the ideal solution, enactment would be difficult unless both the XP and DO would be in favor of it. OT&E can be accomplished more effectively by an independent agency reporting directly to the SAC Chief of Staff, but there are considerable, strong forces within the command which resist such an OT&E organization no matter how valid the need. Unless these forces are identified and are brought to favorable terms, any attempt at complete reorganization will be futile. Efficient resource allocation continues to be a growing problem within the Air Force. Any reorganization should strive to maximize these resources.

Test and Evaluation is a process that may be performed throughout the life cycle of a weapon system and should not be constrained by the boundaries of an inefficient system. The weapons we have are only as good as the process we use to evaluate them.

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## GLOSSARY

### DEFINITIONS

**Design Test and Evaluation (DT&E):** Test and evaluation activities that demonstrate that engineering design and development decisions are correct, that design risks have been minimized, and that the system meets engineering and operational specifications. 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 performance criteria by the procuring command. DT&E, a natural part of the contractor's engineering process, should be initiated as early in the development process as possible and includes testing of components, subsystems, and computer program preparation models of the entire system.

**Operational Test and Evaluation (OT&E):** Test and evaluation activities that evaluate DT&E for systems where there is no available warlike funding.

**Operational Test and Evaluation (OT&E):** Test and evaluation activities that estimate a prospective system's military utility, operational effectiveness, and operational suitability, and need for support elements. It provides information on organization, personnel requirements, doctrine and tactics, and may result in support, operation and maintenance concepts. OT&E should be accomplished by operational and support personnel of the type and organization or class expected to use and maintain the system being evaluated, and should be conducted in as realistic an operational environment as possible.

**Operational Test and Evaluation (IOT&E):** Accomplished after the final production decision and supports the decision on production prior to the production decision. IOT&E is accomplished using representative items, prototypes, or pilot production items. However, these items must be sufficiently representative of the production article to provide a valid estimate of the operational effectiveness and suitability of the production system. It is especially important to provide as realistic as possible operational environment for IOT&E in order to ensure that performance, safety, maintainability, reliability,

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human factors, and logistics supportability criteria can be simulated under conditions similar to those that will exist when the system is deployed. Operational testing should be separate from development testing. However, DT&E and OT&E may be combined when separation would cause delay involving unacceptable military risk, or would cause an unacceptable increase in the acquisition cost of the system.

**Solution of Operational Test and Evaluation (FOT&E):** Conducted after the production decision is made on the system. For most major programs FOT&E is normally conducted in phases. AFOT&E conducts the first phase through first production article testing to refine initial estimates made during IOT&E. The second phase is conducted by the MAJCOM scheduled to receive the system to refine tactics and techniques and training programs for the aircraft. FOT&E is conducted to refine the initial estimates made during IOT&E and to ensure that production article performance and operational effectiveness/suitability is equal to or greater than that of production article.

**Development Test and Evaluation (DOT&E):** Conducted in lieu of FOT&E in a plane where there is no development article. DOT&E is conducted to determine the test results of the development article prior to the production decision, but prior to Air Force acceptance of the first article. The DOT&E category of tests includes those all modifications, changes, and improvements to the development article that are required to meet the test results and to the production article.

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