

**Audit**



**Report**

OFFICE OF THE INSPECTOR GENERAL

ADVANCED TEST FACILITIES

Report No. 93-079

March 29, 1993

Department of Defense

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## Acronyms

ASC	Advanced Simulation Center
ECITFs	Electronic Combat Integrated Test Facilities
EO	Electro-optical
GWEF	Guided Weapons Evaluation Facility
HEML	High Energy Microwave Laboratory
HWIL	Hardware-in-the-Loop
IDA	Institute for Defense Analyses
IR	Infrared
JCG(T&E)	Joint Commanders Group for Test and Evaluation
MICOM	U.S. Army Missile Command
MILCON	Military Construction
MMW	Millimeter Wave
MRTFBs	Major Range Test Facility Bases
MSTIRC	Multi-Service Test Investment Resources Committee
OSD	Office of the Secretary of Defense
R&D	Research and Development
RDT&E	Research, Development, Test and Evaluation
RF	Radio Frequency
T&E	Test and Evaluation
TERIB	Test and Evaluation Reliance and Investment Board
USD(A)	Under Secretary of Defense (Acquisition)



INSPECTOR GENERAL  
DEPARTMENT OF DEFENSE  
400 ARMY NAVY DRIVE  
ARLINGTON, VIRGINIA 22202

March 29, 1993

MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY (FINANCIAL  
MANAGEMENT)  
ASSISTANT SECRETARY OF THE AIR FORCE  
(FINANCIAL MANAGEMENT AND COMPTROLLER)  
DIRECTOR, TEST AND EVALUATION

SUBJECT: Audit Report on Advanced Test Facilities (Report No. 93-079)

We are providing this final report for your information and use. Comments from the Director, Test and Evaluation; the Assistant Secretary of the Navy (Research, Development and Acquisition); and the Assistant Secretary of the Air Force (Financial Management and Comptroller) were considered in preparing this final report.

Recommendations and potential monetary benefits are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment. You must provide final comments on the unresolved recommendations by May 28, 1993. We also ask that your comments indicate concurrence or nonconcurrence with the material internal control weaknesses highlighted in Part I.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. Raymond Spencer, Program Director, at (703) 614-3995 (DSN 224-3995) or Mr. Steven Hughes, Project Manager, at (703) 693-0362 (DSN 223-0362). Copies of the final report will be distributed to the activities listed in Appendix C.

A handwritten signature in cursive script that reads "Robert J. Lieberman".

Robert J. Lieberman  
Assistant Inspector General  
for Auditing

cc:  
Secretary of the Army  
Secretary of the Navy  
Secretary of the Air Force

Office of the Inspector General, DoD

Report No. 93-079  
Project No. 2AB-0025.02

March 29, 1993

**ADVANCED TEST FACILITIES**

**EXECUTIVE SUMMARY**

**Introduction.** Advanced test chambers are part of the overall hardware-in-the-loop test process. These facilities consist of anechoic chambers connected to various simulation and instrumentation laboratories, so actual weapon system components can be stimulated in realistically-simulated operational scenarios. Advanced test facilities are used extensively to expose weapon systems to the density and complexity of the electromagnetic environments, which are encountered in combat.

**Objective.** The objective of the audit was to review the justifications for developing multiple Military Department comprehensive electronic combat integrated test facilities. We also evaluated applicable internal controls to ensure that adequate Office of the Secretary of Defense and Service oversight were provided.

**Audit Results.** The audit determined that the Navy's proposed multimode missile guidance systems test facility at the Naval Air Warfare Center - Weapons Division, Point Mugu, California, represents an unwarranted duplication of test capabilities. As a result, the Navy can avoid spending \$10 million by utilizing existing Army and Air Force facilities.

In addition, we determined that the Air Force violated Defense regulations by spending \$5.4 million of Research, Development, Test and Evaluation (RDT&E) appropriation funds to construct an anechoic chamber. As a result, the Air Force will have to cite applicable military construction (MILCON) appropriation funds to reimburse FYs 1990 through 1992 RDT&E funds expended and obligated.

**Internal Controls.** The audit identified weaknesses in controls to require documentation that support recommendations and endorsements for developing duplicative test assets and the misapplication of appropriated funds. A description of the controls assessed is in Part I.

**Potential Benefits of Audit.** Potential monetary benefits to be gained by implementing the recommendations will be approximately \$10 million. Appendix A summarizes the potential benefits resulting from audit.

**Summary of Recommendations.** We recommend that the Director, Test and Evaluation, endorse a revision to the proposed charter for the Test and Evaluation Reliance Investment Board to require recommendations and endorsements of test facilities and resources to be documented and in agreement with the Board findings. We recommend that the Navy cancel the proposed Advanced Missile Chamber (MILCON P-199) and utilize Army and Air Force missile guidance systems test facilities. We also recommend that the Air Force reimburse FYs 1990 through 1992 RDT&E appropriations with applicable military construction appropriation funds and deobligate applicable FY 1992 RDT&E funds.

**Management Comments.** The Director, Test and Evaluation, concurred in principle with Recommendation A.1, which has been reworded in this final report. The Assistant Secretary of the Navy (Research, Development and Acquisition) nonconcurred with Recommendations A.2.a. and A.2.b., stating that the technical merits of the facility will be reviewed by Project Reliance. The Navy did not provide evidence that the Army or the Air Force could not support the Navy's requirements. Also, the Navy did not provide supporting workload requirements for the facility. The Air Force nonconcurred with Recommendations B.1., B.2., and B.3., stating that the anechoic chamber was correctly considered equipment and funded from the research, development, test and evaluation appropriation.

# Table of Contents

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Executive Summary

Part I - Introduction	1
Background	2
Objective	2
Scope	2
Internal Controls	3
Prior Audit	3
Part II - Findings and Recommendations	5
Finding A. Duplicative Missile Guidance Systems Test Facility	6
Finding B. Funding Anechoic Chamber Construction	12
Part III - Additional Information	19
Appendix A. Summary of Potential Benefits Resulting From Audit	20
Appendix B. Activities Visited or Contacted	21
Appendix C. Report Distribution	22
Part IV - Management Comments	25
Comments From the Director, Test and Evaluation	26
Comments From the Assistant Secretary of the Navy (Research, Development and Acquisition)	28
Comments From the Assistant Secretary of the Air Force	31

This report was prepared by the Acquisition Management Directorate, Office of the Inspector General for Auditing, DoD. Copies of the report can be obtained from the Information Officer, Audit Planning and Technical Support Directorate (703) 614-6303 (DSN 224-6303).

## **Part I - Introduction**

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## Background

The density<sup>1</sup> of the threat signal environment combined with an enemy's ability to change the nature of its signal increased dramatically during the 1980s. Developers and testers are creating state-of-the-art simulation capability to meet these challenges. Advanced test facilities have anechoic chambers that provide the capability for nondestructive performance evaluation of weapon systems. Advanced test facilities for missile guidance systems are part of the overall hardware-in-the-loop test process. As such, the facilities are used to evaluate guidance and control sensors and flight hardware components. Sensors that depend on visible light or infrared (IR) emissions and those operating across the radio frequency (RF) spectrum can be evaluated. Also evaluated at advanced test facilities are multimode seekers, which combine RF guidance with electro-optical (EO), IR, and laser guidance systems separately or in combination on the same missile.

## Objective

The objective of the audit was to review the justifications for developing multiple Military Department comprehensive electronic combat integrated test facilities (ECITFs). We also evaluated applicable internal controls to ensure that the Office of the Secretary of Defense (OSD) and Service provided oversight.

## Scope

We interviewed Government personnel involved in ECITF management, acquisition, operation, testing, and support. We examined data relative to the capacity, use, configuration, and staffing of ECITFs from FYs 1990 through 1992. We also examined FYs 1993 through 1997 planning documents, including military construction (MILCON) proposals, improvement and modernization proposals, funding documents, and contract statements of work.

This economy and efficiency audit was performed from February to August 1992 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary. Appendix B lists the activities visited or contacted during the audit.

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<sup>1</sup>Density is the number of threat radars per region.

## Internal Controls

The audit identified internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Controls did not require documentation of recommendations and endorsements by the Multi-Service Test Investments Resource Committee to support its findings. Further, controls were not adequate to ensure that use of appropriated funds complied with applicable laws and regulations. All recommendations, if implemented, will correct the weaknesses. We determined that implementing Recommendations A.2.a. and A.2.b. will realize an estimated monetary benefit of \$10 million. This report will be provided to senior officials responsible for internal controls within OSD and each affected Military Department.

## Prior Audit

The Office of Inspector General, DoD, Report No. 93-006, "Electronic Combat Integrated Test Facilities," October 16, 1992, addressed consolidating test assets. The audit was expanded to address a tasking by the Maryland congressional delegation to evaluate the methodology followed and evidence obtained that supported the Institute for Defense Analyses' (IDA) cost comparison report, which identifies alternatives for developing Navy and Air Force ECITFs. The audit determined that IDA Paper P-2727 contained critical flaws that significantly impacted the report's conclusions. The audit report recommended that the Director, Test and Evaluation (the Director), not support development of the Benefield Anechoic Facility based on IDA's cost analysis report. Additionally, the report recommended limiting further investment at the Benefield Anechoic Facility to current Air Force reprogramming capabilities, contingent upon the Air Force's agreeing to prohibit program-specific funding until the opportunities for redistribution of existing assets are fully explored. It also recommended that the Director direct the Navy to accelerate and refine the electronic combat test plan study and exercise oversight responsibilities to restrict new Air Force investments until the Navy-led Electronic Warfare Reliance study is completed. The Director nonconcurred with the final report and the matter is being mediated through DoD audit followup procedures for disputed reports.

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## **Part II - Findings and Recommendations**

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## **Finding A. Duplicative Missile Guidance Systems Test Facility**

The Navy's proposed multimode missile guidance systems test facility is an unwarranted duplication of test capabilities. The Navy's unwarranted duplication was due to an ineffective Multi-Service Test Investment Resources Committee (MSTIRC) review designed to limit unnecessary duplication of new test capabilities. As a result, the Navy can avoid spending \$10 million for the proposed test facility by utilizing DoD assets.

### **Background**

The Navy proposed building a facility at the Naval Air Warfare Center - Weapons Division, Point Mugu, California, for next generation multimode seeker testing. The Navy's Advanced Multimode Missile Test Laboratory (Advanced Missile Chamber) is a proposed FY 1997 MILCON project, designated MILCON P-199. In addition to the MILCON's proposed cost of \$10 million, test instrumentation for this project is estimated to cost approximately \$57 million.

DoD Directive 5134.1, "Under Secretary of Defense (Acquisition)," [USD(A)], August 8, 1989, assigns responsibilities, functions, relationships, and authorities to the USD(A) for all matters relating to the DoD acquisition system. It further states, in part, that available resources are to be used to maximum advantage to eliminate duplication of effort.

DoD Directive 3200.11, "Major Range and Test Facility Base," November 1, 1985, states, in part, that test and evaluation support capabilities shall be based on a combination of user requirements and the mission of the activity and shall not be unnecessarily duplicated within DoD.

The Director, Test and Evaluation, monitors and evaluates the Major Range Test Facility Bases to ensure their adequacy to meet requirements and to prevent unnecessary duplication. To assist the Director, Test and Evaluation, in fulfilling this responsibility, the Joint Commanders Group for Test and Evaluation [JCG(T&E)] provides its recommendations on proposed capital investments for testing. The JCG(T&E) established the MSTIRC to provide it with recommendations regarding intended capital investments in new test capabilities and technologies.

MSTIRC performs a joint technical review function to identify long-lead test and evaluation (T&E) technology development needs and to facilitate the development of an integrated DoD T&E investment strategy by validating needs and seeking cooperative solutions. The initial evaluations of the Services' proposals are made by the MSTIRC Oversight Panels (the MSTIRC Panels). The MSTIRC Panels evaluate the individual Service/agency proposals from the perspectives of commonality, interoperability, and priorities to find opportunities for cooperative developments and to ensure no unwarranted

## Finding A. Duplicative Missile Guidance Systems Test Facility

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duplication of test facilities and resources are planned by the Services and agencies.

### Proposed Missile Guidance Test Facility

The Navy has proposed building the Advanced Missile Chamber at Point Mugu for testing the next generation multimode missiles. The Navy provided documentation that acknowledged the proposed Advanced Missile Chamber duplicates newly constructed Army and Air Force missile guidance test facilities; however, the proposed chamber would be considerably larger than the Army facility and only slightly larger than the Air Force facility. Further, the Navy Program Manager for the Advanced Missile Chamber could not provide a workload for the proposed facility but provided documentation that stated, "There is no way that the Army or Air Force can be expected to provide such a capability for the Navy on a continuing basis." Details are provided below.

**Proposed Missile Test Facilities.** DoD has funded the construction of two advanced missile test facilities. The Army facility became fully operational in FY 1992, and the Air Force facility is due to be fully operational by FY 1997. Both facilities have laboratories that will be capable of testing EO, IR, RF, millimeter wave (MMW), and multimode guidance systems. In addition, Guided Weapons Evaluation Facility's (GWEF's) laboratories include threat laser test capabilities. Each facility is described below.

**U.S. Army Missile Command (MICOM) Advanced Simulation Center (ASC).** The ASC in Huntsville, Alabama, cost \$20 million and maintains four hardware-in-the-loop (HWIL) simulators and an advanced simulation processor complex. Separate simulators are necessary because the target environments they provide involve radically different physical principles. For example, the EO target and terrain environment are simulated with a 1:600 scale model of representative terrain features and vehicles. Target closure is simulated by moving the entire model on rails. However, terrain is not employed in RF testing. Instead, target closure is simulated by varying the amplitude of signals from radars.

**Air Force GWEF.** The GWEF at Eglin Air Force Base, Florida, cost \$21.5 million and provides laboratory simulation test support for developing precision guided-weapon technology and evaluating the performance of those weapons. Real time HWIL simulation evaluates weapon performance from launch to target intercept. Target simulators in each laboratory simulate the signals that weapon seekers would encounter in the real world. The capacity of GWEF's facilities will be greatly enhanced by FY 1997 with the addition of a multi-mode capability and two additional HWIL laboratories.

**Capacity and Projected Workload.** Navy personnel were unable to provide a projected workload for the proposed Advanced Missile Chamber. Before a funding or construction decision, the Navy must demonstrate that a valid multimode seeker workload requirement exists. We obtained the FY 1992 and projected FYs 1993 through 1995 workloads for the MICOM facility. The GWEF provided FY 1992 workload and could only estimate its growth potential for FYs 1993 through 1995. We used the data provided in computing the average utilization for each facility in Figure 1. MICOM's projected utilization

## Finding A. Duplicative Missile Guidance Systems Test Facility

slightly exceeded the capacity provided by a one-shift operation, and GWEF's projected utilization was approximately 86 percent of one shift.

We identified a more cost-effective alternative to constructing the Navy's proposed facility. This alternative added an additional shift to the MICOM facility. The cost to operate the additional shift at MICOM should equate to the cost to operate a single shift at the Navy's proposed facility. This alternative avoids the cost of constructing the Navy's facility. The excess capacities (shown as hashmarks) for MICOM and GWEF were combined to create the total excess capacity shown in Figure 1.

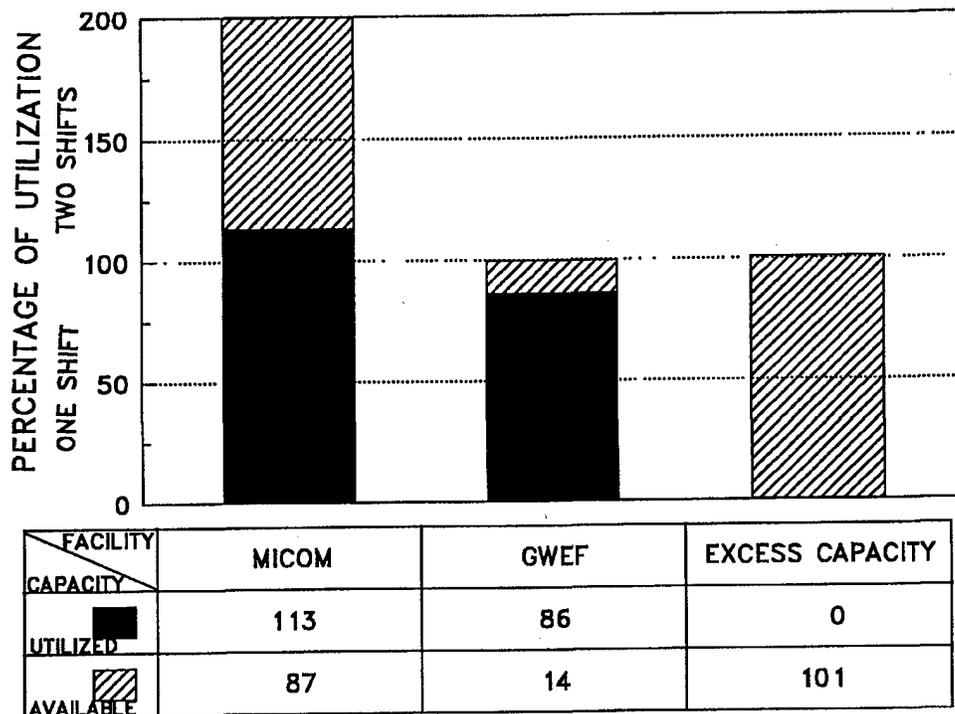


FIGURE 1 CAPACITY AND AVERAGE UTILIZATION  
FYs 1992 - 1995

As shown in Figure 1, the excess capacities at the MICOM and GWEF facilities equate to greater than a one-shift operation. Thus, the burden is on the Navy to demonstrate that neither the MICOM nor GWEF test facilities, either singularly or together, can satisfy Navy's projected multimode seeker testing requirements. The Navy can avoid substantial costs by utilizing existing facilities for multimode seeker testing requirements.

## **Ineffective Review Process**

Although MSTIRC reviews, prioritizes, and validates test and evaluation capability requirements, the audit determined that MSTIRC's review of the proposed project was ineffective and its endorsement for funding was not consistent with the results of its review, as discussed below.

**Review.** Two independent panels within MSTIRC performed reviews that addressed duplication, commonality, and an overall assessment. MSTIRC's Air Vehicle Panel was assigned primary review responsibility, and its evaluation was the final MSTIRC position on the Navy's project. This panel concluded that the proposed project was a duplication of existing capabilities, additional justification was required, and the proposed project was not a candidate for Central Test and Evaluation Investment Program<sup>2</sup> funding. An evaluation performed by MSTIRC's Armament/Munitions Panel also concluded that additional justification was required and that facilities existed that could perform HWIL testing.

**Endorsement.** Even though both Panels concluded that additional justification was needed, MSTIRC ignored their advice and endorsed funding of the proposed project without obtaining such justification. We discussed the proposed project with MSTIRC's chairman to determine the rationale for their endorsements. The chairman stated the panels were not asked to provide rationale for their endorsements. The chairman further stated that "while the proposed project was endorsed for funding, it was considered less important than other submissions reviewed." To provide a clear audit trail, we believe that MSTIRC should document its rationale when endorsements are contrary to available evidence. At the conclusion of our review, OSD was merging the MSTIRC and the Reliance Panel, thus creating the Test and Evaluation Reliance and Investment Board.

## **Conclusion**

Internal control procedures instituted with the formation of MSTIRC did not ensure that recommendations and endorsements of the panel were documented to support its findings. MSTIRC's funding endorsement of the proposed project was not consistent with the results of its review. Internal controls can only be effective when responsible officials are willing to enforce such controls. We believe that this proposed project should not be funded and that the Navy should utilize existing missile guidance test facilities for conducting multimode seeker testing. Utilization of existing resources would avoid the expenditure of \$10 million in FY 1997.

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<sup>2</sup>DoD program that provides new test resources to improve the capability of major DoD test ranges to test developmental weapons.

## **Finding A. Duplicative Missile Guidance Systems Test Facility**

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### **Recommendations, Management Comments, and Audit Response**

1. We recommend that the Director, Test and Evaluation, in his capacity as chairman of the Defense Test and Evaluation Steering Group, initiate a revision to the draft charter for the Test and Evaluation Reliance and Investment Board to require that all Board recommendations be fully supported by its analyses.

2. We recommend that the Commander, Naval Air Systems Command:

a. cancel the proposed Advanced Missile Chamber (Military Construction P-199); and

b. utilize U.S. Army and Air Force multimode seeker missile guidance systems test facilities.

**Management Comments.** The Director, Test and Evaluation (the Director), concurred in principle with Recommendation 1. However, the Director stated that the recommendations cannot be directly implemented by his office; that the Multi-Service Test Investment Resources Committee has now been replaced by the Test and Evaluation Reliance and Investment Board, (TERIB), thereby obviating any need to revise the MSTIRC charter; that the TERIB charter provides for documentation of recommendations and endorsements; that the charter would be reviewed by the Joint Logistics Commanders in February 1993; and that he would endorse changes to meet the intent of our report. The full text of management comments is in Part IV of the report.

**Audit Response.** The Director has the responsibility to provide oversight of acquisition test and evaluation resources and to review all requests for major investments in test capabilities. The Joint Logistics Commanders, the Joint Commanders Group (Test and Evaluation), and the proposed Test and Evaluation Reliance and Investment Board are advisory panels that were established to provide advice concerning investments in test capabilities that are ultimately provided to the Defense Test and Evaluation Steering Group chaired by the Director. Review of the proposed TERIB charter as of January 1993 indicated that the potential exists for the reported deficiency to reoccur. We found no evidence that TERIB recommendations and endorsements had to be consistent with its results of review. We have revised our recommendation to the Director in accordance with his agreement to endorse a revision to the TERIB charter to address the systemic problem. The revised recommendation urges the Director, as chairman of the Defense Test and Evaluation Steering Group, to ensure the TERIB charter is revised to require all Board recommendations be fully supported by its analyses.

**Management Comments.** The Assistant Secretary of the Navy (Research, Development and Acquisition) [the Assistant Secretary] nonconcurred with Recommendations A.2.a. and A.2.b. The Assistant Secretary stated that:

o the purpose of the Advanced Missile Chamber is to appropriately evaluate future missile systems currently in design;

## Finding A. Duplicative Missile Guidance Systems Test Facility

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o proper evaluation requires a laboratory 208-feet long, 80-feet wide and 60-feet high, with an anechoic chamber that provides a missile-to-target range of 90 feet;

o the technical merits of the Advanced Missile Chamber will be reviewed by Project Reliance, and if the review process proves the Advanced Missile Chamber is duplicative and unwarranted, then the Navy will cancel the proposed facility; and

o since the Advanced Missile Chamber is now programmed for 1997, there is no danger that the Navy will embark on the project before completion of the review.

**Audit Response.** The Assistant Secretary's comments infer that the only criteria by which the proposed acquisition should be evaluated is by its size. We believe that any evaluation should also determine whether the Army and Air Force's missile guidance test facilities (to include planned upgrades) can meet the Navy's requirements for testing its missile product improvement efforts. As stated in this finding, the initial review of the technical merits of this acquisition by the Board determined that the Advanced Missile Chamber was duplicative and unwarranted. Thus, the Navy has to demonstrate that neither the Army nor Air Force test facilities can satisfy its testing requirements. We believe our recommendations are still valid. Accordingly, we request that the Navy reconsider its position in its response to the final report.

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## **Finding B. Funding Anechoic Chamber Construction**

The Air Force did not comply with DoD Directives, by obligating and expending \$5.4 million of Research, Development, Test and Evaluation (RDT&E) funds to build an anechoic chamber at Kirtland Air Force Base, New Mexico. This condition was due to the Air Force incorrectly certifying funds and classifying the chamber as equipment. As a result, the Air Force will have to cite applicable military construction (MILCON) funds to reimburse FYs 1990, 1991, and 1992 RDT&E funds obligated and expended on construction of the chamber.

### **Background**

The Air Force obtained approval for a MILCON project and issued a military interdepartmental purchase request to the Army Corps of Engineers, Albuquerque District, New Mexico, to construct the High Energy Microwave Laboratory (HEML). The original MILCON submission contained numerous references to the anechoic chamber, suggesting that the anechoic chamber was included in the original MILCON cost. For example, the HEML specifications provided for a large, high-bay laboratory area with reinforced concrete foundation, special radiation shielding walls, and a concrete roof over the large anechoic test chamber area. The specifications further provided for a special large shielded area with an anechoic chamber containing two high-power sources of exposure for test objects as large as an F-16 aircraft.

Appropriations funding guidelines are specified in the following documentation:

- o Department of Defense Budget Guidance 7110.1, May 1990, specifies the appropriate use of RDT&E and military construction funds.
- o Air Force Regulation 80-22, "Funding to Acquire Research and Development (R&D) Facilities and Install R&D Equipment," April 30, 1991, provides guidance for using RDT&E funds or military construction funds for the acquisition of facilities. The regulation specifically states that the MILCON appropriation is the standard method of providing facilities at Government-operated R&D installations and activities.
- o Air Force Regulation 172-1, "United States Air Force Budget Policies and Procedures," October 15, 1990, establishes budgetary policies and procedures for the use and programming of the RDT&E appropriation.
- o Air Force Regulation 177-16, "Administrative Control of Appropriations," November 30, 1988, prescribes Air Force policies and procedures designed to enforce the financial discipline associated with limitations on the amount of funds available for obligations and expenditures and places responsibility with the comptroller to ensure the proper usage of funds.

## Finding B. Funding Anechoic Chamber Construction

### Anechoic Chamber Funding

Kirtland Air Force Base, New Mexico, used RDT&E funds for the construction of a large anechoic chamber, costing \$5.4 million, although DoD Directive 7110.1-M states RDT&E funds are limited to \$300,000 for minor construction projects. The project was incrementally funded over a 2-year period and used 3 fiscal years' appropriations as shown in Figure 2.

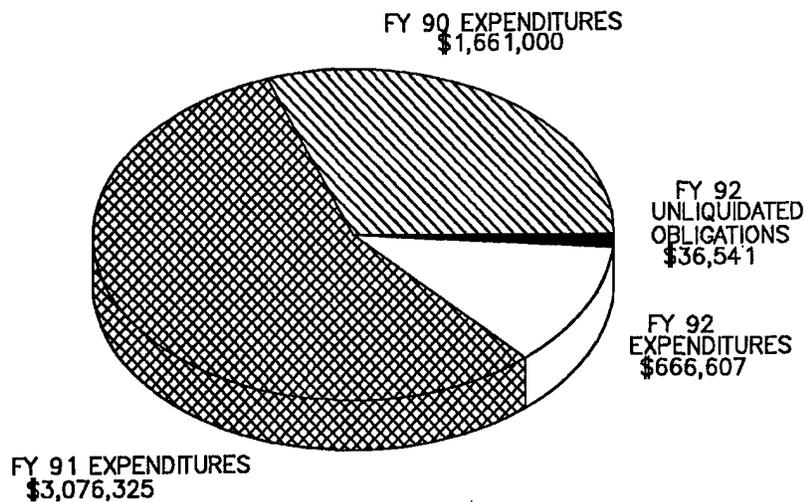


FIGURE 2 EXPENDITURES AND OBLIGATIONS

As of September 25, 1992, total expenditures and unliquidated obligations were \$5,403,932 and \$36,541, respectively, as shown in Figure 2.

**Finding B. Funding Anechoic Chamber Construction**

**Certification of Funds**

Air Force regulations establish two levels of approval for requests of funds. The first approval is given by the responsible Air Force Budget Office and ensures that budget authority has not been exceeded. The second level requires the responsible Accounting and Finance Office to certify the availability and correct usage of funds. Neither approval level questioned the availability or use of RDT&E funds for the anechoic chamber. In addition, the request for prior year funds was not challenged. Table 1 shows the flow of commitment and obligation funding documents.

**TABLE 1: FLOW OF COMMITMENT AND OBLIGATION DOCUMENTS**

Commitments			Obligations		
FY*	DATE	AMOUNT	FY*	DATE	AMOUNT
91	12-21-90	\$2,269,000			
91	05-09-91	807,325	91	05-09-91	\$3,076,325
90	05-10-91	1,661,000			
			90	05-29-91	1,661,000
92	03-19-92	405,000			
92	04-16-92	270,000			
92	04-30-92	10,571			
			92	06-05-92	415,571
			92	06-12-92	246,876
			92	06-12-92	21,967
92	06-18-92	25,000			
			92	08-17-92	18,735
<b>TOTAL</b>		<b>\$5,447,896</b>			<b>\$5,440,474</b>
*Fiscal Year Funds Appropriated					

## **Defining Chambers as Equipment**

To justify the use of RDT&E funds, the High Power Microwave Program Office (the Program Office) classified the anechoic chamber as special equipment within the HEML construction. We asked the Program Office to provide support for classifying the construction as equipment. The Program Office could not provide documentation supporting its decision. We determined that the Program Office's classification of the chamber as equipment is contrary to DoD's definition of equipment, prior categorization and funding of anechoic chambers, and the original MILCON proposal that identified special equipment.

## **Reimbursement of Appropriations**

The Air Force's improper use of RDT&E funds requires reimbursement with appropriate MILCON funds. However, MILCON funds are approved on a line-item basis through designated project numbers. Thus, MILCON funds, for the fiscal year approved for the project, will be required to reimburse RDT&E appropriations for FYs 1990, 1991, and 1992.

## **Conclusion**

The Air Force's funding review process was ineffective in preventing the improper use of RDT&E funds to construct the anechoic chamber. Two separate reviews did not challenge the appropriateness of the action taken by the Program Office. Further, the Program Office's attempt to justify the use of RDT&E funds by classifying the chamber as special equipment was also found to be contrary to established definitions and procedures. Thus, the Air Force must reimburse FYs 1990, 1991 and 1992 RDT&E appropriations, deobligate the applicable unexpended FY 1992 RDT&E funds, and use the correct appropriations and years.

## **Recommendations, Management Comments, and Audit Response**

**We recommend that the Assistant Secretary of the Air Force (Financial Management and Comptroller):**

## **Finding B. Funding Anechoic Chamber Construction**

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- 1. reimburse FYs 1990, 1991, and 1992 Research, Development, Test and Evaluation appropriations for \$1,661,000; \$3,076,325; and \$666,607, respectively, with applicable military construction appropriations for the anechoic chamber at Kirtland Air Force Base;**
- 2. deobligate \$36,541 of FY 1992 Research, Development, Test and Evaluation funds related to the construction of the anechoic chamber complex; and**
- 3. initiate investigation on misuse of Research, Development, Test and Evaluation funds, as required by Air Force Regulation 177-16.**

**Management Comments.** The Assistant Secretary of the Air Force (Financial Management and Comptroller) [the Assistant Secretary] nonconcurrent with Recommendations B.1., B.2., and B.3., stating that the anechoic chamber was correctly funded from the RDT&E appropriation. The Air Force stated that the High Power Microwave Laboratory is for research and development and not a test and evaluation facility; the DD Form 1391 listed the anechoic chamber as equipment to be funded from other appropriations; anechoic chambers are custom-designed to meet research and development requirements and are not "off-the-shelf" scientific acquisitions; the chamber can be taken apart and reassembled; there should be specific guidelines for funding anechoic chambers; and efforts are under way to standardize guidelines for RDT&E and Military Construction purchases. The full text of management comments is in Part IV of the report.

**Audit Response.** We disagree with the Assistant Secretary's position that the anechoic chamber was properly classified as equipment and, therefore, properly funded through the research, development, test and evaluation appropriation. Classifying anechoic chambers costing over \$300,000 as equipment and constructing them with RDT&E monies is inconsistent with previous Air Force practice. The comparable chamber at the Air Force Development Test Center at Eglin Air Force Base, for example, was funded in the Military Construction appropriation. The statement that the facility is not for test and evaluation is contrary to the stated purpose reported to Congress. The DD Form 1391 provided to Congress states that "the facility requirements are to research and test high powered microwave weapons technology. The anechoic chamber will be used to test and evaluate a variety of systems and subsystems, including tactical missiles and airplanes." The categorization of the HEML has no direct bearing, however, on the audit finding.

The DD Form 1391 was submitted for approval with significant errors and misleading information for the line item "equipment from other appropriations". First, the appropriation cited was "3080," (Other Procurement, Air Force), as opposed to "3600," (Research, Development, Test and Evaluation). Second, the amount for "equipment from other appropriations" on the front page of the DD Form 1391 states \$10 million as the total of "equipment" while the total on the detail page is \$14.8 million. There is no explanation for the difference. The detail page lists a "large anechoic/screen room" and also a "small anechoic/screen room," not a "chamber" as described in other sections of the DD Form 1391.

The chamber in question at Phillips Laboratory did not involve uniqueness in construction, absorbent materials or the door design. The Air Force provided

## Finding B. Funding Anechoic Chamber Construction

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us a brochure of the radar-absorbent material and showed us the door installed by the contractor. In fact, with slight modifications to existing chambers at multiple locations, this facility could be duplicated.

Anechoic chambers, like any metal building (such as the outer structure of the high-energy microwave laboratory), theoretically can be taken apart in sections and reassembled, although the practicality of moving the large chamber at the Phillips Laboratory is highly questionable. We believe the anechoic chamber is an integral part of the Phillips Laboratory facility and that the Air Force never intended for the chamber or the facility to be dismantled and moved from the current location.

Public law, DoD directives and Service regulations provide guidance on funding construction. We believe those guidelines are clear enough to indicate that Military Construction funds should have been used for this project. To the extent that the Air Force misinterpreted the guidelines, it would be useful to provide additional clarification of them so that future violations of this type can be averted. We endorse the efforts described by the Air Force to improve current guidance and agree that specific guidance for funding anechoic chambers could be useful. Nevertheless, we maintain that the recommendations in this report are necessary and appropriate. We ask that the Air Force reconsider its position in response to the final report.

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## **Part III - Additional Information**

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## Appendix A. Summary of Potential Benefits Resulting From Audit

Recommendation Reference	Description of Benefits	Amount and/or Type of Benefit
A.1.	Economy and Efficiency. Strengthen guidelines and procedures.	Nonmonetary.
A.2.	Economy and Efficiency. Avoid expenditure for duplicate test assets.	Funds Put to Better Use. \$10 million of FY 1997 Military Construction Funds.
B.1.	Compliance. Correction of financial records.	Nonmonetary.
B.2.	Compliance. Correction of financial records.	Nonmonetary.
B.3.	Compliance. Correction of financial records.	Nonmonetary.

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## **Appendix B. Activities Visited or Contacted**

### **Office of the Under Secretary of Defense (Acquisition)**

Director, Test and Evaluation, Washington, DC

### **Department of the Army**

Army Missile Command, Huntsville, AL

### **Department of the Navy**

Assistant Secretary of the Navy (Research, Development, and Acquisition),  
Washington, DC  
Comptroller of the Navy, Washington, DC  
Director of Navy Test and Evaluation and Technology Requirements, Washington, DC  
Naval Air Systems Command, Arlington, VA  
Naval Air Warfare Station, Point Mugu, CA

### **Department of the Air Force**

Assistant Secretary of the Air Force (Financial Management and Comptroller),  
Washington, DC  
Air Force Materiel Command, Wright-Patterson AFB, OH  
Aeronautical Systems Division, Wright-Patterson AFB, OH  
Air Force Development Test Center, Eglin AFB, FL  
Air Force Flight Test Center, Edwards AFB, CA  
Air Force Weapons Laboratory, Kirtland AFB, NM

### **Non-Government Activities**

Grumman Corporation, Melbourne, FL

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## **Appendix C. Report Distribution**

### **Office of the Under Secretary of Defense (Acquisition)**

Director, Test and Evaluation, Washington, DC

### **Department of the Army**

Secretary of the Army, Washington, DC  
Department of the Army, Inspector General, Washington, DC  
Army Missile Command, Huntsville, AL

### **Department of the Navy**

Secretary of the Navy, Washington, DC  
Assistant Secretary of the Navy (Financial Management), Washington, DC  
Assistant Secretary of the Navy (Research, Development, and Acquisition),  
Washington, DC  
Comptroller of the Navy, Washington, DC  
Director of Navy Test and Evaluation and Technology Requirements, Washington, DC  
Naval Air Systems Command, Arlington, VA  
Naval Air Warfare Center - Weapons Division, Point Mugu, CA

### **Department of the Air Force**

Secretary of the Air Force, Washington, DC  
Assistant Secretary of the Air Force (Financial Management and Comptroller),  
Washington, DC  
Air Force Materiel Command, Wright-Patterson AFB, OH  
Air Force Weapons Laboratory, Kirtland AFB, NM

### **Non-DoD Activities**

Office of Management and Budget  
U.S. General Accounting Office, National Security and International Affairs Division,  
Technical Information Center

**Non-DoD Activities (Cont'd)**

Chairman and Ranking Minority Member of the Following Congressional Committees and Subcommittees:

Senate Committee on Appropriations  
Senate Subcommittee on Defense, Committee on Appropriations  
Senate Committee on Armed Services  
Senate Committee on Governmental Affairs  
House Committee on Appropriations  
House Subcommittee on Defense, Committee on Appropriations  
House Committee on Armed Services  
House Committee on Government Operations  
House Subcommittee on Legislation and National Security, Committee on  
Government Operations

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## **Part IV - Management Comments**

# Management Comments From the Director, Test and Evaluation



ACQUISITION

OFFICE OF THE UNDER SECRETARY OF DEFENSE

WASHINGTON, DC 20301-3000

11 JAN 1993

MEMORANDUM FOR DIRECTOR, ACQUISITION MANAGEMENT DIRECTORATE, DOD  
(IG)

SUBJECT: Draft Audit Report on Advanced Test Facilities (Project  
No. 2AB-0025.02, November 10, 1992)

The purpose of this memorandum is to provide your office with additional information that may affect the recommendations for Finding A of the subject report. I concur with the thrust of those recommendations directed to my office; however, the recommendations, as written in the draft audit report, can not be directly implemented by my office.

Finding A, Recommendation Number 1. recommends that the Director, Test and Evaluation; (a) "revise" the Multi-Service Test Investment Resources Committee's (MSTIRC) charter and (b) "require" that the planned Test and Evaluation Reliance and Investment Board (TERIB) charter includes provisions for the documenting of endorsements and recommendations to agree with findings. I am in basic agreement with your recommendations, and can report that action has already been taken by the Joint Commanders Group for Test and Evaluation ((JCG(T&E)) relative to the TERIB charter. It should be noted that the MSTRIC has now been replaced by the TERIB and this would obviate any need to revise the MSTRIC charter.

The current TERIB charter, which was approved by the JCG(T&E) on 17 November 1992, will come before the Joint Logistics Commanders (JLC) for approval during February 1993. This charter provides for documentation of recommendations and endorsements. The TERIB charter mandate includes identification of multi-Service commonality, interoperability and unwarranted duplication across all functional areas. Additionally, the charter also provides for the development of a single integrated and prioritized DoD(T&E) investment recommendation. If this charter requires amendment, I will take action as Chairman of the Defense Test and Evaluation Steering Group (DTESEG) to endorse a revision of the charter to incorporate the intent of your Finding A-1 recommendation. Concurrence by the DTESEG members will result in an action for the JCG(T&E) to implement recommended changes to the TERIB charter.

## Management Comments From the Director, Test and Evaluation

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Actions already taken by the JCG(T&E) or proposed by this memorandum should not present any further complications relative to your Finding A-1. The funding for the facility in question will not be requested from Congress for three more years. By that time we will know a lot more about the requirement for this facility. Should the above actions, which I believe have/will satisfy the intent of your recommendations, prove to be insufficient then you may want to consider redirecting your recommendations to the JLC through the Services. Let me know if I can provide any additional information regarding this matter.



Charles E. Adolph  
Director  
Test and Evaluation

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# Management Comments From the Assistant Secretary of the Navy (Research, Development and Acquisitions)



DEPARTMENT OF THE NAVY  
OFFICE OF THE ASSISTANT SECRETARY  
(Research, Development and Acquisition)  
WASHINGTON, D C 20350-1000

JAN 25 1993

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE INSPECTOR GENERAL

Subj: DODIG DRAFT AUDIT REPORT ON ADVANCED TEST CHAMBERS  
(PROJECT NO. 2AB-0025.02)

Ref: (a) DODIG memo of 10 Nov 1992

Encl: (1) Department of the Navy comments

I am responding to the draft audit report forwarded by reference (a) concerning the Advanced Test Chambers.

The Department of the Navy response is provided as enclosure (1).

  
Edward C. Whitman

**Management Comments From the Assistant Secretary of the Navy (Research,  
Development and Acquisition)**

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DEPARTMENT OF THE NAVY RESPONSE  
TO  
DODIG DRAFT AUDIT REPORT OF NOVEMBER 10, 1992  
ADVANCED TEST CHAMBERS  
PROJECT NO. 2AB-0025.02

Finding A:

The Navy's proposed multimode missile guidance systems test facility is an unwarranted duplication of test capabilities. The unwarranted duplication was due to an ineffective Multi-Service Test Investment Resources Committee (MSTIRC) review designed to limit unnecessary duplication of new test capabilities. As a result, the Navy can avoid spending \$10 million for the proposed test facility by utilizing existing DOD assets.

Recommendation 1a and 1b:

We recommend that the Director, Test and Evaluation:

a. revise Multi-Service Test Investment Resources Committee's charter to require recommendations and endorsements of test facilities and resources to be documented and in agreement with its findings.

b. require that the charter for the planned Test and Evaluation Reliance and Investment Board provides for documenting recommendations and endorsements to agree with its findings.

DON position:

Concur. The Multi-Service Test Investment Resources Committee has been replaced by the Test and Evaluation Reliance and Investment Board. This board will, through project Reliance Test Capabilities Master Plans and the Test Resource Master Plan, review all DOD Test Evaluation investments and capabilities for unwarranted duplication.

Recommendation 2a and 2b:

We recommend that the Commander, Naval Air Systems Command:

a. cancel the proposed Advanced Missile Chamber (MILCON P-199); and

b. utilize U. S. Army and Air Force multimode seeker missile guidance systems test facilities.

DON position:

Do not concur. The purpose of the advanced multimode missile test laboratory is to appropriately evaluate future missile systems currently in design. Several missile product improvement efforts encompass multimode seeker designs, including W band. Proper

Encl. (1)

**Management Comments From the Assistant Secretary of the Navy (Research, Development and Acquisition)**

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performance evaluation requires a laboratory 208 feet long, 80 feet wide and 60 feet high, with an anechoic chamber that provides a missile-to-target range of 90 feet. No hardware-in-the-loop facility of this size exists today at any government or contractor facility.

We will review the technical merits of the proposal through project Reliance and determine if the mission requirements can be met by other DOD facilities of Military Departments. If the Reliance process proves the chamber to be duplicative and unwarranted, then recommendations will be made to cancel the proposed advanced missile chamber. We will also validate any potential benefits during this process in accordance with cost benefit analysis guidelines contained in SECNAVINST 7000.14B. Our review should be complete by 30 September 1993. Since P-199 is now programmed for 1997, there is no danger that we will embark on this project before completion of this review.

# Comments From the Assistant Secretary of the Air Force



OFFICE OF THE ASSISTANT SECRETARY

DEPARTMENT OF THE AIR FORCE  
WASHINGTON DC 20330-1000

29 JAN 1993

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING  
OFFICE OF THE INSPECTOR GENERAL  
DEPARTMENT OF DEFENSE

SUBJECT: DoD(IG) Draft Report, "(U) Advanced Test Facilities,"  
(Project No. 2AB-0025) - INFORMATION MEMORANDUM

This is in reply to your memorandum requesting the Assistant Secretary of the Air Force (Financial Management and Comptroller) to provide Air Force comments on subject report.

We nonconcur with audit recommendation B. We believe that the anechoic chamber was correctly funded from the Research, Development, Test and Evaluation Appropriation (RDT&E). The DD Form 1391 for the High Power Microwave Laboratory was submitted through OSD to Congress and identified the anechoic chamber under equipment provided from other appropriations as the screen room. The chamber was never included in the scope of the facility construction. The project was constructed as approved by Congress.

We recognize that the funding for RDT&E/Construction needs clarification. Currently, OSD and the Services are actively reviewing for standardization the funding guidelines for RDT&E and Construction purchases.

Attached are Air Force financial management comments. Also we have reviewed the Phillips Laboratory response and concur with their comments.

A handwritten signature in cursive script that reads "John W. Beach".

JOHN W. BEACH  
Principal Deputy Assistant Secretary  
of the Air Force, Financial Management

- 2 Attachments
1. Management Comments to Audit Recommendations.
  2. Phillips Laboratory 14 Dec 92 letter.

## Comments From the Assistant Secretary of the Air Force

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### DRAIT OF A PROPOSED AUDIT REPORT

#### ADVANCED TEST FACILITIES

PROJECT NO. 2AB-0025.02 NOVEMBER 10, 1992

#### Finding B.

We recommend that the Assistant Secretary of the Air Force (Financial Management and Comptroller):

a. reimburse FYs 1990, 1991, and 1992 Research, Development, Test and Evaluation appropriations for \$1,661,000; \$3,076,325; and \$666,607, respectively, with applicable military construction appropriations for the anechoic chamber at Kirtland Air Force Base;

b. deobligate \$36,541 of FY 1992 Research, Development, Test and Evaluation funds related to the construction of the anechoic chamber complex; and

c. initiate investigation on misuse of Research, Development, Test and Evaluation funds, as required by Air Force Regulation 177-16.

#### MANAGEMENT COMMENTS. Nonconcur

We have reviewed the Phillips Laboratory response to this audit along with comments from HQ AFMC/FM and we agree with Phillips Laboratory that the anechoic chamber installed in the High Energy Microwave Laboratory (HEML) was Research, Development, Test and Evaluation (RDT&E) equipment and was properly funded as equipment. We do not agree with the audit that the anechoic chamber was part of the Military Construction Project that should have been funded with Military Construction Appropriation (MILCON 3300). The following are our reasons for believing an anechoic chamber is equipment and should be funded with an acquisition appropriation.

1. The HEML is a multipurpose R&D facility which supports the development of high power microwave weapon technology. It is a Research and Development facility and not a Test and Evaluation facility.

2. The HEML building was designed to accommodate a large chamber and the DD Form 1391 listed the anechoic chamber as equipment to be funded from other appropriations (non-MILCON). The DD Form 1391 submitted to and approved by Congress listed the anechoic chamber as equipment to be funded from other than MILCON (Atch 1). (Note; page 274 contains a copy of the DD Form 1391. It contains typing errors such as listed a screen or anechoic chamber as a "scream room" rather than a "screen room." Also the appropriation number was listed as "3080" rather than 3600

## Comments From the Assistant Secretary of the Air Force

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appropriation.) However, on page 272, the anechoic chamber was listed as part of the \$10 million dollars for "EQUIPMENT FROM OTHER APPROPRIATIONS (NON-ADD)"

3. Anechoic chambers are custom designed to meet the research and development requirements. Anechoic chambers are not "off-the-shelf" scientific acquisitions. In the research and development community, an anechoic chamber is equipment that is specifically designed and may be small or very large in size. This chamber was designed to house a fighter aircraft for technology investigations. The chamber is 72 feet wide, 72 feet long and 40 feet high. Rantec Microwave and Electronics, Inc., fabricated the anechoic chamber off-site and assembled it within the building. Sections of the chamber are welded together. The welding is a critical technology of the assembly and special technicians are used for this task. The final critical operation is the design of the length, shape, and selection of the material to energy neutralize or deaden microwaves within the chamber. For example, the length and thickness of the cone shaped deadening material varies with the size of the chamber and research to be performed within the chamber. These cones are attached to the steel surface with velcro. These efforts are not ordinary "brick and mortar" construction tasks.

4. The anechoic chamber rests on the floor of the building and the chamber can be taken apart in sections using an acetylene cutting torch. These sections can be reassembled within another building. The present facilities are usable for any R&D operation requiring a large high bay.

5. We believe that there should be specific guidance on how to fund the acquisition of an anechoic chamber. OSD and the Services are actively reviewing the standardization of the funding guidelines for RDT&E and Construction Appropriations purchases.

6. In summary, the anechoic chamber is considered by the Air Force as equipment. Kirtland AFB submitted the DD Form 1391 with the building costs excluding the anechoic chamber as equipment to be funded by other appropriations (RDT&E 3600). The 14 December 1992 Philips Laboratory letter provides detailed information and HQ AFMC/FM, HQ SAF/AQT, AF/CE, and SAF/FMB concur with their comments. The 1391 was approved by HQ USAF, OSD, and Congress and the project was constructed as approved by Congress. The 1391 for this construction project listed the anechoic chamber as an equipment item not funded by Military Construction. Specifically, the chamber (screen room) was identified in section 12b of the 1391 as: "Equipment associated with this project [that] will be provided from other appropriations."

Comments From the Assistant Secretary of the Air Force

1 COMPONENT AIR FORCE		FY 1988 MILITARY CONSTRUCTION PROJECT DATA			2 DATE 7/7	
3 INSTALLATION AND LOCATION KIRTLAND AIR FORCE BASE, NEW MEXICO			4 PROJECT TITLE HIGH POWER MICROWAVE LABORATORY			
5 PROGRAM ELEMENT 7.28.06	6 CATEGORY CODE 310-926	7 PROJECT NUMBER MHW880102	8 PROJECT COST CODE 7,400			
9 COST ESTIMATES						
ITEM	UOM	QUANTITY	UNIT COST	COST		
HIGH POWER MICROWAVE LABORATORY	SF	25,000	200	5,000		
SUPPORTING FACILITIES				1,690		
UTILITIES	LS			(1,125)		
PARKING	LS			( 80)		
SITE PREPARATION	LS			( 230)		
COMMUNICATION SUPPORT	LS			( 275)		
SUBTOTAL				6,690		
CONTINGENCY (5%)				335		
TOTAL CONTRACT COST				7,025		
SUPERVISION, INSPECTION AND OVERHEAD (5.5%)				386		
TOTAL REQUEST				7,411		
TOTAL REQUEST (ROUNDED)				7,400		
EQUIPMENT FROM OTHER APPROPRIATIONS (NON-ADD)				(10,000)		
10 DESCRIPTION OF PROPOSED CONSTRUCTION: Large high bay laboratory area with reinforced concrete foundation, special radiation shielding walls and concrete roof over large anechoic test chamber area, diagnostic, instrumentation, calibration, machining and control areas, classified computer room and administrative areas.						
11. REQUIREMENT: 64,547 SF ADEQUATE: 39,547 SF SUBSTANDARD: 0 PROJECT: Construct a high power microwave (HPM) laboratory. REQUIREMENT: Adequate facilities, properly sized and configured, for research and effects testing of high power microwave and other directed energy weapons. The Air Force is establishing a high power microwave (HPM) lethality/vulnerability technology base for decisions on advanced weapon and defensive hardening applications. HPM sources with a wide range of parameters and high power effects must test on a variety of systems and subsystems, including tactical missiles and airplanes, for full evaluation. Development and operation of HPM sources allows the Air Force to investigate potentially enhanced vulnerabilities and rapid collection of test data and provides needed research support for other directed energy concepts. CURRENT SITUATION: The Air Force has no other laboratory or facility with any capability for high current, high energy, light ion acceleration. This facility gives the Air Force an independent verification capability and provides alternatives for research to the national laboratories and allows independent research into critical exoatmospheric applications of particle beam weapons. With this facility, the Air Force could pursue research into unique particle beam applications without competing with other programs and limited accelerator resources. The Air Force will develop technical expertise in particle beam and microwave directed						

DD FORM 1391

PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED

PAGE NO

Comments From the Assistant Secretary of the Air Force

1 COMPONENT		2 DATE	
AIR FORCE		FY 1988 MILITARY CONSTRUCTION PROJECT DATA	
3 INSTALLATION AND LOCATION			
KIRTLAND AIR FORCE BASE, NEW MEXICO			
4 PROJECT TITLE		5 PROJECT NUMBER	
HIGH POWER MICROWAVE LABORATORY		MEMV880102	
<p>energy weapons through first hand research, improving the capability of the Air Force to evaluate weapons utility.</p> <p><u>IMPACT IF NOT PROVIDED:</u> Research and test of HPM weapons technology will not be performed. The necessary data base for Air Force weapons and defense decisions will not be available to ensure the safety and continued operations of Air Force personnel and aircraft in warfare against this weapon.</p>			
DD FORM 1391c		PREVIOUS EDITION IS OBSOLETE IN THE USAF	
1 DEC 76		PAGE NO	

Comments From the Assistant Secretary of the Air Force

1 COMPONENT AIR FORCE		2 DATE Fy 1985	
3 INSTALLATION AND LOCATION KIRTLAND AIR FORCE BASE, NEW MEXICO			
4 PROJECT TITLE HIGH POWER MICROWAVE LABORATORY		5 PROJECT NUMBER NEWV880102	
12. SUPPLEMENTAL DATA:			
a. Estimated design data:			
(1) Status:			
(a)	Date Design Started	86 JUN 11	
(b)	Percent Complete as of January 1987	35	
(c)	Date 35% Designed	86 OCT 15	
(d)	Date Design Complete	87 SEP 04	
(2) Basis			
(a)	Standard or Definitive Design -	Yes	No X
(b)	Where Design Was Most Recently Used -	N/A	
(3) Total cost (c) = (a) + (b) or (d) + (e): (\$000)			
(a)	Production of Plans and Specifications	460	
(b)	All Other Design Costs	20	
(c)	Total	480	
(d)	Contract	480	
(e)	In-house		
(4) Construction start 85 JAN			
b. Equipment associated with this project will be provided from other appropriations:			
EQUIPMENT NOMENCLATURE	PROCURING APPROPRIATION	FISCAL YEAR APPROPRIATED OR REQUESTED	COST (\$000)
// Scream Rm & Control Vacuum System	3080	1988	2,000
Power Supply Diagnostic Equipment	3080	1988	4,000
Computer	3080	1988	4,000

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Comments From the Assistant Secretary of the Air Force

NOV 24 '92 11:47 FROM HQ AFMC/CE

PAGE 002

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07:01 28. 02 00N

1. COMPONENT (AFSC)		FY 1994, MILITARY CONSTRUCTION PROJECT DATA		2. DATE	
(Air Force)				24 APR 85	
3. INSTALLATION AND LOCATION			4. PROJECT TITLE		
Kirtland AFB NM			Neutral Particle Beam/High Energy Microwave Laboratory		
5. PROGRAM ELEMENT		6. BAYCODE/ZONE	7. PROJECT NUMBER	8. FUNDING NUMBER	
63601P		210-924	NBNV 880102	7,400	
9. COST ESTIMATE					
ITEM		MAN	QUANTITY	UNIT COST	EST. COST
NEUTRAL PARTICLE BEAM/HIGH ENERGY MICROWAVE LAB		SF	25,000	203	5,100
SUPPORTING FACILITIES					1,584
UTILITIES		LS			(1,100)
PARKING		LY			(80)
SITE PREP/EARTH WORK		LS			(200)
PAINTING		SF	25,000	9.75	(244)
SUBTOTAL					6,584
CONTINGENCY (5%)					329
TOTAL CONTRACT COST					7,029
SUPERVISION, INSPECTION, & OVERHEAD					267
TOTAL REQUEST					7,416
TOTAL REQUEST (ROUNDED)					7,400
EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS					10,000
10. DESCRIPTION OF PROPOSED CONSTRUCTION					
DESCRIPTION: Project consists of large high bay laboratory area with reinforced concrete foundation, special radiation shielding walls and concrete roof over large anechoic test chamber area, plus diagnostic, instrumentation, calibration, machining and control areas, classified computer room and administrative areas.					
REQUIREMENT: 27,500 SF ADEQUATE: 72,500 SF SUBSTANDARD: 0					
PROJECT: Construct a Neutral Particle Beam/High Energy Microwave (NPM/HME) laboratory for research and effects testing of high power microwaves (HPM) and other directed energy weapons technologies.					
REQUIREMENT: The Air Force is pursuing an aggressive technology program to establish a HPM lethality/vulnerability data base to support decisions on advanced weapon and hardening applications. This requires development of HPM sources with a wide range of parameters and high power effects tests on a variety of systems and subsystems, including tactical missiles and airplanes. This facility is essential for the development and operation of rep-rated HPM sources which will allow investigation of potentially enhanced vulnerabilities and rapid collection of test data. It will also provide needed research support for other DMW concepts such as WFE.					
IMPACT STATEMENT: Research and test of HPM technology cannot be effective and safely performed without this facility. The necessary data base for AF weaponization and hardening decisions will not be available.					

DD FORM 1381

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Comments From the Assistant Secretary of the Air Force

NOV 24 '82 11:48 FROM HQ AFMC/CE

PAGE 804

FORM 280W 8191 848 888  
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NOV 23 08 22 NOV

1. COMPONENT		FY 1982 MILITARY CONSTRUCTION PROJECT DATA		2. DATE	
AIR FORCE					
3. INSTALLATION AND LOCATION					
KIRTLAND AFB, N.M.					
4. PROJECT TITLE				5. PROJECT NUMBER	
NEUTRAL PARTICLE BEAM/HIGH POWER MICROWAVE LABORATORY				880V 88010Z	
<u>MAJOR R&amp;D EQUIPMENT LIST</u>					
Large Anechoic/Screen Room \$1.5 Mil					
Small Anechoic/Screen Room .8 Mil					
Screen Rooms (800 ea) .9 Mil					
High Energy Density Capacitors 1.5 Mil					
Marx Banks Generator 1.4 Mil					
Diagnostic & Computer 1.6 Mil					
Control Computer 2.0 Mil					
Marx Oil Tanks 1.5 Mil					
Transformer Driven Pulse Power Supply 1.5 Mil					
Microwave Source 1.0 Mil					
Mis. Small Instrumentation 1.5 Mil					
TOTAL				\$14.8 Mil	

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PAGE 80

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DL

IN R&D DIVISION, KIRTLAND AFB NM

11-23-79 821 877M FROM PL/DL, KIRTLAND AFB NM  
 GPO : LINK 8 - 483-236  
 WASHINGTON 20541-22-11

Comments From the Assistant Secretary of the Air Force

JAN 05 '93 14:32 HQ AFMC FM WPAFB OH 454330000

F.1/E



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS AIR FORCE MATERIEL COMMAND  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

31 DEC 1992

FROM: HQ AFMC/FM  
4375 Chidlaw Road Suite 6  
Wright-Patterson AFB OH 45433-5006

SUBJ: DOD (IG) Draft Report, "Advanced Test Facilities," (Project No 2AB-0025)  
Finding B

TO: SAF/FMP

1. We reviewed the Phillips Laboratory response (attached) regarding funding of the anechoic chamber installed in the High Energy Microwave Laboratory (HEML) as Research & Development (R&D) equipment. The DD Form 1391, presented to Congress, clearly identified it as equipment to be installed in the HEML. Funding of the anechoic chamber with Research, Development, Test, and Evaluation (RDT&E) funds is consistent with DOD Directive 7110.1M, AFR 172-1, and AFR 80-22. These regulations allow RDT&E funds to be used for the development, design, purchase, and acceptance testing of equipment or instrumentation required for RDT&E.

2. We concur with the comments from Phillips Laboratory. This is a coordinated HQ AFMC position. The AFMC point of contact is Maj Shuck, HQ AFMC/FMBM, DSN 787-6922.

*Thomas L. Miner*  
THOMAS L. MINER, SES  
Principal Asst. DCS/Financial Management  
& Comptroller

1 Atch  
PLWS Ltr, 14 Dec 92

cc: AF/TE

TOTAL OF 5 PAGES  
FROM: HQ AFMC/FMB  
Maj Shuck  
PHONE: DSN 787-6922  
MAIL: DSN 996-1197  
TO: Ted Nilson  
CC: SAE/FRAND  
MAIL: 223-7294

*Atch 2*

## Comments From the Assistant Secretary of the Air Force

JAN 05 '93 14:38 HQ AFMC FM WPAFB OH 45433000

P.25



**DEPARTMENT OF THE AIR FORCE**  
PHILLIPS LABORATORY (AFSC)  
KIRTLAND AIR FORCE BASE, NEW MEXICO 87117-6008

REF ID: A774 09 PL/WS

14 Dec 92

SUBJECT: DOD (IG) Draft Report, "Advanced Test Facilities" (Project No 2AB-0025)

TO: HQ AFMC/ST

1. The DOD IG draft audit report Finding B: Anti-deficiency Violation, states that the Air Force improperly used Research, Development, Test and Evaluation (RDT&E) appropriation to fund an anechoic chamber required to support the development of high power RF generation technologies. The IG claims that MILCON funds and not RDT&E funds should have been used for the anechoic chamber. The IG finding is based on its definition of the anechoic chamber as construction instead of R&D equipment. We non-concur with this finding.

2. The DOD IG included the Phillips Laboratory's High Energy Microwave Laboratory (HEML) in its audit of electronic combat integrated test facilities (ECITFs) because it contains a large anechoic chamber. HEML is a multi-purpose R&D facility which supports the development of high power microwave weapon technology. It is a Research & Development facility and not a Test & Evaluation Facility and, as such, it is used for very different functions. The IG apparently accepted the need for HEML, but took issue with the type of funds used for the anechoic chamber.

3. The Air Force from the beginning of the HEML construction project considered the anechoic chamber and its associated high power microwave sources and instrumentation to be R&D equipment and properly planned for it in the PE 63605F budget. The chamber is required to provide a secure, electromagnetically shielded, controlled environment in which to acquire data on high power microwave effects on large systems and to develop high power microwave sources. The HEML building was designed to accommodate a large chamber as stated on the original DD Form 1391 submitted in Apr 86. The chamber itself was never part of the MILCON, which is a fact contrary to the IG report. The large anechoic chamber and its associated high power microwave sources and instrumentation were identified on the DD Form 1391C as major R&D equipment. The building was designed to accommodate all of the required R&D equipment.

4. The special radiation shielding walls and roof listed on the DD Form 1391 were for X-rays and not for the Radio Frequency (RF) shielding that the anechoic chamber provides. At the time of the MILCON submission, high power microwave sources all operated at very high voltage and produced an intense x-ray environment. Subsequently, advances in high power microwave sources dramatically reduced the associated x-ray environment and allowed us to eliminate the need for special radiation shielding walls and roof in the final HEML building design.

5. The HEML building was designed and built by the Army Corps of Engineers using Ike Monty, Inc. as the construction contractor. This construction took

## Comments From the Assistant Secretary of the Air Force

JAN 05 '93 14:33 HQ AFLC/FM

WPAFB OH 454330000

P.3/5

place from 23 Sep 88 to 31 Mar 91. The large anechoic chamber was fabricated and assembled in the HEML by Rantec Microwave & Electronics, Inc., with a period of performance from 29 May 91 to 31 Aug 92. The contract award for fabrication and assembly of the anechoic chamber did not occur until after completion of the HEML MILCON project.

6. The basic issue in the IG audit is the definition of equipment versus construction. There appears to be no absolute definition of equipment installation versus facility construction, but one key measure appears to be whether or not it is an integral part of the facility. The anechoic chamber is definitely not an integral part of the HEML building.

7. On 30 Nov 92, in response to a request by PL/JA for their definition of equipment, the DOD IG referenced DOD Directive 4275.5, Acquisition and Management of Industrial Resources. This directive defines Special Test Equipment, Construction and Non-Severable Equipment in the following manner.

a. Special Test Equipment. Either single or multipurpose integrated test units engineered, designed, fabricated, or modified to accomplish special testing in performance of the contract. Such testing units comprise electrical, electronic, hydraulic, pneumatic, mechanical, or other items or assemblies of equipment that are mechanically, electrically, or electronically interconnected to become a new functional entity, causing the individual item or items to become interdependent and essential in the performance of special purpose testing in the development of production of particular supplies or services. Special test equipment does not include material, special tooling, buildings, and non-severable structures (except foundations and similar improvements necessary for the installation of special test equipment), and plant equipment items used for general testing purposes.

b. Construction. The erection, installation, or assembly of buildings or structures; the addition, expansion, extension, alteration, conversion, or replacement of existing buildings or structures. It includes equipment and utilities installed and made a part of the real property (excludes installation and relocation of severable property and minor modifications necessitated by installation of relocation of severable property) and related site preparation, excavation, and other land improvements.

c. Non-severable Property. Property that cannot be removed after erection without substantial loss of value or damage to the property or to the premises.

3. The IG claims that the large anechoic chamber installed in the Phillips Laboratory's High Energy Microwave Laboratory (HEML) is construction and not equipment. This is counter to the above definition of construction which explicitly excludes severable property. The anechoic chamber was assembled in the completed HEML facility with no structural connections to the building other than the foundation. It is a separate, severable entity from the facility. The chamber could be disassembled and removed from the HEML facility leaving the HEML facility intact and usable for any R&D operation requiring a large high bay. The chamber itself could be reassembled in another building. The HEML building is maintained on the Civil Engineering facility listing, while the anechoic chamber is accountable equipment for the Phillips Laboratory.

## Comments From the Assistant Secretary of the Air Force

JAN 05 '93 14:39 HQ AFLO/FI: WPAFE OH 454330023

P.4/5

9. DOD Directive 7110.1-M, paragraph C. states that RDT&E appropriations will finance the development, design, purchase, installation, and acceptance testing of equipment or instrumentation required for support of RDT&E activities. Paragraph E-2 of this directive states that items of equipment which are movable in nature and not affixed as an integral part of a facility are not normally considered construction costs. The anechoic chamber is in principle movable and could be removed without damage to the building which is accordance with the definition of equipment in DOD Directive 7040.2, paragraph B. Paragraph D of this instruction further states that the cost of installing equipment in an existing real property facility, such as installation of required shielding for electromagnetic radiating devices is not construction.

10. The IG report states that the High Power Microwave Program Office could not provide documentation supporting its decision to classify the chamber as equipment. The Program Office submitted a memo on 12 Aug 92 that showed that the equipment definition was consistent with guidance in AFR 172-1, Volume 1, 15 Oct 90 and AFR 80-22, 30 Apr 81. We never considered the anechoic chamber as construction of a facility, but rather fabrication and in place assembly of R&D equipment. It is not an integral part of the HEML building. This memo apparently never reached the IG or they did not accept its argument. All equipment and operation costs for HEML are supported by 3600 funds. MILCON funds were only for construction of the HEML building

11. All of the above referenced DOD and AF documents support the AF definition of the anechoic chamber as R&E equipment. In addition, the anechoic chamber was identified as R&D equipment in the HEML MILCON submittal to Congress. While this does not prove that it is equipment, it clearly documented the AF position from the beginning. We firmly believe that the anechoic chamber as used in HEML is equipment and not part of the facility construction. Definition of the anechoic chamber as equipment, although larger than most laboratory equipment, is consistent with treatment of smaller chambers in laboratories across the country. These chambers are neither installed nor maintained by facilities personnel. They are operated and maintained as equipment by skilled technical personnel.

12. The IG also questioned the use of FY 91 funds prior to incremental FY 90 funds. This unplanned funding profile came about due to a change in our procurement strategy and a time lag in our financial system. We initially planned to have the Army Corps of Engineers purchase the anechoic chamber and oversee its installation. However, the highly technical nature of this purchase proved to be beyond their capabilities and their estimated costs were excessive. Therefore, we decided to terminate the Army Corps of Engineer support and use the full technical capabilities of the Phillips Laboratory procurement. Recovery of our FY 90 funds, that had been provided to the Army Corps of Engineers, took several months to accomplish and in the interim our FY 91 funds became available and were used to begin the chamber contract. This resulted in a strange funding sequence. However, the net result was consistent with our Program Management Directive (PMD) which designated both FY 90 and FY 91 funds for purchase of the anechoic chamber. Later a modification to the contract used some FY 92 funds to cover installation costs and special physical security requirements not originally foreseen. All funds for this project were properly approved.

Comments From the Assistant Secretary of the Air Force

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JAN 05 '93 14:40 HQ AFPC/FM WPAFE OH 454330000

P.5-5

13. In summary, we have reviewed the IG report and history of the anechoic chamber procurement and have determined that no anti-deficiency exists. The anechoic chamber is clearly R&D equipment located in HEML. This is in accordance with all relevant DOD and AF regulations and the HEML MILCON submission to Congress. The IG anti-deficiency finding is based on their improper definition of the chamber as construction, rather than its proper description as R&D equipment. No regulations preclude the use of RDT&E funds for the anechoic chamber purchase and all funds were properly approved by the Air Force. The IG needs to acknowledge the proper definition of the chamber as equipment and withdraw its anti-deficiency allegation.

14. This letter represents a coordinated response of the Air Force Phillips Laboratory to the subject DOD IG anti-deficiency allegation.

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