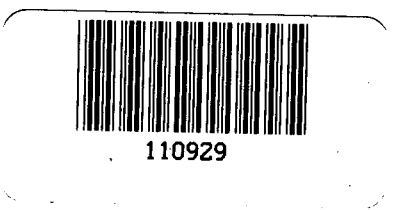
REPORT BY THE U.S.

General Accounting Office

Increased Oversight And Interservice Use Of Military Aviation Training Ranges Can Reduce Costs

Aviation training ranges used by military aircrews for practicing maneuvers and weapons delivery should be managed in ways that provide the highest quality facilities possible with available resources. Aircrews practice on these ranges to keep ready to perform their combat missions.

This report evaluates the effectiveness and economy of aviation training range management in two of the services and identifies opportunities for improvement.



LCD-80-14
NOVEMBER 26, 1979

GAO

United States General Accounting Office
Washington, DC 20548

Logistics and
Communications
Division

B-175773

The Honorable Harold Brown
The Secretary of Defense

AGC00005

Dear Mr. Secretary:

This report presents our evaluation of the effectiveness and economy of the services' operation and management of aviation training ranges and identifies opportunities for improvements. Because of delays in providing written comments, this report is being issued without formal comments from the agencies involved. However, we discussed the report contents with representatives of the Departments of Defense, the Navy, and the Air Force, and have incorporated their comments where appropriate.

This report contains recommendations to you on pages 30 and 39. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

Copies of this report are being sent to the Chairmen of the House and Senate Committees on Appropriations and Armed Services, the House Committee on Government Operations, and the Senate Committee on Governmental Affairs; the Secretaries of the Navy and Air Force; and the Director, Office of Management and Budget.

Sincerely yours,

R. W. Gutmann

R. W. Gutmann
Director

REPORT BY THE U.S. GENERAL ACCOUNTING OFFICE TO THE SECRETARY OF DEFENSE

INCREASED OVERSIGHT AND INTERSERVICE USE OF MILITARY AVIATION TRAINING RANGES CAN REDUCE COSTS

D I G E S T

Aviation training ranges providing areas and facilities the military services need for their aircrews to practice combat maneuvers are costly. Effective and economical management can be best achieved through

--determining servicewide range requirements and emphasizing interservice use where feasible and

--coordinating and supporting modernization programs. AGC00035 AG-C01001 AGC00098

The Air Force and Navy (including the Marine Corps) spent an estimated $39.3 million in fiscal year 1978 to operate and maintain training ranges. For the most part, this report does not include the Army because it does not manage any fixed-wing ranges.

Range management is highly decentralized, usually down to the operating base level. Top management levels have

--exercised little oversight,

--reviewed only limited range management information, and

--failed to consistently emphasize maximum interservice use of ranges.

Neither the Department of Defense (DOD) nor the services are required to make periodic assessments of aviation range requirements and assets. For the most part, range locations have been based on the location of air training bases. Without

requirements and assets, there is no assurance that training ranges properly match each service's range needs. Also, each service has developed ranges over the years, primarily for its own use, so there has been no systematic method to ensure that adequate consideration was given to locating and developing facilities for maximum interservice use as required by DOD instructions. (See p. 10.)

As a result of these management practices:

--The services' total range requirements and assets appear to be imbalanced.

--Similar range complexes exist in some geographic areas--each exhibiting low utilization rates.

--Range modernization programs appear to contain some unnecessary duplication and some weakly supported items.

USING THE RANGES

DOD and the services have recognized the benefits of interservice range sharing, and such sharing is required by regulations when feasible and economical. Some ranges are shared regularly, but sharing is not as widespread as it could be. For example, information gathered in a GAO questionnaire showed that less than half of 55 range scheduling activities indicated shared range use. Most of the ranges which did not indicate some interservice use were located in areas where sharing would be feasible. (See p. 11.)

In some areas, it appears that increased sharing of ranges would reduce flying costs. (See p. 12.)

In a few areas, the services operated similar ranges, each exhibiting low use rates. Such

underused facilities were costly in terms of operation and maintenance, equipment, and modernization costs. (See p. 15.) Greater emphasis on shared use and development of ranges would help ensure that such situations do not occur in the future.

Maximum efficiency in range operation can be achieved only if ranges are used at or near their normal capacities. Although the services' policy is to achieve maximum use of their ranges, they have not clearly defined maximum or acceptable use levels. And because service headquarters does not monitor actual range use, it does not know the extent of interservice sharing or total range use. (See p. 26.)

Responses to questionnaires GAO sent to all range scheduling activities indicated, however, that overland and overwater ranges were used an average of only 25 and 35 percent, respectively, of the available time in fiscal year 1978. (See p. 26.)

MODERNIZATION PROGRAMS

The services have established range modernization programs to duplicate more closely combat environments, to accommodate new training requirements, and to take advantage of technological advances in equipment.

In fiscal year 1979, over $50 million was funded for modernization programs. The estimated cost of planned improvements for fiscal years 1981-84 exceeds $350 million. (See p. 31.)

These high costs and the services' limited resources mean improvements should be carefully planned and justified to make sure they are, in fact, needed. This does not always appear to be the case. For example:

--Although the services rely heavily on range operators and aircrew squadrons to

identify range improvements, they have not issued criteria on how this should be done. (See p. 32.)

--The services have not issued detailed guidance on the factors to be considered when preparing justifications; therefore, the justifications were very brief, did not show how the planned improvements would affect the quality of aircrew training, and did not include cost-benefit analyses. (See p. 32.)

Regulations require interservice sharing of support facilities wherever feasible and economical, but the services generally have developed their range modernization programs independently with little regard for potential interservice range use. (See p. 33.)

RECOMMENDATIONS

GAO recommends that the Secretary of Defense:

--Direct the services to emphasize compliance with instructions requiring interservice cooperation in the development and use of aviation training ranges. The services should be directed to assess range requirements and existing assets continually with a view toward achieving maximum interservice use and range operating efficiency.

--Require that the services develop detailed guidance for identifying and justifying aviation training range improvements.

--Include a thorough consideration of interservice sharing possibilities in the justification for and subsequent review of proposed modernization projects.

--Direct the services to work jointly to determine whether electronic warfare simulator equipment or the Air Combat Maneuvering Instrumentation system

should be the principal means of providing electronic warfare training in the future, as well as how many systems are really needed in a given geographic area.

AGENCY COMMENTS

DOD was requested to provide written comments on a draft of this report within 30 days, but it was unable to do so. After a number of unsuccessful attempts to obtain formal DOD comments, GAO decided to issue the report without them. However, the report does recognize and evaluate oral comments, and draft written comments provided by agency officials at a meeting held on September 27, 1979, are incorporated where appropriate. These comments generally agree with GAO's conclusions and recommendations, but they disagree with a portion of the range utilization statistics and with GAO's opinion that increased interservice use of certain ranges is feasible and cost effective.

GAO did not take the time to confirm or refute DOD's contention that the utilization data received from certain ranges was incorrect. However, GAO recomputed the questioned statistics using the revised DOD figures throughout the report. The effect of the change was to increase the utilization for overland ranges by 1 percent.

GAO disagrees with DOD's position that increased interservice use of certain ranges is not feasible. GAO believes that through increased sharing and better coordination in range use and modernization, significant cost savings can be achieved. The details of these matters are discussed on pages 12, 13, 17, 18, 21, 22, 23, 25, and 29.

Contents

ABBREVIATIONS

ACMI	Air Combat Maneuvering Instrumentation
DOD	Department of Defense
EW	electronic warfare
GAO	General Accounting Office
TAC	Tactical Air Command

CHAPTER 1

INTRODUCTION

The readiness of the Nation's air forces depends greatly on aircrews who can successfully and skillfully perform their assigned missions. The military services' aviation training ranges provide the areas and facilities the aircrews need to develop and maintain such proficiency by practicing offensive and defensive air maneuvers and weapon deliveries. Through repeated practice, aircrews and the aircraft they fly can be welded into effective weapon delivery systems.

Realistic training ranges enhance the quality of aircrew training by providing targets and threats closely resembling the postulated combat environment. The ranges also provide the areas and facilities the services need to develop and analyze air warfare tactics and command and control procedures, and some ranges are sufficiently large to provide for operational testing and large-scale exercises.

TYPES AND COST OF TRAINING RANGES

The Air Force, Navy, and Marine Corps aviation training ranges usually have areas where aircrews can safely practice bombing, strafing, and other air-to-ground and air-to-air combat tactics. Most air-to-ground training is conducted at overland ranges which normally have a prescribed land area the military owns or leases, and a designated airspace which is restricted from use by commercial aircraft. Other ranges are often located over coastal waters, and consist only of a designated airspace where aircrews can practice air-to-air combat maneuvers and tactics.

The size and complexity of aviation training ranges vary considerably. For example, some ranges cover less than 3,000 acres and provide only simple targets for bombing and strafing practices. In contrast, other ranges are large complexes ranging from 100,000 to more than 1 million acres of land. These large complexes normally include several separately scheduled weapons targets, feedback systems on aircrew performance, and even electronic warfare (EW) threat emitters that simulate the radar environment aircrews might encounter in an actual enemy conflict. The diagrams on page 3 depict

a simple and a sophisticated aviation training range, and the table below summarizes the number of separately scheduled ranges the Air Force, Navy, and Marine Corps operate. 1/

	Range scheduling activities	Separately scheduled ranges		
		Overland	Overwater	Total
Air Force (note a)	26	56	2	58
Navy and Marine Corps	29	54	61	115
Total	55	110	63	b/173

a/Includes the Tactial Air Command, U.S. Air Forces in Europe, Pacific Air Forces, Alaskan Air Command, Air Force Reserve, and Air National Guard.

b/Of the total, 9 Air Force and 33 Navy and Marine Corps ranges are located outside the continental United States.

Operation and maintenance costs for most aviation ranges were not readily identifiable because they were included in local installation budgets. However, based on information gathered through a questionnaire which we sent to all activities responsible for scheduling range usage, an estimated $39.3 million was spent in fiscal year 1978 to operate and maintain aviation training ranges (excluding military personnel costs). In that same year, approximately 2,000 military and 800 civilian and contractor personnel were involved directly in range operation and support.

Over the past several years, the Air Force and the Navy (including the Marine Corps) have established formal programs to improve the quality of aircrews' training during range practices. These programs have attempted to increase range realism by adding targets and threats which closely duplicate postulated combat environments. In addition, these services have installed or have plans to install expensive, high-technology training aids, such as the Air

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1/Excludes the Department of Defense's (DOD's) major test and evaluation ranges, except for the Tactical Fighter Weapons Center at Nellis Air Force Base, Nevada, which is used extensively for aircrew training.

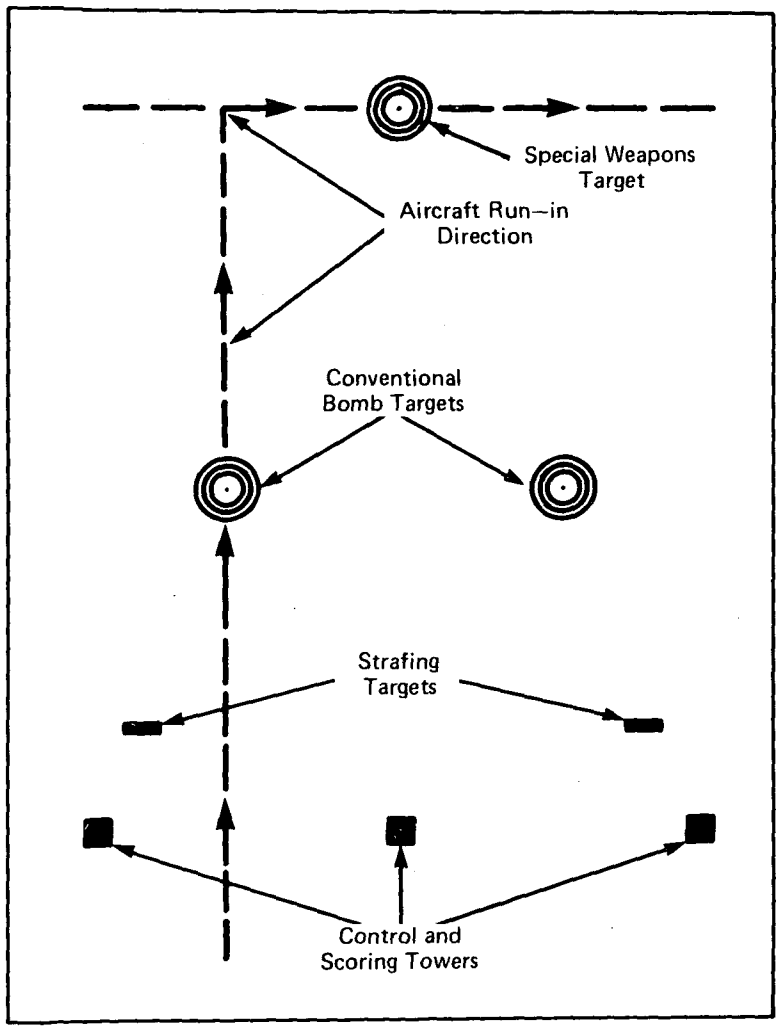

Diagram 1. SIMPLE RANGE LAYOUT WITH CIRCULAR BOMBING TARGETS. (Not to scale.)

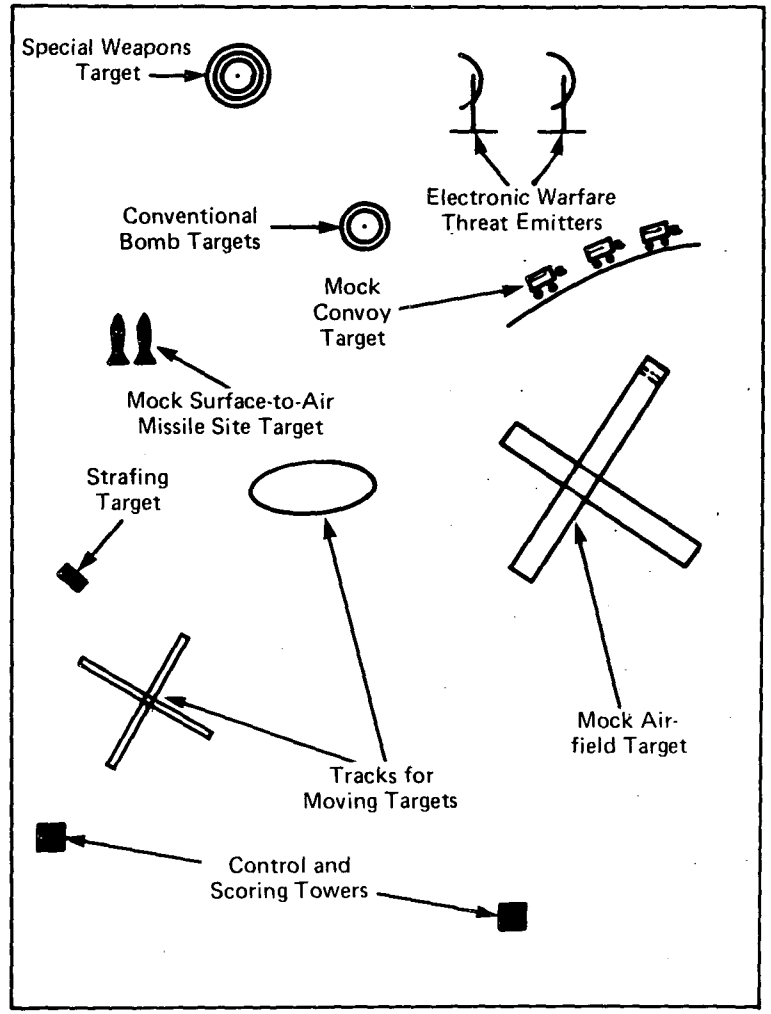

Diagram 2. MORE SOPHISTICATED RANGE LAYOUT WITH REALISTIC TARGETS AND ELECTRONIC WARFARE SIMULATORS. (Not to scale.)

Combat Maneuvering Instrumentation (ACMI) system and new weapon delivery scoring equipment, for further enhancement and expansion of aviation training ranges. The following table summarizes the costs of past and planned range improvements.

	Range Modernization Costs				
	1977 (actual)	1978 (actual)	1979 (actual)	1980 (est.)	1981-84 (est.)
	(millions)				
Air Force	$34.9	$18.7	$42.4	$48.5	$302.9
Navy and Marine Corps	3.6	9.7	8.3	11.9	52.1
Total (note a)	$38.4	$28.4	$50.6	$60.5	$354.9

a/All but one of totals do not add due to rounding.

SCOPE OF REVIEW

We examined DOD, Air Force, Navy, and Marine Corps policies and procedures for managing aviation training ranges and various documents used to support past and planned range modernization programs. For the most part, we have excluded the Army from our review because the Army does not manage any fixed-wing aviation training ranges. However, we did look at the feasibility of using some Army-owned land for aircrew training by the other services.

Since range usage and other detailed information needed for our analysis was not always available at higher command levels, we sent questionnaires requesting such data to all activities responsible for scheduling aviation training ranges. A copy of the questionnaire and summaries of the responses are included as appendixes I through IV.

Our fieldwork included visits to the following locations:

--Headquarters commands:

Office of the Secretary of Defense, Washington, D.C.
Headquarters, U.S. Air Force, Washington, D.C.

Headquarters, Department of the Army, Washington, D.C.
Commandant, U.S. Marine Corps, Washington, D.C.
Chief of Naval Operations, Washington, D.C.
Naval Air Systems Command, Washington, D.C.

--Operating commands:

Tactical Air Command, Hampton, Virginia.
Commander in Chief, Atlantic Fleet, Norfolk, Virginia.
Commander, Naval Air Force, Atlantic Fleet, Norfolk, Virginia.
Commander, Naval Air Force, Pacific Fleet, San Diego, California.
Fleet Marine Force, Atlantic, Norfolk, Virginia.
Tactical Air Wings, Atlantic, Virginia Beach, Virginia.
Training and Doctrine Command, Hampton, Virginia.
Forces Command, Atlanta, Georgia.

--Other commands and range complexes:

Naval Air Systems Command, Target and Range Systems Division, Point Mugu, California.
Fleet Analysis Center, Corona, California.
Naval Air Station, Fallon, Nevada (Fallon range complex).
Naval Air Station, Oceana, Virginia (Viginia Capes operating area ranges).
Marine Corps Air Station, Yuma, Arizona (Yuma range complex).
Seymour Johnson Air Force Base, North Carolina (Dare County range).
Fort Lewis, Washington (Yakima firing range).
Fort Stewart, Georgia (Fort Stewart range).

We provided a draft of this report to DOD and the services on July 19, 1979, and requested written comments within 30 days. At their request, we met with representatives of DOD and the services on August 3, 1979, to discuss the report contents, and we subsequently provided the data on range availability and usage obtained during our review. When no written comments had been received by September 27, 1979, we met with a DOD representative and obtained a draft copy of portions of the proposed written comments that had been thus far prepared. The oral and unofficial written comments have been incorporated in this report where appropriate.

CHAPTER 2

EFFECTIVE AVIATION TRAINING RANGE MANAGEMENT: THE ESSENTIAL INGREDIENTS

Today's aviation training ranges are necessary, but costly. An estimated $39.3 million was spent in fiscal year 1978 to operate and maintain Air Force and Navy training ranges. Although the magnitude of investment in training ranges could not be determined, millions of dollars are also being spent each year on programs to modernize existing ranges. For example, in fiscal year 1979, the Air Force, Navy, and Marine Corps spent $50.6 million on range improvements.

Since training ranges are essential in developing mission-ready aircrews, the ranges must be managed in a manner that provides the highest quality training possible. However, because both monetary and physical resources are limited, ranges must also be managed as effectively and economically as possible. Also, other range related problems, such as land and airspace encroachment attempts, budgetary competition between training improvements and military hardware, and the need to conserve energy and reduce flying hour costs, require close management attention at all levels.

Effective range management today and in the future will require well-informed organizations with the responsibility and authority for overseeing the management and operation of all aviation training ranges. We believe that future range effectiveness and efficiency can best be achieved through (1) integrated, servicewide range requirements determinations which emphasize interservice use where feasible and (2) well-coordinated and well-supported modernization programs.

MATCHING REQUIREMENTS AND ASSETS

A basic step in effective range management is the matching of total aviation range requirements and assets. The services need to periodically determine:

--How many ranges are needed to accommodate essential aircrew training.

--Where the ranges should be located to minimize distance from operating bases and to maximize opportunities for interservice use.

--What types of ranges and range capabilities are needed.

--Whether the current inventory of range assets best satisfies total range requirements.

In addressing these matters and in preparing requirements assessments, the services should carefully consider the (1) aircrew training requirements (the number, type, and frequency of air training events each aircrew needs to attain and maintain combat readiness), (2) number of aircrews to be trained, (3) time required for each training event, (4) number of aircrews that can safely train simultaneously, (5) range operating hours, and (6) training requirements for new weapon systems. In addition, when selecting the home locations of new air units, the services should carefully assess the availability of training ranges to ensure that current assets are used to their fullest before new ranges are established. Likewise, when changing the home locations of existing air units, the services should select locations which have available range capacity nearby and examine the possibility of closing ranges no longer needed.

To assess range requirements and to achieve maximum training benefits and operating efficiency from ranges, the services should ensure that an adequate level of usage is maintained at all ranges. To ensure adequate levels of usage, the services should continually review current range rates and assess ways to improve such rates. As a result of these reviews, sufficient information should be available for range users to readily determine the capabilities, availabilities, and operating procedures of the ranges in their areas. Further, interservice use of ranges should be encouraged, and priorities for their use should be set to prevent scheduling conflicts.

We found, however, that the services were not required to periodically assess aviation range requirements. For the most part, the services established their ranges based on the locations of their air training bases--not on analyses of actual aircrew training requirements. In addition, although regulations require the services to maximize the sharing

of facilities and other support services, such as training ranges whenever possible for economy and effectiveness, this has not always been accomplished. Even though the services' policy is to achieve optimum use of training ranges, the services have not routinely received and reviewed range utilization statistics.

Although we found some very effective examples of coordination in range usage among the services, more could be done. We did not attempt to calculate the services' total range requirements or to identify every possibility for increased interservice use. The following conditions are examples which indicate that greater management attention is required in this area.

--Some geographic areas had similar range complexes with low use rates.

--Overall aviation training range usage rates for fiscal year 1978 were low.

These matters are discussed further in chapter 3.

COORDINATING AND SUPPORTING MODERNIZATION PROGRAMS

Realistic, sophisticated training ranges can provide aircrews with experience as close as possible to combat, short of actual conflict. However, developing ranges that closely duplicate combat environments and that provide accurate feedback on aircrew performance requires considerable funds. In addition, other types of range modifications are often needed to accommodate the training requirements of new weapon systems and to take advantage of technological advances in training aids and weapon scoring equipment.

As a result, range facilities and capabilities are changing and must be constantly assessed in light of aircrew training requirements. The services need to periodically determine:

--What new range capabilities or range improvements are needed to provide the highest quality training facilities possible.

--How planned improvements will increase the quality and degree of training.

--Whether the anticipated benefits from proposed range improvements exceed the anticipated costs.

--Which ranges should be improved.

In addressing these matters, the services must consider many of the same factors they consider when determining total range requirements. For example, the services must carefully analyze current and future aircrew training requirements, number of aircrews to be trained, and any planned unit basing changes. Once potential range improvements are identified, the services should closely scrutinize each improvement from a cost-benefit perspective and prepare detailed written justifications for items recommended for approval.

The services should then forward the justifications to the headquarters level for a rigorous top management review. This review should include a servicewide view to eliminate any unnecessary duplication and to maximize the potential for interservice use of planned improvements.

During our review, we found that the services had not issued detailed guidance explaining how potential range improvements should be identified, justified, and reviewed. Also, as mentioned previously, the services are required to maximize the sharing of facilities whenever possible for economy and effectiveness. However, with some notable exceptions, the services were not routinely considering the potential for interservice use of proposed range improvements. As a result:

--Some items included in past and future range modernization programs were weakly supported and of questionable need.

--Some unnecessary duplication in the services' past and planned programs may have occurred.

We believe that through better management guidance and increased oversight, the services can significantly improve the management of aviation training ranges. In the following chapters, we examine current range management in greater detail and offer suggestions for improvement.

CHAPTER 3

IMPROVING RANGE MANAGEMENT AND USE

Because of limited service guidance on some aspects of range management and only partial compliance with DOD-wide instructions concerning interservice use of facilities, aviation training range management has not been as effective and efficient as it could be. We believe that with better guidance and management oversight, the services can (1) ensure a better balance between total range requirements and assets and (2) optimize range use from both intraservice and interservice perspectives.

RANGE REQUIREMENTS

During our review, we found that neither DOD nor the services were required to periodically assess aviation range requirements. Generally, ranges were established based on the locations of air training bases--not on analyses of actual aircrew training requirements. For example, the Air Force's Tactical Air Command (TAC) established an aviation training range close to most of its major air bases. Each of these "backyard" ranges primarily supports aircrew training from the nearby TAC base which reduces flight time to and from the range. Similarly, the Navy and Marine Corps established ranges near their operating bases to support their aircrew training needs.

Both the Air Force and the Navy have recognized the need to assess and match range requirements and assets, but little has been done. For example, in 1976 TAC attempted to project its range requirements based on aircraft equipage, planned missions, and aircrew training requirements. However, the management information necessary for making an accurate projection was not available. Also, we were told that after a study of test and evaluation range requirements had been made, the Navy recognized the need for a similar study for aircrew training ranges. However, the study has not been made.

Without such assessments, the services cannot be assured that the current inventory of aviation training ranges properly matches the range needs of each service. More importantly, with each service developing ranges over the years primarily for its own use, no systematic method has been developed to ensure that adequate consideration has been

given to locating and developing range facilities for maximum interservice use as required by DOD instructions.

During our review, we noted several conditions which indicated that actual range needs and current range assets were imbalanced and that the services were not maximizing the potential for interservice range development and use. For example:

--Additional potential existed for increased interservice sharing of ranges.

--Some geographic areas had similar range complexes with low utilization rates.

--Overall aviation training range utilization rates for fiscal year 1978 were low.

--During fiscal year 1978, few denials were given by range schedulers to aircrew squadrons requesting to use the ranges.

The following sections discuss these points in greater detail.

POTENTIAL FOR INTERSERVICE SHARING OF RANGES

DOD and the services have recognized that interservice support has benefits. Regulations require that the services support each other when the capability exists and when such arrangements will increase DOD's economy and effectiveness. As such, some interservice sharing of aviation training ranges is performed on a regular basis.

For example, the Air Force and the Navy agreed to share the cost and use of an ACMI system near North Carolina. At the time of our review, the Air Force was using the facility 25 percent of the time it was available, and the Navy was using it the other 75 percent. The arrangement seemed to be working satisfactorily for both services, and apparently the sharing of this range is less costly than each service owning and operating its own ACMI system.

Another example is the Air Force's agreement to use the Army's Fort Stewart, Georgia, range to conduct some air-to-ground training. Since Fort Stewart is closer to some Air

Force bases than Air Force ranges, flying time and cost are reduced when the Fort Stewart range is used.

For the most part, however, we believe that the services have not maximized the potential for interservice cooperation and sharing of range facilities as directed by regulations. Analysis of information gathered in our questionnaire showed that less than half of the 55 range scheduling activities indicated interservice range use. Of those activities which did not indicate some interservice use, the majority were located in areas where interservice use would be feasible.

Reducing flying costs

In some areas it appears that increased sharing of range facilities would reduce flying costs. For example, aircrews from Seymour Johnson Air Force Base in North Carolina primarily use the Dare County range, their backyard range, for training. The range is about 105 nautical miles from the base. About 35 nautical miles closer is the Marine Corps' Cherry Point range which was used about 34 percent of the hours it was available in fiscal year 1978. Although Seymour Johnson aircrews used the Cherry Point range to a limited extent in fiscal year 1978, it appears that greater use is feasible and could result in reduced flying cost. Also, the Air Force and the Marine Corps did not enter into a formal interservice support agreement over use of the Cherry Point range until November 1978, after we had raised the question in our review.

According to DOD the Cherry Point range is unsuitable for TAC strafing requirements; the extra flying time to the Dare County range is used for low level navigation training; and the Cherry Point utilization rate is higher than discussed above.

In later discussions with Air Force officials, we were told that the primary factor affecting Air Force use of Cherry Point for strafing training was a 400-foot difference between the points at which Marine Corps and Air Force pilots must, for safety reasons, "stop shooting" as they approach the target. This stop shooting point is called the foul line. The Marine Corps foul line is 1,600 feet from the strafing target, and the Air Force has recently changed its foul line requirement from 1,600 feet to 2,000 feet from the target. Waivers of specific requirements have been granted to permit Air Force use of other ranges, and a similar waiver

for Air Force use of Cherry Point appears to be a possible alternative. If waiver of the foul line requirement is not feasible, a 2,000-foot foul line could be established at Cherry Point. The cost of constructing a foul line, with an observation tower, could be quickly recovered from the flying hour cost savings which would result from increased use of the range for training pilots from Seymour Johnson Air Force Base. Conventional bombing practice and rocket firings can be conducted at the range without any modifications.

DOD's contention that utilization of the Cherry Point range is greater than 34 percent is based on the fact that the range is manned only 40 hours a week. We agree that use of this basis results in a greater statistical utilization rate, and would seem to militate against increased use of the range for training Air Force pilots. However, the savings available from the Air Force using this closer range would more than offset the cost of increasing the range's staff to make it more available for Air Force use. The 35-nautical mile difference in the flying distance from Seymour Johnson Air Force Base to Dare County versus Cherry Point equates to a saving of 5.53 minutes flying time each way, or 11.06 minutes for a round trip. A training official at Seymour Johnson said that this reduction in transit time would not result in any significant reduction in navigation training. The reduced flying time of 11.06 minutes equates to about $135 in costs for fuel and lubricants which could be saved by each F-4E aircraft using the closer range.

As another example, in fiscal year 1978 aircrews from the Naval Air Station at Whidbey Island, Washington, flew 3,014 training missions to its air-to-ground Boardman range in Oregon, 210 nautical miles away. However, the Army's Yakima Firing Range, which encompasses over 263,000 acres of land, is 74 nautical miles closer to Whidbey Island. Army officials responsible for Yakima said that arrangements probably could be made to allow the Navy to use their range to some extent, although Yakima's terrain is not ideal for air-to-ground training and there may be some environmental problems. Due to the differences in the distance involved, we believe that significant flying cost savings would result if even a small portion of the training flights could be diverted to Yakima.

In commenting on our report, DOD said that the Navy had conducted a study of ten potential sites, including Yakima,

in an attempt to locate one which could replace the Boardman range. Additionally, DOD stated that Yakima was designed for ground weapons firing and was unsuitable for the A-6 aircraft air-to-ground training mission.

We agree that the Army's range is not designed for Navy aircrew training. However, we believe that a portion of Yakima's 263,000 acres could be made available for Navy training. The report cited by DOD was performed in 1973 and agreed with our opinion that Yakima could be used by the Navy and that it would result in cost savings. The study concluded, in part, that:

> "The terrain in all candidate sites is suitable for the target facilities required, and topographically acceptable approach corridors for both beginning and advanced trainees can be established at all sites."

Another related example is Moody Air Force Base in Georgia. TAC gained control of this base in the early 1970s and assigned a wing of fighter aircraft to it. To perform their missions, aircrews from Moody must train on an air-to-ground range. However, Moody does not have any air-to-ground ranges close to it which can fully support its requirements. Before TAC gained control of Moody, the Air Training Command used the facility as an initial aircrew flight training base and did not require the use of air-to-ground ranges.

As a result, Moody aircrews have been flying considerable distances to obtain range time. Some ranges used by Moody aircrews are shown below.

Range	Controlling service	Nautical miles from Moody
Eglin	Air Force	160
Poinsett	Air Force	213
Avon Park	Air Force	226
Stevens Lake	Navy	87
Pinecastle	Navy	135
Fort Stewart	Army	95

The Air Force has pursued alternatives for obtaining range support for Moody, including the use of other service ranges. However, the closest ranges cannot support Moody's needs. For example, Stevens Lake, which is owned by the State of Florida, is closed to aircrew training approximately 6 months a year because of Army National Guard training and the hunting season. Another alternative is the Army's Fort Stewart, but it is only available for Air Force use about 325 hours a year.

We believe these examples show the extreme importance of range location and availability in the services' decisions on where to base air units.

Duplicative range facilities

Another condition suggesting potential for greater interservice coordination, as well as a possible range requirement and asset imbalance, is the existence of similar ranges in the same geographic area--each exhibiting low utilization rates. For example, both the Navy and the Air Force operate major ranges in Florida which provide targets for air-to-ground weapons practice, and which attempt to replicate the same or similar enemy EW threats. As shown on page 16, the two ranges are about 85 nautical miles apart.

The Air Force employed 262 military and civilian personnel to operate and maintain its range and spent approximately $2 million in fiscal year 1978 on the range's operation and maintenance. 1/ The Navy spent about $166,000 to operate and maintain its range in fiscal year 1978 and employed 80 military and civilian personnel. Both services have invested heavily in their respective ranges and have planned extensive improvements. For example, over the next 5 years, the Air Force plans to spend approximately $16 million in range improvements and the Navy plans to spend about $7.3 million.

As depicted in the table on page 17, each facility was used less than 50 percent of the hours it was available for training in fiscal year 1978. Due to the low utilization rates and the considerable resources the services need to

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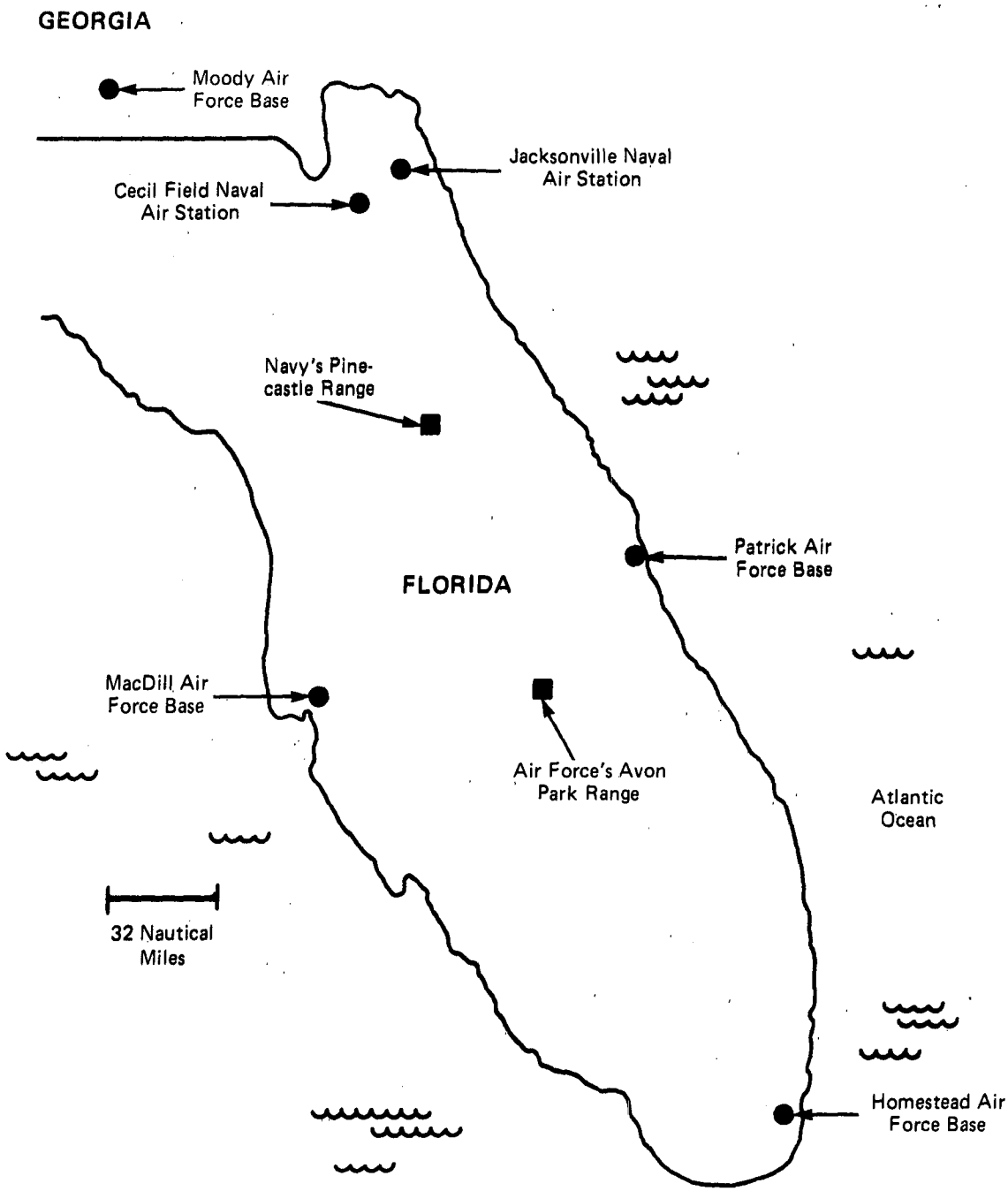
1/Operation and maintenance costs cited here and elsewhere in this report do not include military personnel costs.



MAP SHOWING MAJOR ELECTRONIC WARFARE TRAINING RANGES IN FLORIDA

operate the ranges, it appears questionable that the two services require two major ranges, each with EW training facilities, 85 miles apart in Florida. However, making such a final determination is beyond the scope of this review. But we believe that the services should be looking closely at this type of situation, particularly in future planning, to ensure maximum integration of their range requirements and to avoid any unnecessary duplication in range facilities.

Fiscal Year 1978 Use Of Pinecastle and Avon Park Training Ranges In Flordia (note a)

	Pinecastle	Avon Park
Hours available	4,144	6,500
Hours scheduled	3,367	3,330
Percent of available hours scheduled	81	51
Hours scheduled but not used because of:		
Weather	195	247
Range maintenance	78	-
Aircrew no-show	371	300
Other	781	-
Hours used	1,942	2,783
Percent of available hours used	47	43

a/See page 27 for description of utilization calculations.

In commenting on our report, DOD stated that the utilization figures shown above were for the total ranges and did not reflect the utilization of the EW equipment at the ranges. It added that the EW equipment was available 2,187 hours at Avon Park and 1,856 hours at Pinecastle.

The available hours shown for Avon Park represent the cumulative number of hours that three separately scheduled air-to-ground ranges at the complex were available for training in fiscal year 1978. Air Force officials said that Avon Park's EW equipment can provide for EW training at two of

these ranges simultaneously. Thus, using the DOD availability figure, the EW equipment was actually available 4,374 training hours. Of this, Air Force officials stated that 1,422 hours or 33 percent was used in fiscal year 1978.

Of the 1,856 hours that EW equipment was available at Pinecastle in fiscal year 1978, Navy officials said that 757 or 41 percent was used. Also, the availability of Pinecastle's EW equipment could have been increased to the total complex availability if manning of the equipment had been increased.

DOD also commented that range use fluctuated through the year and that, during some months, very high utilization was achieved. While this is probably true, we believe that several alternatives are available to easily accommodate range demand fluctuations, such as increasing the manning at certain ranges to increase availability, using alternate ranges, or limiting the training performed at complex ranges, such as Avon Park or Pinecastle, to EW and more sophisticated training versus the more routine bombing practice. Therefore, we believe that the annual use rates we present in this report are valid indications of range utilization.

Commenting further, DOD stated that a 1974 Air Force and Navy study of EW facilities at Avon Park and Pinecastle concluded that consolidation of these ranges was neither practical nor feasible. This study was not made available to us during our review and thus we cannot comment on its findings.

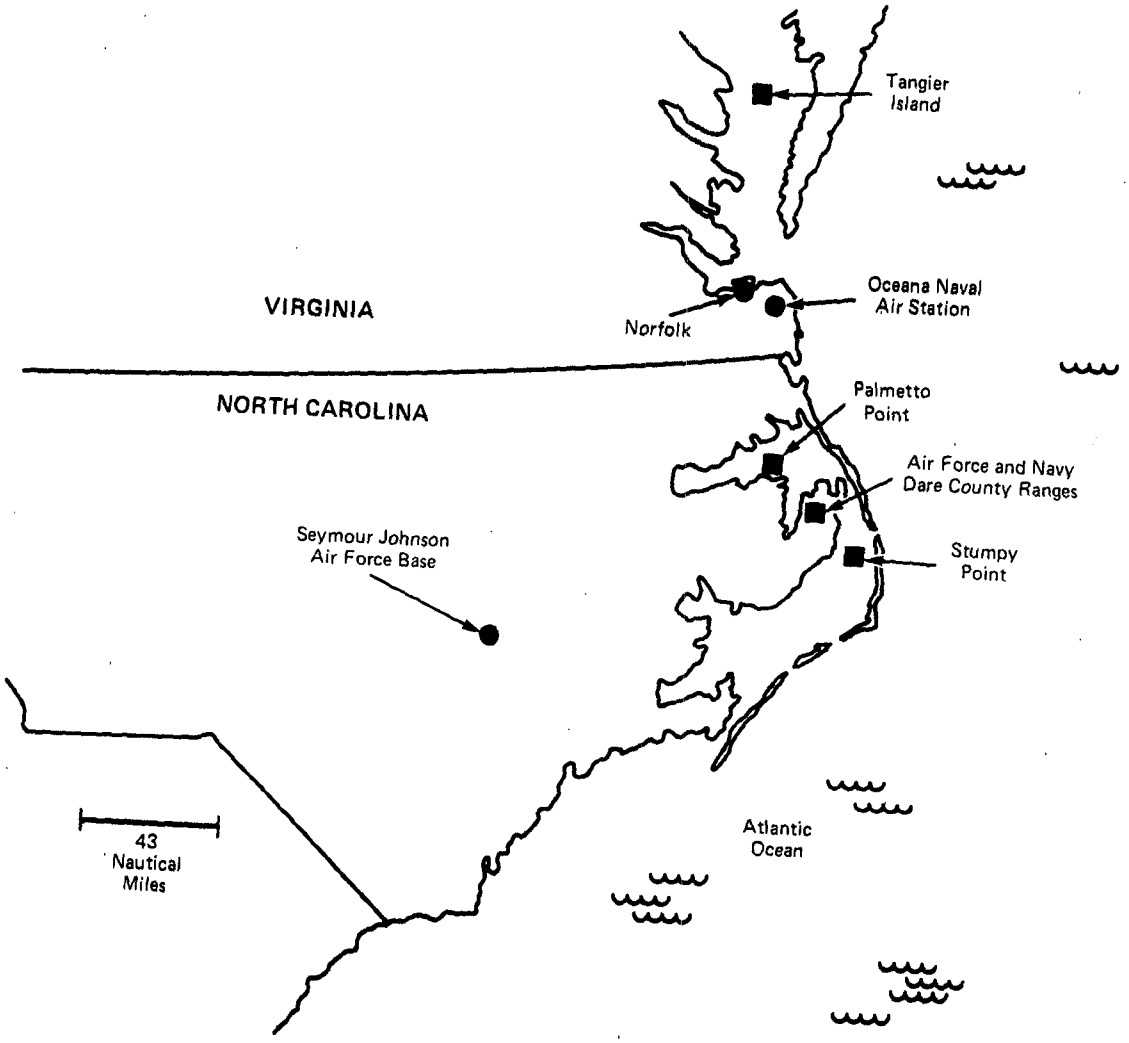
In its comments on the Avon Park and Pinecastle ranges, we believe that DOD has not addressed the real issue of effective and cost-efficient range management. As we have discussed in chapter 2, we believe that range management should be from a servicewide perspective. The services should not only be looking at optimizing initial range investment costs for equipment, but also at the long-term annual operation and maintenance costs. This can be best achieved when separate service interests are overcome to allow maximizing of total DOD-wide benefits. It is this approach that we believe should be pursued in future range planning.

A similar situation to the above example exists in Dare County, North Carolina, where the Air Force and Navy have constructed similar air-to-ground ranges on a 46,648-acre

parcel of land. (See map on the following page.) The Navy range, which is used primarily for bombing and strafing practice by Navy and Marine Corps aircrews, cost about $363,000 to operate and maintain and had nine civilian personnel in fiscal year 1978. The Air Force range is also used for the same practice, primarily by aircrews from Seymour Johnson Air Force Base in Goldsboro, North Carolina. The range had 16 civilian and military employees and cost about $771,000 for operation and maintenance in fiscal year 1978.

As in the previous example, both the Air Force and the Navy have plans to improve their respective ranges extensively over the next 5 years. For example, both services plan to install EW training equipment, automatic television bomb scoring systems, and other improvements. In total, the Air Force will spend about $10.6 million and the Navy about $3.9 million if all planned improvements are approved and installed.

Both ranges are located on Air Force-owned land. Although the Air Force, through interservice arrangements, furnishes services such as weather data and some maintenance support to the Navy, each service continues to independently operate, schedule, and modernize its own range. Further, neither range was used at or near its capacity in fiscal year 1978. On the average, the Air Force range was available for training about 42 hours a week, of which 25 hours, or 61 percent, was actually used for aircrew training. The Navy range availability averaged 80 hours a week, of which 37 hours, or 46 percent, was actually used. The table on page 21 summarizes the usage statistics for the two ranges.



MAP SHOWING LOCATION OF DARE COUNTY RANGES

Fiscal Year 1978 Use of
Dare County Ranges (note a)

	Navy range	Air Force range
Hours available	4,160	2,165
Hours scheduled	3,079	1,874
Percent of available hours scheduled	74	87
Hours scheduled but not used because of:		
Weather	127	235
Range maintenance	-	-
Aircrew no-show	1,046	319
Other	-	9
Hours used	1,906	1,311
Percent of available hours used	46	61

a/See page 27 for description of utilization calculations.

We believe it is questionable that the services require adjacent, independently operated air-to-ground ranges in North Carolina. While two separate targets probably are needed to accommodate all training, it appears that some savings in range operating and scheduling costs would result if there were a single range manager.

In commenting on our report, DOD challenged the Dare County utilization statistics shown above, stating that the ranges were normally manned only 5 days a week and range use was virtually saturated. However, DOD provided no alternative utilization statistics.

During our review, we visited both the Navy and Air Force offices which were responsible for scheduling range use and maintaining usage data for Dare County ranges. While at these offices, we reviewed their detailed records to obtain the statistics on range hours scheduled and used. These statistics were also supported by the questionnaires completed by the two Dare County range scheduling offices. According to these records and the completed questionnaires,

the services were normally staffing each range only 5 days a week--the Navy on a two shift or 16 hours a day basis and the Air Force on a one shift or 8 hours a day basis. These statistics equate to 4,160 hours of available time for the Navy and 2,080 hours for the Air Force. Therefore, we disagree with DOD's challenge to the accuracy of the Dare County utilization statistics.

DOD further commented that consolidating the range management function for both sides of the Dare County range would not result in any cost savings. It also stated that a Navy and Air Force review indicated that no overhead or supervisory positions could be eliminated by consolidating management of ranges.

We disagree with the services' position. While we have not made a detailed cost analysis, it is difficult to conceive that savings would not result from consolidating the range scoring, maintenance, security, scheduling, and management functions. Past experience with consolidating similar functions in the military shows that while consolidating may result in a higher cost to one or the other of the services involved, it almost always results in cost savings to the Government as a whole.

In addition, a single range manager at Dare County would be in a better position to plan and coordinate range modernization requirements. As discussed in chapter 4, this has been a problem in the past at the Dare County ranges. Furthermore, during subsequent discussions with service representatives, we found that the cited Navy and Air Force manning review at Dare County was performed after our draft report was made available to the services. Additionally, the review resulted in no written summary or report. We, therefore, cannot verify the results of the study.

The map on page 20 also illustrates an example of one service operating several separate ranges in the same geographic area. The Navy operates and centrally schedules the use of four air-to-ground ranges, including Dare County, within a 70-nautical mile radius of the Norfolk, Virginia, area. The table on the following page summarizes information concerning these ranges.

Range	Personnel assigned to the range (FY 1978)	Range improvements planned	Percent of hours available in fiscal year 1978 that were (note a) scheduled	used
Dare County	9	yes	74	46
Tangier Island	2	yes	28	17
Stumpy Point	not manned	yes	13	13
Palmetto Point	b/0	yes	5	5

a/See page 27 for description of utilization calculations.

b/Manned by personnel from Dare County range when required.

We believe that the Navy's central scheduling of these ranges, as well as several additional air-to-air ranges in the area, has been effective and economical. But in view of the low use and planned improvement of the ranges, we believe that it is questionable that the Navy needs such a range capacity in this geographic area.

In commenting on this example, DOD said that the low utilization rates for Stumpy Point and Palmetto Point were attributed to their primary use as alternative targets for the Dare County range when that range could not be used. Also, DOD stated that the cost of operating these two ranges was insignificant since they were not instrumented and no additional manpower was required to operate them.

We agree that the low utilization rates for Palmetto Point and Stumpy Point are attributable primarily to the fact that these are alternate ranges for Dare County. However, we believe that the Navy should use Tangier Island as the primary alternate for the Dare County range since it has a low utilization rate and is already manned and instrumented. Also, use of Tangier Island as the primary alternate could eliminate the need for expensive improvements planned for the Palmetto Point and Stumpy Point ranges. (See p. 36.)

Factors discouraging interservice range use

Although interservice use of aviation training ranges offers many benefits and is required, when feasible, by

regulation, we believe several factors have discouraged such use.

First, under the services' current systems, range management is highly decentralized--usually down to the operating base level. For example, the Air Force's operating base level is generally responsible for managing daily range operations, including scheduling range time. Air Force headquarters exercises little management oversight of ranges, delegating this responsibility to its major commands. These commands, such as TAC, are responsible for overall range administration, including a review of utilization and needed range improvements.

The Navy's management structure is similarly decentralized. Range management is generally a function of the operating base level, and range scheduling is usually performed by area coordinators who schedule all Navy and Marine Corps ranges in specified geographic areas. In the past, the Navy's intermediate commands have exercised little oversight of the ranges. However, during our review we were told that a training range planning group was being formed in the Atlantic Fleet which would be responsible for monitoring range use and reviewing proposed range improvements. As in the Air Force, Navy headquarters provides little management oversight for aviation training ranges.

At the DOD level, there is no organization with the responsibility and authority for overseeing the management and operation of all aviation training ranges. However, a DOD organization, the Deputy Director for Test and Evaluation, does perform an oversight function for the services' major development, test, and evaluation ranges. The organization was formed in 1971, and it currently has about two equivalent full-time personnel.

In carrying out its oversight responsibility for these test and evaluation ranges, the organization (1) provides overall policy direction and planning guidance, (2) reviews the present and planned test and evaluation capabilities and capacities to ensure that requirements are met and to avoid unnecessary duplications and retention of obsolete assets, and (3) provides guidance for assignment of test programs. According to an organization official, the organization also monitors usage reports from test and evaluation ranges and encourages maximum interservice cooperation and usage.

Because management for aviation training ranges is highly decentralized, it appears that most range scheduling activities are concerned only with their own ranges and the training of their own aircrews. Also, with limited top management oversight and emphasis, the services have not been encouraged to identify opportunities for increased interservice sharing of ranges.

Another factor discouraging greater interservice use of ranges is a degree of service parochialism in range ownership which fosters a "me first" attitude in scheduling and use. In response to our questionnaire, 11 range scheduling activities indicated that they gave their own aircrews first priority when requesting range time, regardless of the needs of other service aircrews who might request range time. Also, at one range we visited, the owning unit blocked off prime range time for its aircrews far in advance. Consequently, if other services wanted to use the range, they had to use it at much less desirable times--very early in the morning or very late in the afternoon.

Finally, the lack of an adequate range management information system also hinders greater interservice sharing of range facilities. Usually squadron or wing commanders are responsible for deciding which ranges their aircrews will use for training. However, when making this decision, a commander often has little information on the capabilities or range operating procedures of other service ranges because there is no system to provide this data. Even if a commander is knowledgeable of other service range facilities, range utilization and availability information is not normally available.

In commenting on our report, DOD stated that unit commanders have ready access to the Flight Information Publication which includes the following information on all training ranges: the associated restricted area, controlling agency, operating hours, scheduling agency, and telephone numbers. We agree that this publication is available to commanders. However, it does not contain information on range capabilities, operating procedures, or availability as discussed above. Also, the publication is not a simple list of ranges, but is a detailed listing of all areas in which flight is restricted for any reason by the Federal Aviation Administration. While commanders could use the publication as a starting point for obtaining detailed range information, its use is cumbersome and time consuming. We

believe specific data on aviation training ranges, as discussed above, should be available to squadron and wing commanders.

LOW RANGE UTILIZATION

The services' policy is to achieve maximum utilization of their aviation training ranges. However, in the past, the services have not clearly defined maximum or acceptable use levels. More importantly, actual range utilization has not been closely monitored by service headquarters. For example, although TAC collects and reviews usage information for its ranges, such information is not routinely reviewed by Air Force headquarters. In the Navy and Marine Corps, range usage information is usually maintained by local range managers, but it is not reviewed or monitored by higher command levels. As a result, service headquarters does not routinely know the extent of the total range utilization or the extent of interservice sharing of ranges.

Since overall range utilization data was not readily available, we sent a questionnaire to all activities responsible for scheduling range usage. In the questionnaire, each range scheduling activity provided, for fiscal year 1978, the number of hours each range was (1) open and available for aircrew training, (2) scheduled for aircrew training, and (3) actually used for aircrew training. The summarized results of this information are shown in the following table and more detailed utilization statistics are included in appendixes III and IV.

Utilization Of Aviation Training Ranges
In Fiscal Year 1978 (note a)

	Percentage of available range hours	
	Scheduled	Used
Air Force:		
Overland ranges	44	33
Overwater ranges	64	62
Navy and Marine Corps:		
Overland ranges	29	22
Overwater ranges	36	34
Total ranges:		
Overland ranges	33	25
Overwater ranges	37	35

a/Of the 173 total ranges, usage data was not available for 2 overland and 8 overwater ranges.

In order to compute the utilization percentages in the table, we divided the number of hours ranges were scheduled and used for aircrew training by the number of hours ranges were available for aircrew training. On an average, overland ranges were available for training about 73 hours per week in fiscal year 1978 and overwater ranges were available about 94 hours per week. The difference between range hours scheduled and used was attributed to hours scheduled but not used because of bad weather, unplanned range maintenance, aircrews not showing up for training, or other miscellaneous reasons.

Although the table shows that overland and overwater range use in fiscal year 1978 was 25 and 35 percent, respectively, a few overland ranges were used extensively, as the table below shows.

	Percent of available hours used					
	0-10	11-25	26-50	51-75	76-100	Total
Overland ranges:						
Air Force	3	15	24	12	2	56
Navy and Marine Corps (note a)	17	13	17	1	4	52
Total	20	28	41	13	6	108

a/Usage data on two overland ranges were not available.

As stated previously, the services have not defined optimum or desired use rates for their ranges. However, in a May 1979 response to questions from the House Committee on Appropriations, the Air Force stated that a range's capacity was practically saturated when aircrews used 65 percent of the range's operating hours for training. If this criterion is accepted, range use in fiscal year 1978 was apparently well below maximum levels.

In response to the Committee's questions, the Navy stated that no optimum utilization rate can be applied to its ranges because the type and quality of training required dictate the need for a range, not the duration of the range's use. We appreciate what the Navy is saying--that aircrew training requirements and the geographic locations of air bases should justify the need for a range and that range utilization as such is less significant. For example, a training range may be close to a geographically isolated air base and it may have low use, but it is still needed to meet aircrew training requirements and to minimize flying hours. However, some geographic areas of the Nation have several air bases and several aviation training ranges. When each of these ranges exhibits fairly low use rates or when the closest range to each base is not always used by that base's aircrews, coordination and utilization rates are important and should be closely monitored by service headquarters.

Using questionnaire data, we also examined range utilization from another perspective. During a period of actual range use, usually more than one aircraft can safely use the range simultaneously. For instance, normally, during a designated range period on the air-to-ground range, from one to four aircraft can conduct weapons delivery practice. In some cases, as many as 16 aircraft can operate on a range at one time. Thus, we compared the total number of aircraft which could safely use each range during a single range period with the number of aircraft that normally did use the range during each period in fiscal year 1978. On the average, we found that only 59 percent of range capacity was used during an average range period. The low number of denials given to aircrew squadrons requesting range time for training is another indication that ranges are being used below their capacities. Of the 55 service activities responsible for scheduling range usage, only 18 denied or even delayed a squadron's request for range time during fiscal year 1978. (See p. 48 for further details.) We believe that if ranges were being used at or near capacity, this number would have been significantly higher.

In commenting on our report, DOD said that the utilization information supplied to us by five range scheduling offices was incorrect because of the nature of the questionnaire, the accompanying instructions, and differing interpretations by the range offices. While we do not necessarily agree that the information is incorrect, in the interest of conservatism we recomputed the utilization rates based on the revised information provided by DOD. The overall effect of the recomputation is to increase the total utilization rate for Air Force overland ranges by 3 percent, for Navy overland ranges by 1 percent, and for all overland ranges, combined, by 1 percent. The recomputed statistics are reflected throughout the report.

Also, according to DOD, the report treats all ranges equally whether they are overwater air space ranges with no instrumentation and no personnel assigned or complex overland instrumented and manned ranges. DOD said that our treatment would degrade the use of the more critical and expensive overland ranges. We have, therefore, divided the ranges into the broad categories of overwater and overland ranges, with separate utilization rates for each category. We believe that any further subdivision would be highly subjective and of little value, since no two ranges are identical in their physical characteristics and degree of sophistication. Additionally, contrary to DOD's opinion, the overwater ranges which for the most part were not instrumented or manned showed a higher utilization rate than the overland ranges.

DOD also commented that the report included 45 Navy ranges which were available 24 hours a day, 365 days a year, and stated that while such availability was theoretically possible, these ranges could not be scheduled, manned, or used to this extent. However, the usage statistics DOD was concerned with included only 31 of the 45 ranges. Eight of the ranges that DOD cited had been deleted from our review since they were primarily used for artillery firing and other ground training. For six others, availability and usage data had not been included in our overall utilization statistics since the Navy could not provide any usage information for these ranges. Of the 31 remaining ranges, 9 are overland and 22 are overwater. Even though these ranges are available for training 24 hours a day, several achieved high utilization rates in fiscal year 1978 and one was reported as being scheduled and used 100 percent of the time. Because of this, we believe that it is reasonable to include these 31 ranges at their reported availability in the overall utilization statistics.

CONCLUSIONS

In our opinion, the above examples indicate that aviation training ranges have not been managed effectively and efficiently. One problem has been a lack of management guidance requiring service headquarters to (1) assess range requirements and assets and (2) review range usage rates. Another problem has been limited DOD and service emphasis on complying with DOD instructions to maximize service cooperation and to share facilities where economically beneficial. As a result, we believe that the services' total range requirements and assets are unbalanced and greater interservice use of ranges can be achieved.

Through better management guidance and increased management attention and oversight, we believe the services can improve the future operation and use of aviation training ranges.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

The Secretary of Defense should direct the services to emphasize compliance with instructions requiring interservice cooperation in the development and use of aviation training ranges. In this context, the Secretary should direct the services to continually assess range requirements and existing assets with a view toward achieving maximum interservice use and range operating efficiency.

CHAPTER 4

IMPROVING RANGE MODERNIZATION PROGRAMS

The primary purpose of the services' training range improvement programs is to enhance the quality of aircrew training by developing ranges that closely duplicate combat environments, including realistic targets and simulated enemy EW threats. In addition, some range improvements provide for increased range safety and for feedback systems on aircrew performance, such as weapons delivery scoring equipment.

The Air Force and the Navy, including the Marine Corps, annually request considerable funds to improve and modernize their aviation training ranges. In fiscal year 1979 over $50 million was funded, and the services will request an estimated $60 million in fiscal year 1980. The total estimated cost of planned improvements over the next 5 fiscal years exceeds $350 million. (See table on p. 4.)

RANGE MODERNIZATION PROCESS

In the Air Force, TAC has been delegated the primary responsibility for developing aviation training range improvement plans. One TAC representative said that the entire requirement determination process was "not too scientific and very subjective." TAC generally begins the process by compiling and placing priorities on modernization proposals, spanning a 5-year period, which have been suggested by range users, operators, and personnel on the TAC staff. Factors affecting the decision as to which ranges will be improved include (1) available land area at the range, (2) quantity of aircraft that train at the range, (3) amount of aircraft the range can handle over a period of time, and (4) assessment of benefits to be received from an incremental change in additional equipment.

With its modernization plan prepared, TAC then hosts an annual range requirements conference which is attended by representatives of Air Force headquarters, the Pacific Air Forces, U.S. Air Forces in Europe, Alaskan Air Commmand, and the Air Force Development Command. The conference results in a listing of range modernization proposals, by priority, for all tactical air forces for the next 5 years. TAC then prepares written justifications for these proposals and forwards the package to Air Force headquarters for review and approval.

Summarizing the process at the headquarters level, various panels and boards review the package until a budgeting dollar level is recommended to the Air Force Council. The Council considers the recommended budgeted dollar level and accepts it or suggests changes. The Council submits its recommendation through the Chief of Staff to the Secretary of the Air Force for final approval of the proposed budget.

The Naval Air Systems Command's Target and Range Systems Division is responsible for the Navy's range modernization program. Each year the Division sponsors a meeting to obtain the fleet commanders' input on range improvements. Meeting attendees include representatives from Commanders in Chief of the Atlantic, Pacific, and Naval Forces Europe. The fleet commanders rely heavily on range operators and users to identify improvement needs.

The meeting results in a proposed 5-year plan for Navy range modernization. According to Division representatives, range improvement justifications are the responsibility of the requesting organization, and whether or not a proposed item is part of the plan depends on the consensus of meeting attendees. The division further refines the plan and presents it in an executive session to the fleet commanders and the Chief of Naval Operations. This session results in an approved 5-year range improvement plan, which becomes the basis for the budget submission to DOD.

At the DOD level, there is no organization responsible for reviewing aviation training range improvement proposals on a line-item basis. However, DOD reviews the services' budget proposals and subsequently issues guidance which forms the basis for the budget submissions to the Congress. The actual range modernization funding requests to the Congress involve multiple appropriations including: Other Procurement; Research, Development, Test, and Evaluation; Aircraft Procurement; Military Construction; Operations and Maintenance; and Military Personnel.

NEED FOR BETTER JUSTIFICATION AND COORDINATION

The services' current systems for identifying, justifying, and reviewing range modernization projects have several shortcomings. These shortcomings are the result of the services not issuing guidance on what these stages should include and on what factors should be considered

when preparing justifications for proposed improvements. For example, both the Air Force and the Navy rely heavily on range operators and aircrew squadrons to identify possible range improvements.

As a result, most justifications we reviewed were very brief, did not always show how the planned improvements would affect the quality of aircrew training, and usually did not include cost-benefit analyses. For example, the following was a supporting justification for a $5 million range improvement included in the Air Force's fiscal year 1983 planned program. However, this item was later deleted during a program update.

"RANGE INFORMATION AND CONTROL SYSTEM

"DESCRIPTION: The Range Information and Control System (RICS) will consist of a centralized range instrumentation and data gathering, processing, and display capability for Type II ranges. It will be the information center of range data.

"OPERATIONAL CONCEPT/LOCATION: The RICS will provide centralized, real-time information for scheduling, monitoring and control of range activity and the objective evaluation of tactical missions. The FY 83 RICS program will provide a RICS at Luke, MacDill, and Homestead.

"IMPACT IF NOT APPROVED: There will be no integrated control center for all Type II range activity. Hence, there will continue to be a lack of real-time evaluations of EW (electronic warfare) threat activity and tactical operations. The RICS would also be expected to improve range safety."

Another shortcoming is the limited consideration given to interservice use of proposed range improvements. As discussed previously, regulations require the services to maximize the sharing of support facilities whenever feasible and economical. For the most part, however, the Air Force and the Navy, including the Marine Corps, have independently developed their range modernization programs with little regard for potential interservice range usage. As discussed in chapter 3, the primary cause for this appears to be the services' decentralized management of aviation training

ranges and limited top management emphasis on ensuring maximum interservice coordination in range development and use.

Although the services have not been coordinating their determinations on total requirements for range improvements, they have occasionally cooperated in developing and procuring certain range improvement systems. To exemplify, the Air Force and the Navy recognized their similar need for a new, highly sophisticated system that could monitor and evaluate aircrew proficiency in air-to-air combat manuvers and simulated missile firings. In 1974 the two services established a joint project office responsible for developing and procuring such a system--now known as the ACMI system. Despite this high degree of coordination and cooperation, the two services for the most part, independently determined the total number of ACMI systems each would like to have instead of jointly assessing total requirements with a view toward interservice ACMI usage. One notable exception to this is the ACMI system off the coast of North Carolina. As discussed in chapter 3, the Air Force's and the Navy's sharing in the cost and use of this system has created a successful and beneficial arrangement.

Improving coordination

Because of the shortcomings in the service range modernization process, we believe that perhaps some unnecessary duplication may have occurred in the past and planned range modernization programs, and the need for some planned range improvements can be questioned. To illustrate, at the time of our review in 1978, both the Air Force and the Navy were planning to install EW threat simulators on their respective ranges in Dare County. (See p. 19.) The Air Force planned to spend about $4.4 million, and the Navy planned to spend about $2.7 million. We were told that the Air Force's system would have greater capabilities than the Navy's, and that it could meet both Air Force and Navy aircrew training needs. In discussing this possible duplication with service representatives, we found that neither service was aware of the other's plans.

In responding to a House Committee on Appropriations question about this situation, the Air Force stated in May 1979, that the system it had planned for Dare County would not be installed because of poor tests results of a prototype system. However, the Air Force also stated that the

requirement for such equipment was still in existence and it would coordinate its efforts with the Navy to determine the best solution to fulfill both services' training requirements.

As another example, an ACMI system was approved for Luke Air Force Base, Arizona, in fiscal year 1979. The system is expected to cost about $10.7 million and will be located about 60 nautical miles south of Luke. About 96 nautical miles from Luke is another ACMI system which the Navy has owned and operated since 1973. In its justification, the Air Force stated that it had considered the possibility of sharing the Navy's system and concluded that the Navy was already fully using it and that Luke ACMI requirements alone exceeded the capacity of one system. However, at the time of our review in 1978, the Air Force had not clearly defined aircrew training requirements for an ACMI system and in fiscal year 1978 the Navy's system was actually used only 50 percent of the available training time.

Since the new ACMI system is physically closer to Luke than the Navy's, flying time and cost to and from the range will be minimized for Luke aircrews. Thus, we cannot conclude that the Air Force does not need the new ACMI or that it is not cost effective. But we believe that this situation again shows the importance of viewing range modernization from a DOD-wide perspective. In other words, if originally planned and located for the benefit of both services, would one ACMI system have been adequate to meet both services' requirements in that geographic area? Our primary concern is not in the past but in the future. We believe that greater emphasis on servicewide cooperation in future range modernization programs will help ensure developing effective training ranges at the least possible cost.

Improving justifications

Our review of the justifications for future range modernization programs showed that some items were weakly supported and appeared to be of questionable need. Service representatives said that the improvements we questioned were only planned and that plans could be changed. We believe, however, that such weakly supported items indicate that the services need to change the way they justify and coordinate their range improvement programs.

Examples of the questioned items are summarized in the following sections.

Automatic bomb scoring system

In fiscal year 1976, funds were approved for the Navy to install a new automatic video weapons delivery scoring system on 33 Navy and Marine Corps ranges by fiscal year 1983. According to the Navy, the system will add bomb scoring capability on some ranges and improve the accuracy on other ranges which now use manual scoring systems.

Although each installation would cost about $175,000, the justification for the system did not include a detailed cost-benefit analysis; it stated only that the system would reduce the need for range scoring personnel. However, agency officials said that the overall personnel impact on some ranges had not been determined. For example, at some scheduled locations, the system would reduce the number of personnel used to score bomb drops, but would increase the number of maintenance and security personnel.

Two activities which are scheduled to receive this new system have expressed concern about the need for it. The commanding officer of one activity was strongly opposed to installing the new system, stating that the current bomb scoring method satisfactorily met the Navy's requirements at a lower cost.

Apparently, the Navy did not consider range usage in deciding which ranges would receive the system. For instance, the fiscal year 1978 use rate was only 5 percent at one range selected (Palmetto Point) and only 13 and 17 percent, respectively, at two other ranges selected (Stumpy Point and Tangier Island).

ACMI system

The Navy plans to install a $7 million ACMI system at its Pinecastle range in Florida in fiscal year 1981. Although the system is primarily designed to aid air-to-air combat training, it will not be used for that purpose because air space at Pinecastle is too limited. Instead, the system will be modified to simulate EW threats and to allow scoring of simulated bomb drops. However, the Pinecastle range already has a considerable investment in EW threat simulators and has several targets where bombing can be scored.

The development of an EW training capability for the ACMI system has been an area of disagreement between the Air Force and the Navy. The Navy believes that such development is feasible and will be more economical than EW threat simulator equipment. The Air Force questions the feasibility of using the ACMI for EW training, particularly at low altitudes, and prefers continued development and use of EW threat simulator equipment. We believe the services should review and compare the relative benefits and costs of EW training on an ACMI system to using EW threat simulator equipment to determine which method will be the most effective and economical means of providing EW training in the future.

Debriefing system

The Air Force planned a $963,000 ACMI debriefing subsystem for Davis-Monthan Air Force Base, Arizona, for fiscal year 1983. The subsystem would be used to debrief aircrews which had flown missions on ACMI ranges at Luke and Nellis Air Force Bases. However, most of the aircrews at Davis-Monthan have primarily air-to-ground combat roles and require little training on ACMI ranges. When questioned about this improvement, Air Force officials said they planned to delete the item during the next update of their 5-year modernization program.

PAST CONCERNS WITH MODERNIZATION PROGRAMS

This report does not represent the first time that the services' modernization programs for aviation training ranges have been questioned. For example, in fiscal year 1978, the Congress deleted $16.5 million from the EW portion of the Air Force's range modernization request because of poor justification, unnecessary changes in prior-year programs, and poor management at the Air Force headquarters. Also, the House Committee on Appropriations deleted the entire $42 million from the Air Force's modernization program for fiscal year 1979 because of poor justification, although the funds were later restored by the Congress.

The Air Force improvement program was also the subject of our March 1, 1978, report, 1/ which questioned the format

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1/"Air Force Requirements for Electronic Warfare Operational Test and Training Equipment" (PSAD-78-83, Mar. 1, 1978).

of the budget submission. We recommended that:

> "The Secretary of the Air Force in presenting future fund requests for operational range improvements--which include electronic warfare threat simulators and related equipment--give congressional decisionmakers a comprehensive picture of what the monies are for, why they are needed, and how they are to be spent."

Finally, some service organizations have expressed concern over the management of range modernization programs. One Navy command, for instance, requested funds for a project to improve the Navy's range modernization programs. The following are excerpts from that request.

> "In the past, no comprehensive plan has been developed to cover the I&M (improvement and modernization) requirements of all Fleet Training Ranges. Systems have been produced by individual ranges without adequate attention to their long-term maintenance, repair, and other support requirements. By beginning with a concerted attempt to determine precisely what training requirements are to be met, it will be possible to decide what new equipments and improvements will be needed to enable the ranges to satisfy these requirements * * * If proper planning and engineering support for Fleet Training Ranges is not established, it can be expected that the ranges will continue to be updated in an unsystematic manner. As a result, the ranges will continue to procure systems for which adequate support planning has not been provided, and Fleet readiness will suffer due to inadequate training facilities."

CONCLUSIONS

The military services could improve their range modernization programs by developing detailed criteria for identifying and justifying improvements.

To ensure that only well-supported, valid range improvements are approved, the services should include in their justification actual aircrew training requirements, cost-benefit analyses, and evaluations on past and planned range usage rates. In addition, to comply with interservice regulations, the services, in their justifications and subsequent management reviews, should require that adequate

consideration has been given to potential joint service development and use. Through this process, management would be in a better position to derive the maximum training benefits from all range modernization expenditures.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

The Secretary of Defense should:

--Require that the services develop detailed guidance for identifying and justifying aviation training range improvements.

--Include a thorough consideration of interservice sharing possibilities in the justification for and subsequent review of proposed modernization projects.

--Direct the services to work jointly to determine whether EW simulator equipment on the ACMI system should be the principal means of providing EW training in the future, as well as how many systems are really needed in a given geographic area.

APPENDIX I

PERSONNEL ASSIGNED TO AVIATION TRAINING

RANGES FOR FISCAL YEAR 1978

	Military	Civilian	Total
Air Force	1,458	667	2,125
Navy and Marine Corps	507	120	627
Total	1,965	787	2,752

APPENDIX II

ESTIMATED OPERATION AND MAINTENANCE FUNDING FOR AVIATION TRAINING RANGES (note a)

	Fiscal year	
	1977	1978
	(millions)	
Air Force	$21.2	$27.7
Navy and Marine Corps	10.4	11.7
Total	$31.6	$39.4

a/Does not include military personnel costs.

AVIATION TRAINING RANGES UTILIZATION FOR FISCAL YEAR 1978 (note a)

	Number of saparately scheduled ranges	Total range hours (note c)			Percent of available range hours that were:	
		Available	Scheduled	used	Scheduled	Used
Air Force (note b):						
Overland	56	142,000	62,000	47,000	44	33
Overwater	2	8,000	5,000	5,000	64	62
Navy and Marine Corps:						
Overland	54	274,000	80,000	59,000	29	22
Overwater	61	298,000	108,000	102,000	36	34

a/Excludes DOD's major test and evaluation ranges except for the Tactical Fighter Air Force Reserve and Air National Guard.

b/Includes Tactical Air Command, U.S. Air Forces in Europe, Pacific Air Forces, Alaskan Air Command, Air Force Reserve, and Air National Guard.

c/Figures rounded to the nearest thousand. Also, utilization data were not available for two Navy overland and nine overwater ranges.

APPENDIX III

APPENDIX IV

U.S. GENERAL ACCOUNTING OFFICE
Survey of DOD Air Training Ranges

Introduction

The purpose of this questionnaire is to obtain information on the extent and nature of utilization of air training ranges. It should be completed by personnel familiar with the scheduling and utilization of each range or target complex.

We believe that in most cases the information requested should be readily available. If, however, any of the requested information cannot be provided precisely, please provide the best estimates available and indicate that they are estimates.

Many organizations receiving this questionnaire have only one range or target group. Others, however, have more than one. In part II of the questionnaire we ask for scheduling and utilization information for each range or target group by name. In all other parts of the questionnaire the information requested is for the entire complex of ranges and/or target groups at the installation or facility.

Part I: General Range Information

1. Which of the following capabilities are present in the range(s) at your installation or facility. (Please check as many as apply)

	(Number of responses)			(Number of responses)	
1.	45	Conventional bombing	8.	17	Electronic warfare
2.	23	Nuclear bombing	9.	37	Tactical target
3.	44	Strafing	10.	36	Bomb scoring
4.	45	Air to ground rockets	11.	31	Strafe scoring
5.	30	Air to air combat manuevering	12.	23	Tactical target scoring
6.	15	Missile firing	13.	28	Live ordnance authorized
7.	4	ACMR/I	14.	25	Other, please specify

_____

_____

(55 aviation training range scheduling activities responded.)

APPENDIX IV

*2. Please enter below the total number of full-time, or full-time equivalent, military and civilian personnel authorized and assigned to operation and maintenance of ranges at your facility as of the beginning of fiscal years 1978 and 1979.

	FY 1978			FY 1979	
	AUTHORIZED (Total)	ASSIGNED (Total)		AUTHORIZED (Total)	ASSIGNED (Total)
Military	2/0/4/1/	1/9/6/5/	Military	2/1/9/6/	2/1/0/2/
Civilian	/7/7/4/	/7/8/7/	Civilian	/7/4/8/	/7/5/9/

*3. Please enter below the budgeted amounts for operation and maintenance of all ranges at your installation for fiscal years 1977, 1978, 1979. (Totals)

FY 1977

/3/1/6/0/0/8/7/2/

FY 1978

/3/9/3/6/2/8/8/4/

FY 1979.

/3/3/0/7/0/9/5/7/ (note a)

4. When two or more requestors seek use of a range or target at the same time, which of the following best describes the way in which the decision is made as to which requestor will receive the range time?

(Total responses) (note b)

1. 16 first come first served
2. 0 requestor based nearest to this facility receives preference
3. 0 requestor based at greatest distance from this facility receives preference
4. 33 requestor having highest priority operational mission receives preference
5. 5 most frequent user of range receives preference
6. 0 least frequent user of range receives preference
7. 6 first request from our service component, (Air Force, Navy, etc) first served
8. 6 not applicable-competing requests rarely, if ever, received
9. 13 Other (please describe) _____

*If this information is not available in your organization, please obtain it from the range resource manager.

a/Some activities did not provide fiscal year 1978 operation and maintenance costs.

b/Some activities indicated more than one answer.

APPENDIX IV

Part II:Range Utilization During FY 1978

5. Please provide the FY 1978 utilization information requested below for each range or target.

A. Range/ Target name	B. Number of aircraft that can safely use Range at any time	C. Number of aircraft that normally use Range at any one time	D. Number of days when range was available for use in FY 78	E. Number of hours normally available per operating day	F. Number of hours range was scheduled for Training in FY 78	G. Number of hours scheduled but not used in FY 78' because of: 1. weather	2. range maintenance	3. user no-show	4. other
(Total)	(Average)	(Average)	(Not averaged)	(Total hours available)	(Total)		(Total)		
Air Force									
58 separately scheduled ranges	4.35	3.40		150,239	65,519	6,288	1,662	5,954	1,268
Navy and Marine Corps (note a)									
115 separately scheduled ranges	6.05	3.16		572,388	187,442	5,018	615	8,282	12,465 (note b)

a/Usage data was not available for 11 Navy ranges.

b/Includes 9,846 hours reported as scheduled but not used with no reasons given.

APPENDIX IV

Part III:Range Users for FY 78

6. Please provide the following information for EACH MAJOR USER (more than 25 range periods per year) for all ranges within your range complex.

A. User ID (unit/ squadron number)	B. Home/ operating base of user	C. Total number of sorties user flew over range	D. Total number of range hours used (per user)	E. Distance (nautical miles) between user operating base and range.	F. When using range, did unit normally: (a) fly single sortie: home base to range to home base	(b) fly to base near range for 1 or more days of training	(c) travel to and use aircraft assigned to range
(Most activities listed several range users. Thus, we have not summarized responses to this section.)							

APPENDIX IV

Part IV: Range Scheduling

7. During FY-78, How many times were requests for range time:

A. (1) Delayed 1 day or more (2) Denied (unit unable to use range for intended training mission)

(If none, please indicate by "0")
(Totals)

No. of request delayed 326

No. of request denied 1,038

For each delay or denial of a request for range time, please give the unit/squadron and reason for the delay/denial.

B. Delayed Requests

unit/ squadron delayed	Reason for delay

C. Denied Requests

unit/ squadron denied	Reason for denial

(Various reasons were provided for delayed and denied requests. The most frequent reason was that the range was already scheduled to be used by another air unit.)

APPENDIX IV

8. To your knowledge are any range improvements planned over the next 5 years (FY 80-84)?

1. ___ yes

2. ___ no

3. ___ don't know

If yes, please (1) give the year in which the improvement is scheduled to occur, (2) show its estimated cost, and (3) describe each improvement.

(1) Year	(2) Cost	(3) Description of improvement

(Because of the varied responses to this section, we have not summarized the data here.)

APPENDIX IV

9. Are there any limitations which restrict usage of your range(s)?

   1. ___ yes

   2. ___ no

   If yes, please list the limitations.

(Because of the varied responses to this section, we have not summarized the data here.)

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APPENDIX IV

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