United States Department of Defense

Report to the Congress

Implementation of the Department of Defense Training Range Comprehensive Plan

Ensuring Training Ranges Support Training Requirements

Submitted by
The Office of the Secretary of Defense
Under Secretary of Defense
(Personnel and Readiness)

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Purpose

The Department of Defense (DoD) is submitting this report to explain its plans for addressing training constraints caused by encroachment – limitations on the use of military lands, marine areas, and airspace for military training. The report documents requirements for training ranges, the adequacy of DoD resources to meet requirements, and plans for addressing gaps between the two. This report also presents an inventory of DoD operational range complexes.

DoD is providing this report in response to Section 366 of the National Defense Authorization Act for Fiscal Year (FY) 2003 (Public Law 107-314), which requires the Department to report on these and related topics (see Appendix A). This report also serves as the interim report required by paragraph (e)(1) of Section 320 of the National Defense Authorization Act for Fiscal Year 2004 (Public Law 108-136, see Appendix B). Because of similarity in their scope and content, DoD plans to submit a series of single reports that respond to the requirements of both Sections in the years when the reports are due. This first report will provide a foundation for future reports for Sections 366 and 320.

Background

Encroachment pressures – such as private development adjacent to ranges, restrictions imposed by environmental regulation, or growing competition for airspace and frequency spectrum – are increasingly impeding DoD's ability to conduct unit training in realistic environments. These pressures limit low-altitude flight training, over-the-beach operations, night and all-weather training, live-fire training, maneuver training, the application of new weapon technologies, and other military activities.

Sections 366 and 320 reflect long-standing Congressional interest in training, range complexes, encroachment, and readiness. Most recently, Congressional attention has focused on DoD's Readiness and Range Preservation Initiative (RRPI). RRPI began with eight provisions that constitute a combination of narrowly focused measures to enhance the readiness of our forces, while maintaining our commitment to environmental stewardship. Five of the eight RRPI provisions have been enacted into law.

Sections 366 and 320's requirements coincide with the Department's efforts to transform training to meet current and anticipated operational requirements. This report reflects the DoD's joint emphasis for training transformation. Section 366 and 320's requirements also coincide with the Department's Sustainable Ranges Initiative. This initiative includes policy, organization, leadership, programming, outreach, legislative clarification, and a suite of internal changes to foster range sustainment.

The Department is taking a proactive role in developing programs to protect facilities from urbanization, and working with states and nongovernmental organizations to promote compatible land usage. The sustainable ranges outreach effort provides stakeholders with an improved understanding of readiness needs, address concerns of state and local governments and surrounding communities, work with nongovernmental organizations on areas of common interest, and to partner with groups outside the Department to reach common goals. Where possible, the Department is working with other Federal agencies and state agencies to develop administrative and regulatory solutions to encroachment pressures.

Each of the Military Services has an active sustainable ranges program. These are described in detail throughout this report.

Overview

Ensuring the readiness of the Armed Forces is one of the Department's most important tasks. No factor makes a more important contribution to readiness than realistic training conducted at dedicated range complexes, ocean operating areas, and in special use airspace (SUA). Our operational training range complexes provide realism, variety, flexibility, specialized training equipment and instrumentation, and safety for the military and the public. They maximize our ability to train as we fight.

In this report, the term "range complex" is defined in slightly different terms for each Armed Service. Army and Marine Corps range complexes are typically defined as installations with more than one type of range. In essence, most Army and Marine Corps range complexes represent the range portions of the larger Army and Marine Corps installations. Navy range complexes are regional groupings of various land, air, and sea ranges. Air Force range complexes are defined as the airspace and land area, with a focus in this year's report on air-to-ground training. In all cases, the phrase "range complex" refers to operational range complexes.

Context

Today, the Department faces a paradox when it comes to the air, land, water, and electromagnetic spectrum required to support realistic training. On one hand, our platforms, weapons, and systems are growing ever more capable, which, when combined with the attendant advancements in doctrine and tactics, create requirements for *more* training space. On the other hand, encroachment reduces the size of the area that is available for military training – sometimes markedly so.

Simulations and simulators currently play important roles in DoD training, but they cannot replace essential live training, especially combined arms and joint training. They will not significantly resolve encroachment problems, at least in the near-term future.

DoD is committed to be a responsible steward of the natural and cultural resources entrusted to its care. Yet encroachment on our test and training ranges has become a significant impediment, and the effects will only worsen unless appropriate action is taken.

Current and Future Training Requirements

Training Requirements

The Military Services develop their training requirements using broadly similar, though not identical, frameworks. The framework begins with an assessment of the National Security Strategy of the United States, the global security environment, weapons and related systems that are available today and that are expected to be available in the near future, and the lessons learned from previous military experience, training evolutions, and experimentation. Out of this assessment, the Services determine how they will operate in combat in the near term future. From their planned operations, the Services identify mission essential tasks. Joint mission essential tasks augment Service-unique tasks. The Services then develop training plans and capabilities to ensure that their forces are proficient in executing the mission essential tasks.

Operational Training that Requires Ranges and Operating Areas

Many DoD training activities require access to ranges, SUA, and ocean operating areas. As a general principle, the larger the unit involved in the training activity, the larger the required training area. The development of the Joint National Training Capability (JNTC) reinforces the Department's requirements for range complexes, SUA, and ocean operating areas. Developing and maintaining a well-trained, integrated joint force requires exercising and coordinating these forces in live training at our range complexes and operating areas, augmented with virtual and constructive simulations.

Command Relationships for Ranges and Range Complexes

The Military Services require ranges and range complexes to train military personnel in realistic settings for the spectrum of military operations. The Military Services, therefore, have historically managed range complexes and related issues. This approach is consistent with Title 10 of the United States Code, under which the Military Services are primarily responsible for construction, repair, and maintenance of installations, subject to the authority, direction, and control of the Secretary of Defense. The Department has taken steps to ensure sound management, implementation and coordination of sustainable range responsibilities at the level of the Office of the Secretary of Defense (OSD) and within the Armed Services. The Senior Readiness Oversight Council (SROC) reviews range sustainment policies and issues. An Integrated Product Team (IPT) reports to the SROC and acts as the DoD coordinating body for developing strategy to preserve the military's ability to train. A Working IPT meets regularly and reports to the IPT. DoD Directive 3200.15 provides guidance and assigns responsibilities related to sustaining ranges and operating areas.

Current Range Requirements Derived from Training Requirements

Each of the Military Services has a structured process for identifying range requirements that arise from training requirements. The Army uses its Range and Training Land Program (RTLP) process to plan, estimate, and program for the live training facilities (ranges and maneuver/training area) needed to meet its live training requirements. Navy range requirements ensure training ranges provide sufficient land, airspace, sea space, and frequency spectrum to complete Interdeployment Readiness Cycle (IDRC) training before Navy forces deploy from their home bases. The Marine Corps requires access to ranges, training areas and airspace that is sufficient to support training to standards across the training continuum. The Air Force groups its range complexes into three categories: Primary Training Ranges, Combat Training Centers and Combat Readiness Training Centers, and the Major Range and Test Facility Base. These categories reflect the different types of ranges that are required to meet Air Force training requirements.

Future Projections

The Military Services are anticipating their future training requirements. The Army is planning, programming, and implementing necessary range modernization to accommodate the transformation of six current force units to STRYKER Brigade Combat Teams (SBCTs). The vision of Army training in 2010 is a networked organization engineered to meet institutional, unit, and modernization training needs for the Army. The Army has begun to develop training requirements for the Future Force (FF) for 2015 and beyond. Navy training ranges will continue to play a critical role in supporting IDRC training for operational forces. Strategic planning for Navy range complexes will include future training operations derived from new Naval platforms and weapons, as well as improvements to infrastructure to support the JNTC. The Marine Corps training and education continuum will evolve to meet diverse and changing operational needs due to future tactics, techniques, and procedures, and training requirements are evolving

to leverage new capabilities. The Air Force develops mission action plans to identify future training requirements in response to changes in air power doctrine and the introduction of new weapons.

Service Range Inventory

DoD Operational Range Inventory

Appendix E provides maps and an inventory of DoD range complexes, individual ranges not in complexes, and special use airspace. The inventory draws from the databases and inventories that the Military Services use for the management of range complexes, installations, airspace, and operating areas. We plan to build on the Military Services' existing range inventories and management information systems to fully support the joint training and warfighting reflected in our Training Transformation efforts, while continuing to meet Service-specific requirements.

Range Capacities and Capabilities

The Department is collecting data and conducting analyses on the capacities and capabilities of all DoD installations, including training ranges, for the 2005 round of military base realignments and closures (BRAC 2005). This report addresses range capacity using a variety of data sources and methods currently available. As DoD proceeds in the BRAC 2005 process through May 2005, it may develop new data sources and methods to measure, analyze, and report range capacity. Accordingly, BRAC 2005 analyses of range capacity may reflect information, metrics, analytical methods, and conclusions that could vary from those presented in this report.

The Department's range complexes, SUA, and ocean operating areas provide a wide variety of capabilities to support military training requirements. The capabilities offered by our range complexes allow all of our military forces to train for all of their assigned operational missions. For example, ground forces can train in operational maneuver; air forces can train for air-to-air, air-to-ground, and other missions; and naval forces can train for strike and anti-surface, anti-submarine, anti-air, and amphibious warfare. Special forces can train to practice their missions. All forces can receive essential live fire training in safe conditions and train for command, control, communications, and intelligence tasks. Forces can train jointly to prepare for joint operations. Capacities and capabilities are addressed in detail in the main body of this report.

Encroachment

DoD is focusing its efforts on encroachment in 11 issue areas: endangered species and critical habitat; cultural resources; unexploded ordnance and munitions; frequency spectrum; maritime sustainability; air- and land-space restrictions; air quality; clean water; wetlands; airborne noise; and urban growth. Reports from the General Accounting Office (GAO) and others have documented the significant limitations on training that each of these factors can pose. The Department is grateful for the support that it has received from the Congress, the states, Native American tribes, non-governmental organizations, and others to address these issues.

Training Constraints and Impact Factors

Recent experience at DoD range complexes indicates that encroachment degrades training in the following ways: creates avoidance areas; reduces usage days; prohibits certain training events; reduces range access; segments training and reduces realism; limits new technologies; restricts flight altitudes;

inhibits new tactics development; complicates night and all weather training; reduces live fire proficiency; increases personnel tempo; and increases costs and risks. Realistic military training will continue to require substantial amounts of airspace, land, water, and frequency spectrum, and encroachment issues will challenge DoD for many years to come.

Adequacy of Current and Future Service Range Resources

Assessing range adequacy is a complex undertaking. It requires the identification, collection, and analysis of a wide variety of data on factors such as training requirements, capacity, capabilities, encroachment, location, and access. The assessment must consider and balance these and other factors, such as the need to allocate training resources between Service-unique and joint training requirements.

Although the Department has many concerns about range adequacy, in general our range complexes in the United States allow military forces to accomplish most of their current training missions. In general, constraints at overseas range complexes pose more difficult encroachment and training challenges, a finding consistent with a recent GAO audit.

Today and in the future, many factors threaten the adequacy of our range complexes, including: encroachment factors and impacts; the growing need for military forces to train in combined arms and joint operations, especially in large multi-echelon exercises; the need to sustain, restore, and modernize range infrastructure; and new weapon systems and technologies.

The fact that our ranges are generally adequate today is a testament to the cooperation the Department has received from the Congress and many states, Native American tribes, local governments, and nongovernmental organizations. It is also a testament to the dedication of our military and civilian personnel, who have worked hard to ensure that military forces can accomplish their training missions in the face of substantial limitations resulting from encroachment and other obstacles.

In the future, the adequacy of our range complexes will erode without substantial efforts to address encroachment, adequate investments in our training range infrastructure, robust range sustainment programs, and the continued cooperation of others. The main body of this report contains more information about the adequacy of range resources for each of the Military Services.

Comprehensive Plans to Address Range Constraints

The Department is developing and implementing comprehensive plans to address training constraints. The Military Services are developing and implementing comprehensive plans that best meet their needs, while ensuring an appropriate amount of consistency across the Department.

DoD Directive 3200.15, "Sustainment of Ranges and Operating Areas," establishes requirements for comprehensive and integrated planning for the sustainment of range complexes and operating areas. The Directive requires the Under Secretary of Defense for Personnel and Readiness to provide guidance and oversight, and the Military Services and other DoD Components to prepare management plans for range complexes and ocean operating areas (OPAREAs). Conducting outreach to promote range sustainment and resolve encroachment issues is a key element of DoD policy and the range management plans.

The Military Services are carrying out the planning required by the Directive. Each Service is implementing a planning process that is best suited to its requirements and ranges. Although the specific approaches differ, the general characteristics of the Service planning processes are similar. The planning processes establish Service-level program priorities and require detailed, structured reviews of individual

installations, range complexes, and OPAREAs. The intensive reviews are carried out in a phased approach. The Services are defining investment priorities for sustainment, modernization, and other range related issues on the basis of the programmatic reviews and assessments of individual range complexes and OPAREAs.

Observations

The transformation of our military forces is driving many changes in the Department of Defense. As we implement these changes, however, some of our basic tenets remain constant. To provide ready military forces to meet our country's national security needs, our personnel must train as they would fight. This is especially true for combined arms and joint training. To train as we would fight requires reliable access to adequate land, air, sea space, and frequency spectrum resources. Today, encroachment effectively reduces the amount of these resources that the Department has to support essential military training.

And while predicting the future can be an uncertain business, all indicators point in the same direction: tomorrow's encroachment problems will be substantially worse than today's without effective management and broad cooperation. As our weapon systems grow in capability, they detect at greater distances, travel faster, cover wider areas, and process more information. These trends suggest training needs for more land area, airspace, sea space, and frequency spectrum. At the same time encroachment diminishes the availability of these resources.

The Department will continue to work with the Congress, other federal agencies, the states, Native American tribes, local governments, host nations abroad, and non-governmental organizations to address today's encroachment problems and prevent them from getting worse. The Department is grateful for the support that the Congress has provided thus far on the Readiness and Range Preservation Initiative, and we look forward to continuing to work with the Congress on the remaining RRPI items.

1. INTRODUCTION

1.1. Purpose

The Department of Defense (DoD) is submitting this report to explain its plans for addressing training constraints caused by encroachment – limitations on the use of military lands, marine areas, and airspace for military training. The report documents requirements for training ranges, the adequacy of DoD resources to meet requirements, and plans for addressing gaps between the two. This report also presents an inventory of DoD operational range complexes.

DoD is providing this report in response to Section 366 of the National Defense Authorization Act for Fiscal Year (FY) 2003 (Public Law 107-314), which requires the Department to report on these and related topics (see Appendix A). This report also serves as the interim report required by paragraph (e)(1) of Section 320 of the National Defense Authorization Act for Fiscal Year 2004 (Public Law 108-136, see Appendix B).

This report addresses Section 366's requirement for the submission of a report with the President's budget for FY 2005. Section 366 requires the Department to provide updated reports with the President's budget for FYs 2006 through 2008. Section 320 requires this interim report and subsequent annual reports in January 2006 through January 2010. Because of similarity in their scope and content, the Department plans to submit a series of single reports that respond to the requirements of both Sections in the years when the reports are due. This first report will provide a foundation for future reports for Sections 366 and 320.

1.2. Background

Specifically, Section 366 requires the Department to assess current and future training range requirements and the ability of current DoD resources to meet them. It calls for a report on implementation of training range inventories and the development of comprehensive plans to address operational constraints caused by limitations on the use of air, land, and sea resources, including proposals to enhance training range capabilities, goals and milestones for planned actions, and projected funding requirements. It also requires the designation of officials with lead implementation responsibilities.

Section 320 requires the Department to conduct a study of encroachment impacts on military installations and operational ranges, focusing on safety and operational buffer areas and compliance with three key environmental laws: the Clean Air Act, the Solid Waste Disposal Act, and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Section 320 also requires plans to respond to encroachment issues.

Encroachment pressures – such as private development adjacent to ranges, restrictions imposed by environmental regulation, or growing competition for airspace and frequency spectrum – are increasingly impeding DoD's ability to conduct unit training in realistic environments. These pressures limit low-altitude flight training, over-the-beach operations, night and all-weather training, live-fire training, maneuver training, the application of new weapon technologies, and other military activities.

Sections 366 and 320 reflect long-standing Congressional interest in training, range complexes, encroachment, and readiness. Most recently, Congressional attention has focused on the Department's Readiness and Range Preservation Initiative (RRPI). RRPI began with eight provisions that constitute a combination of narrowly focused measures to enhance the readiness of our forces, while maintaining our commitment to environmental stewardship. Five of the eight RRPI provisions have been enacted into

law. Recent reports by the General Accounting Office (GAO) also address encroachment and training ranges in the United States and overseas.[1]

1.2.1. Training Transformation

Sections 366 and 320's requirements coincide with the Department's efforts to transform training to meet current and anticipated operational requirements. Increasing joint training is a high priority for this transformation. Our military successes in Operations Iraqi Freedom, Enduring Freedom, Noble Eagle, Allied Force, and Desert Storm are due in part to our ability to operate effectively as an integrated joint force. To operate as a joint force, we must train as a joint force.

The Department's Strategic Plan for Transforming DoD Training, the associated Training Transformation Implementation Plan, and the establishment of the Joint National Training Capability (JNTC) all stress the need to enhance the "joint" focus of military training. The Department is expanding the definition of "jointness" to include interagency, intergovernmental, multinational, and coalition partners because of the important role that other U.S. agencies, foreign governments, multinational organizations, and coalition partners play in contemporary military operations. Our goal is to ensure that training prepares military forces for actual operations, where combatant commanders will deploy them in a joint context based on their capabilities. The recent GAO reports cited above also highlight the importance of joint service approaches to training range sustainment and management. This report reflects the Department's joint emphasis for training transformation.

1.2.2. Sustainable Ranges Initiative

Section 366 and 320 requirements also coincide with DoD's Sustainable Ranges Initiative. This initiative includes policy, organization, leadership, programming, outreach, legislative clarification, and a suite of internal changes to foster range sustainment. New policy directives promote a long-range, sustainable approach to range management. The Department is taking a proactive role in developing programs to protect facilities from urbanization, and working with states and nongovernmental organizations to promote compatible land usage. The sustainable ranges outreach effort provides stakeholders with an improved understanding of readiness needs, address concerns of state and local governments and surrounding communities, work with nongovernmental organizations on areas of common interest, and to partner with groups outside the Department to reach common goals. Where possible, the Department is working with other Federal agencies and state agencies to develop administrative and regulatory solutions to encroachment pressures.

Each of the Military Services has an active sustainable ranges program.[2] These are described in detail throughout this report.

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1 ***Military Training: DOD Lacks a Comprehensive Plan to Manage Encroachment on Training Ranges****. GAO 02-614, June 11, 2002; and* ***Military Training: Limitations Exist Overseas but Are Not Reflected in Readiness Reporting****. GAO 02-525, April 30, 2002.*

2 Other encroachment-related initiatives are being undertaken. For example, the Range Commander's Council sponsors groups on sustainability and environment that address encroachment issues.

1.3. Overview

Ensuring the readiness of the Armed Forces is one of the Department's most important tasks. The **Department of Defense Dictionary of Military Terms** defines readiness as:

> "The ability of US military forces to fight and meet the demands of the national military strategy. Readiness is the synthesis of two distinct but interrelated levels. a. unit readiness–The ability to provide capabilities required by the combatant commanders to execute their assigned missions. This is derived from the ability of each unit to deliver the outputs for which it was designed. b. joint readiness–The combatant commander's ability to integrate and synchronize ready combat and support forces to execute his or her assigned missions."

Readiness is a primary building block of our nation's national security strategy. To defend the United States effectively, our military must assure our allies and friends; dissuade future military competition; deter threats against U.S. interests, allies, and friends; and decisively defeat any adversary if deterrence fails.

Ready military forces contribute to each of these tasks by:

- assuring our allies that U.S. military power will be highly effective and available in a timely manner.
- dissuading potential competitors by denying capability gaps that can be exploited.
- deterring potential adversaries by enabling our ability to deliver rapid, accurate, lethal, and overwhelming military power.
- delivering effective warfighting capabilities to decisively defeat any adversary across the spectrum of conflict.

Many factors contribute to the readiness of our forces, such as the outstanding quality of our personnel, exceptional leadership, modern equipment, sufficient ordnance and spare parts, adequate installation and industrial base infrastructure, strong quality of life programs, and effective education and training.

Of these factors, none is more important than realistic training conducted at dedicated range complexes, ocean operating areas, and in special use airspace (SUA). Realistic training develops individual skills and unit capabilities; helps forces prepare to defeat enemy tactics and systems; helps forces assimilate lessons learned from actual military experience, experimentation, and previous training exercises; facilitates continuous improvement of doctrine, organization, tactics, and equipment; and builds confidence and morale. Rigorous and realistic training also helps the Department meets its obligation to the American people to ensure our troops go into harm's way with the highest possible assurance of success and survival. At their best, our training range complexes provide realism, variety, flexibility, specialized training equipment, and instrumentation. They also provide safety for the military and the public.

In this report, the term "range complex" is defined in slightly different terms for each Armed Service. Army and Marine Corps range complexes are typically defined as installations with more than one type of range. In essence, most Army and Marine Corps range complexes represent the range portions of the larger Army and Marine Corps installations. Navy range complexes are regional groupings of various land, air, and sea ranges. Air Force range complexes are defined as the airspace and land area, with a focus in this year's report on air-to-ground training. In all cases, the phrase "range complex" refers to operational range complexes.

Realistic training maximizes our ability to train as we fight. The benefits of this approach are well documented. The 2001 report by the Defense Science Board Task Force on Training Superiority and Training Surprise offers a typical view. The report concluded that as a result of realistic training at the Department's combat training centers (CTCs), "Trainees are far better prepared for combat than forces trained by other methods."[3]

1.4. Context

Today, the Department faces a paradox when it comes to the air, land, water, and electromagnetic spectrum required to support realistic training. On one hand, our platforms, weapons, and systems are growing ever more capable, which, when combined with the attendant advancements in doctrine and tactics, create requirements for *more* training space. Aircraft and vehicles travel farther and faster. Sensors detect at longer distances. Platforms deliver weapons accurately at greater distances. Unmanned vehicles provide invaluable intelligence. Communications systems carry more data to provide unprecedented intelligence and enable extensive coordination. These changes have brought about not only an overall increase in our military capabilities, but also a vast increase in the size of the battlespace within which we operate, and, therefore, within which we must train.[4]

On the other hand, encroachment reduces the size of the area that is available for military training – sometimes markedly so. Urban and regional development have brought communities near or next to once remote installation boundaries, bringing residents with concerns about noise and safety, and forcing species, endangered and otherwise, to seek refuge in the only natural terrain available nearby – the very terrain that military forces need for realistic training. Environmental regulations limit training across the spectrum of military activities, from amphibious assaults to anti-submarine warfare, from maneuver on land to low level flight. Commercial air traffic competes for the SUA needed for military training. Developers want to build new communities below airspace used historically for military training. A host of new commercial communications products compete for portions of the electromagnetic spectrum currently or formerly used by the military.

In short, our requirements for training space are increasing, but the air, land, water, and spectrum resources we need to conduct training are shrinking.

1.4.1. Simulation

While simulations and simulators currently play important roles in DoD training, they cannot replace essential live training, especially combined arms and joint training. A recent RAND Corporation study documents the complex relationship between live and simulated training.[5] The study finds that acceptance and use of simulated training varies greatly for different training tasks, and that factors such as simulators' quality, fidelity, and availability determine their acceptance and usefulness for different military training requirements.[6]

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3 *Report of the Defense Science Board Task Force on Training Superiority and Training Surprise. Washington, DC: January 2001, p. 15.*

4 *For example, a typical Army brigade today operates over an area that is more than 30 times larger than in World War II. See* ***Army Vision for Sustainable Range Management****, 7 December 2000, presented at Army Worldwide Energy and Environment Conference (derived from page 2).*

5 *John F. Shank, Harry J. Thie, Clifford M. Graf II, Joseph Beel, and Jerry Sollinger,* ***Finding the Right Balance: Simulator and Live Training for Navy Units****. Santa Monica: RAND Corporation, 2002.*

6 *Ibid., p. 68.*

The essential points for this report on Sections 366 and 320 are as follows:

- Simulators can and do enhance and augment live training, and substitute for it in a limited number of cases.
- The current generation of simulators lacks the quality, fidelity, and overall capability to replace substantially more of today's live training.

The Department concludes that increased use of simulation will not resolve encroachment problems, at least for the foreseeable future. Live training at range complexes will remain an essential cornerstone of military training.

1.4.2. Stewardship and Training

The Department is a committed steward of the natural and cultural resources entrusted to its care. Yet encroachment on our test and training ranges has become a significant impediment, and the effects will only worsen unless appropriate action is taken. DoD's Sustainable Range Initiative responds to the numerous encroachment pressures, with an emphasis on outreach and 8 critical encroachment issue areas: (1) Endangered Species Act, (2) unexploded ordnance and other constituents, (3) frequency encroachment, (4) maritime sustainability, (5) air- and land- space restrictions, (6) air quality, (7) airborne noise, and (8) urban growth. This report is, in part, an update on these efforts.

1.5. Scope

The remainder of this report provides greater detail on the topics briefly covered in this introduction. Chapter 2 addresses current and future training requirements. Chapter 3 addresses the requirements related to the Military Services' range inventories and encroachment. Chapter 4 discusses the adequacy of current and future training range resources. Chapter 5 contains the Department's comprehensive plans to address training constraints. Chapter 6 concludes with observations and recommendations.

2. CURRENT AND FUTURE TRAINING REQUIREMENTS

The Department of Defense operates the largest and most diverse training enterprise in the world to support its 3.2 million uniformed and civilian personnel, operating from more than 6,000 locations, using more than 30 million acres of land, in 146 countries. We provide entry-level qualification training to about 200,000 new soldiers, sailors, marines, and airmen each year. We also provide specialized skill training, beyond that acquired in basic training, to develop expertise for specific job requirements. We teach leadership skills for military units of every size, from small groups to large joint combat task forces, and provide professional development education to our noncommissioned and commissioned officers. Military training and education cover an astounding variety of subjects, from basic weapons familiarization to advanced operational art for effective employment of joint combat forces.

The National Security Strategy of the United States directs the major institutions of American national security to transform to meet the challenges of the Twenty-First Century. The Department has fully embraced this direction. Our experiences in Afghanistan and Iraq reinforce the need to transform training to better enable joint operations against an often-unknown threat. Today we deploy our forces to combatant commands for employment in joint operations. We therefore must train as we fight—jointly.

The Congress has helped the Department foster jointness in the past by codifying direction in public law, for example, in various sections of Title 10 of the United States Code:

- Section 153 states that "subject to the authority, direction, and control of the President and the Secretary of Defense, the Chairman of the Joint Chiefs of Staff is responsible for developing doctrine for the joint employment of the Armed Forces, formulating policies for the joint training of the Armed Force, and formulating policies for coordinating the military education and training of members of the Armed Forces."

- Section 164(c) outlines the authority of combatant commanders, and includes among these, "giving authoritative direction to subordinate commands and forces necessary to carry out missions assigned to the command, including authoritative direction over all aspects of military operations, joint training, and logistics."

- Section 165(b) states that, "subject to the authority, direction, and control of the Secretary of Defense and subject to the authority of the combatant commands (under 164(c)), the Secretary of the Military Department is responsible for the administration and support of forces assigned by him to a combatant command."

- Additional Military Service training responsibilities are fixed in the individual Service sections of Title 10. Specifically, 10 USC 3013(b), 5013(b), and 8013(b) task the Secretaries with recruiting, organizing, training, and equipping the forces assigned to the combatant commands.

U.S. Joint Forces Command has been assigned the task of serving as the joint force provider and joint force trainer in the Unified Command Plan. The Secretary of Defense has also directed the command to serve as the lead agent for joint force transformation, the Joint National Training Capability, and for joint experimentation. The Service Components in the United States are assigned principally to Joint Forces Command for joint training subsequent to assignment to and utilization by other combatant commands. Therefore, all joint training requirements are based upon the entire range of combatant command missions. These joint training requirements and capabilities flow from the Joint Mission-Essential Task Lists (JMETLs) selected by the combatant commanders from the Universal Joint Task List.

In the Joint Training Manual for the Armed Forces of the United States, the Chairman of the Joint Chiefs of Staff has issued guidance to the combatant commands and their service components, Military Services, Combat Support Agencies, and Defense Agencies for developing JMETLs, planning and conducting joint training, and assessing command readiness with regard to joint training. The Military Services then develop training plans and capabilities to ensure that their forces are proficient in executing these mission essential tasks within their respective core competencies.

The Military Services maintain a comprehensive set of processes to develop, document, and execute current training requirements. These processes, which are described in greater detail below, typically link current training requirements to a standard training curriculum, which is based in turn on joint and Service-unique mission essential tasks. A wide variety of publications, such as doctrinal reports, guidance documents, instructions, and annual messages or updates, prescribe these processes thoroughly and precisely.

As the subsequent sections of this report demonstrate, encroachment limits the Department's ability to meet current Service core and joint training requirements. In some cases, encroachment prevents military forces from training to the standards established in these documents for current training requirements. In others, the Military Services are able to meet their established requirements for current training, but encroachment increases costs, reduces realism, forces practices in training that must be "un-learned" for actual combat operations, and segments training for multiple tasks, which degrades the quality of individual training evolutions.

Future joint training requirements can be grouped into two categories: near-term and long-term. Training requirements for the near-term future can be assessed with reasonable certainty because we can anticipate the near-term strategic environment, warfighting concepts, and technological capabilities with a reasonable certainty.

Indeed, DoD developed its Training Transformation Strategic and Implementation Plans precisely to address changing training requirements in the near-term future. These plans focus on improving joint knowledge development and distribution capability; establishing the Joint National Training Capability; and fostering the joint assessment and enabling capability for the continuous improvement of joint force readiness.

Over the long term, however, we have greater uncertainty about the strategic environment, warfighting concepts, and technologies, and, therefore, about the training that will be required to provide and maintain ready military forces.

With regard to encroachment in the long-term future, however, all of the trends and indicators point in the same direction: today's problems will worsen without appropriate action.

To meet long-term future training requirements, DoD will need at least as much in the way of air, land, water, and frequency spectrum resources as it uses today, and possibly more. In general, we will continue to maintain a decisive advantage over adversaries by being able to operate effectively during the day and at night, over greater distances, at greater speed, in all weather, with better intelligence, and with improved command, control, and communications. Training forces to become proficient in these advanced capabilities will likely increase requirements for airspace, land, sea area, and communications capacity.

The Department will continue to work collaboratively with other federal agencies, the Congress, the states, Native American tribes, local governments, host nations abroad, and nongovernmental

organizations to minimize the effects of encroachment on military training and readiness in the long-term future.

The next four sections discuss the training requirements of the Military Services.

2.1. Training Requirements

2.1.1. Army

The primary mission of the Department of the Army is to organize, train, equip, and provide forces for prompt and sustained combat on land, air, and in space. The Army deters potential adversaries, reassures allies and friends, and supports the nation at home.

Changes in the strategic environment and Army Transformation have important effects on training. From a strategic perspective, Army forces today use a "train, alert, and deploy" sequence. Maintaining forces that are ready now places increased emphasis on training. Due to political changes, advances in technology, and the Army's role in executing the National Military Strategy, military operations in urban terrain have taken on new dimensions that previously did not exist, and more attention must be given to training in urban environments. Transformation also affects Army training. As the Army maintains the current force and begins to field new weapon systems to support the Future Force, Army ranges must evolve to meet the new requirements to ensure the force remains responsive, deployable, agile, versatile, lethal, survivable, and sustainable.

The Army Master Range Plan identifies the training land, management, operations, and support for range instrumentation, targetry, and device requirements for approved range projects and Army range modernization requirements. The Integrated Training Area Management (ITAM) Program provides the Army with the capability to manage and maintain training lands by integrating mission requirements derived from the Army 's Range and Training Land Program with environmental requirements and management practices.

Only live events require use of ranges and training land. Live fire training exercises to include Combined Arms Field training exercises, maneuver training, and battle drills must be conducted under conditions that replicate actual combat as close as possible. This is especially true at battalion level and below. Virtual and constructive training cannot replace live training. They can, however, supplement, enhance, and complement live training to sustain unit proficiency. Based on resource availability (such as time, ammunition, simulators, and range availability), commanders determine the right mix and frequency of live, virtual, and constructive training to ensure efficient use of allocated training resources.

2.1.2. Navy

Navy range requirements ensure training ranges provide sufficient land, airspace, sea space, and frequency spectrum to complete Interdeployment Readiness Cycle (IDRC) training before Navy forces deploy from their home bases. Under IDRC, basic (unit) level training ensures the unit attains the proficiency needed for more complex or integrated training events. Intermediate training is event-driven and provides initial multi-unit training under simulated threats, usually during the Composite Training Unit Exercise (COMTUEX). Advanced training offers unfolding "scenario-driven" training providing live tactical training in a realistic, coordinated environment, culminating in an integrated Joint Task Force Exercise (JTFEX).

2.1.3. Marine Corps

Title 10 responsibilities are the touchstone for Marine Corps training requirements and range and training area management planning. Under Title 10, the Marine Corps (1) develops landing force amphibious tactics, techniques and equipment, (2) organizes, trains and equips to provide combined arms Fleet Marine Forces, and (3) organizes, trains, and equips Marine Corps forces to conduct prompt and sustained sea combat operations, land, sea, air, and space operations essential to a naval campaign, and amphibious training of all forces assigned to joint amphibious operations.

As articulated in *Expeditionary Maneuver Warfare* (EMW),(MCDP-1), EMW is the Marine Corps' capstone concept for developing tactics, forces, techniques and systems required by the operational context of the 21st Century. EMW operational concepts provide a roadmap for Marine Corps transformation. EMW capability requirements are driving development of weapons, systems, equipment and platforms; tactics, techniques, and procedures; and the training standards and associated range requirements. The Marine Corps' contribution to national security and its role within a naval expeditionary force rest upon five unique core competencies: (1) Warfighting Culture and Dynamic Decision-making, (2) Expeditionary Forward Operations, (3) Littoral Power Projection, (4) Combined Arms Integration, and (5) Forcible Entry from the Sea.

2.1.4. Air Force

The Air Force is the world's preeminent air power largely due to superior training of Air Force personnel. Air combat superiority is directly correlated with realistic training. The objective of realistic training of aircrews is to expose the warfighter to controlled training conditions that simulate combat as closely as possible, so that the experience of actual combat is not wholly unfamiliar. The effectiveness of the United States military's doctrine of realistic training is demonstrated by the dominance of the Air Force in every conflict in which it has been involved.

All air assets need properly configured and equipped ranges and airspace to practice a spectrum of skills, from the most basic to the most complex. The specific features of the training environment required for an aircrew to become skilled in a particular task differ greatly, including in the specific training objectives, the numbers and types of aircraft used, and the complexity of the interaction of different aircraft types in accomplishing a particular mission.

The Air Force training programs for aircrews uses a building-block approach, moving aircrews through six distinct types of training:

- **Undergraduate flying training.** Instructs aircrews in all aspects of basic flying proficiency.
- **Initial qualification training.** Provides instruction in the basic aircrew duties in an assigned position for a specific mission design series (MDS) for the aircraft to which the aircrew is assigned.
- **Mission qualification training.** Brings the aircrew through the point of being considered qualified to perform a command or unit mission.
- **Continuation training.** Provides aircrews with the recurrent training necessary to maintain proficiency at the assigned qualification level.
- **Special mission training.** Provides aircrews special skills required for specialized mission requirements.

- **Upgrade training.** Prepares the aircrew for advanced responsibilities, such as flight leader, instructor, or mission commander.

The types of training beyond basic levels differ in terms of complexity, goals, and number of participants, all of which influence the requirements for the ranges and training areas where the practical aspects of aircrew training are learned. Aircrew training is also viewed within the context of the operational concepts the training supports: readiness, deployment, employment, sustainment, redeployment, and reconstitution. This report focuses on mission qualification, continuing, and special mission training, involving employment, since these are the training stages that demand the most access to ranges.

The basis for aircrew training is the Ready Aircrew Program (RAP). The RAP is the source for specific information on the training requirements related to each MDS (i.e., aircraft type), including the number of sorties per training cycle, mission types flown, weapons employed, and other elements necessary for an aircrew to remain mission qualified. For each MDS aircraft, there are specific training requirements detailed in Series 11 Air Force publications.[7] An annual message from Headquarters, Air Combat Command, Directorate of Training (HQ ACC/DOT) sets specific minimum training requirements for each MDS.

2.2. Operational Training that Requires Ranges and Operating Areas

Many DoD training activities require access to ranges, SUA, and ocean operating areas. As a general principle, the larger the unit involved in the training activity, the larger the required training area. This is easy to see at the extremes: a brigade level training exercise in a realistic combat environment requires vastly more area than individual training for proficiency in small arms.[8]

The development of the JNTC reinforces DoD's requirements for range complexes, SUA, and operating areas. The JNTC is being designed to enhance joint force training to reflect the fact that we routinely fight as joint forces under the combatant commanders. Warfighting success today and in the future depends on our ability to deploy a joint force with decisive, overmatching combat power. As Admiral Edmund P. Giambastiani, Jr., Commander of the Joint Forces Command, recently testified before the House Armed Services Committee regarding the lessons learned during operation Iraqi Freedom:

> The fundamental point is that our traditional military planning and perhaps our entire approach to warfare has shifted. The main change, from our perspective, is that we are moving away from employing Service-centric forces that must be de-conflicted on the battlefield to achieve victories of attrition to a well-trained, integrated joint force that can enter the battlespace quickly and conduct decisive operations with both operational and strategic effects.[9]

Developing and maintaining a well-trained, integrated joint force requires exercising and coordinating these forces in live training at our range complexes and operating areas, augmented with virtual and constructive simulations. Advanced technologies will enable communication and coordination essential for the JNTC's mission success, but they cannot replace live training at our range complexes and in our

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7 *These Air Force publications can be accessed from the World Wide Web at http://afpubs.hq.af.mil.*

8 *There are exceptions. For example, pilots training for long range bombing, air refueling, or anti-submarine warfare missions need to fly long distances to complete their training missions.*

9 *Prepared statement by Admiral Edmund P. Giambastiani, Jr., Commander, United States Joint Forces Command and Supreme Allied Commander Transformation (NATO) before the House Armed Services Committee, United States House of Representatives, October 2, 2002, p. 4.*

operating areas and SUA. Training that requires ranges and operating area is described in detail in the next sections.

2.2.1. Army

Training strategies prescribe the events and standards for achieving and sustaining individual, crew, and unit readiness. The two main Army training strategies are the Standards in Training Commission (STRAC) strategies and the Combined Arms Training Strategy (CATS). These two strategies are the basis of unit collective training. STRAC and CATS provide highly-detailed strategies, standards, and requirements for training different types of Army units, such as armor, infantry, artillery, etc. Commanders use events in the STRAC and CATS strategies to develop their unit training plan to achieve and sustain proficiency in mission essential task lists (METL) tasks, taking into account the frequency, duration, conditions and standards in the strategies.

Based on the Army's training strategies and mission training plans, unit commanders develop unit specific training strategies to achieve and sustain proficiency in METL tasks. These strategies drive requirements for resources needed to conduct live training, including ammunition, OPTEMPO funding, and ranges and training land.

2.2.2. Navy

The Navy conducts most of its training on designated ranges and OPAREAs located near concentrations of forces in the United States, its territories, and overseas. This arrangement allows Navy units to train in controlled environs for high-quality training and safety. Overseas, the Navy has limited range and OPAREA space available, but the Secretary of the Navy's "At-Sea Policy" provides guidelines for training outside of designated OPAREAs in international seas and airspace.

2.2.3. Marine Corps

Marine Corps Training and Education is a structured continuum that provides combat-ready Marines, Marine units and Marine Air Ground Task Forces (MAGTFs). Training requirements constantly adapt to internal and external forces. The Marine Corps training and evaluation (T&E) continuum has five major parts: entry-level, common skills, skill progression, and unit training and professional military education. Marine Corps training is based on defined tasks, conditions, and standards focused on core competencies, is relevant in terms of expected missions and operational environments, and implements EMW doctrine and operational concepts. Training requirement development provides combat-ready units as the Nation's expeditionary force-in-readiness and the means to attain combat readiness across the spectrum of military operations. The goal is to develop unit warfighting capabilities, so Marine units can perform as part of a MAGTF, and the MAGTF can perform as part of a Joint Task Force.

The Marine Corps Combat Development Command (MCCDC) develops Marine Corps warfighting concepts. The Command manages the Expeditionary Force Development System (EFDS) – a system that develops and integrates Marine Corps doctrine, organizational structure, training and education, equipment, and support facilities required to field combat ready forces. The EFDS assesses current and future operating environments and involves continuous adaptation of training and education infrastructure and resources to develop capabilities and associated range, training area, infrastructure and instrumentation requirements.

The operational environment dictates training requirements and planning and T&E program execution. Future conflicts likely will occur in urban complexes, requiring a marked increase in the number and

types of tactical and operational tasks Marines must be trained to execute. Furthermore, Marine Corps forces will be increasingly visible and must limit collateral damage and ensure non-combatant safety. Success in this environment requires MAGTFs fully trained in a variety of operational capabilities. The current security climate necessitates extensive range transformations to guarantee accomplishment of such temporally and spatially evolving training requirements.

2.2.4. Air Force

The Air Force training programs for aircrews uses a building-block approach. Aircrews move through three distinct phases of training that differ in terms of complexity, goals, and number of participants, all of which influence the requirements for the ranges and training areas.

Primary training involves those basic air combat proficiency skills practiced at the Primary Training Ranges (PTR). The PTRs teach basic skills, such as training on proficient delivery of practice ordnance with limited integrated air defense system (IADS) and training in emitter signal recognition and countermeasures. Meeting the repetitive elements of basic aircrew training demands that these ranges be located in close proximity to the user's installation, or else significant costs are accrued in simply traveling to and from a central facility.

Intermediate training builds on the elements learned in basic training through use of a larger and more realistic training environment to execute more complex aircrew tasks and missions. Such training usually occurs at the Combat Training Centers (CTCs) or Combat Readiness Training Centers (CRTCs). Two examples of training conducted at these facilities are the use of real or simulated targets and more sophisticated IADS, which include multiple sources and types of threats (e.g., radar and infrared guided) and more accurate replication of IADS sensors and threats. Generally, intermediate training requires a larger operating space than primary training, in terms of both horizontal area and total airspace volume. The increased complexity of the training requirements met at these facilities requires additional supporting infrastructures (e.g., more personnel and facilities to service targets, IADS threat emitters.) The significant investment required to operate and maintain intermediate training facilities has limited their number; hence aircrews in intermediate training may have to travel longer distances.

Advanced training provides the most realistic environment. In general, advanced training involves many participants operating in a horizontally and vertically integrated force against full-scale, threat representative targets situated in realistic environments (e.g., urban terrain), with a high density, coordinated IADS defending them. The objective of advanced training is to provide as close to a real combat environment as possible, while ensuring safety of the public, aircrews, other Air Force personnel (e.g., ground crews), and the training infrastructure.

2.3. Command Relationships for Ranges and Range Complexes

Under Title 10 of the United States Code, the Military Services are primarily responsible for construction, repair, and maintenance of installations, including range complexes, subject to the authority, direction, and control of the Secretary of Defense.[10]

10 *Title 10 assigns to the Combatant Commanders responsibility for the joint training of forces under their command, but the Military Services maintain responsibility for the range complexes where these forces train. See 10 U.S.C. 164.*

Department of Defense Directive 3200.15, entitled "Sustainment of Ranges and Operating Areas (OPAREAs)," dated January 10, 2003, establishes policy and assigns responsibilities under Title 10 for the sustainment of test and training ranges and operating areas in the Department of Defense (see Appendix C). The Directive assigns substantial responsibilities for range sustainment to the Under Secretary of Defense for Personnel and Readiness; the Under Secretary of Defense for Acquisition, Technology, and Logistics; Director of Operational Test and Evaluation; the Military Services; and Defense Agencies. The Directive also assigns responsibilities to the Chairman of the Joint Chiefs of Staff, the Under Secretary of Defense for Policy, the Assistant Secretary of Defense for Public Affairs and the Assistant Secretary of Defense for Legislative Affairs.

The Department has taken additional steps to ensure sound management, implementation and coordination of sustainable range responsibilities. The Senior Readiness Oversight Council (SROC) reviews range sustainment policies and issues. DoD created an Integrated Product Team (IPT), which is led by the Office of the Under Secretary of Defense for Personnel and Readiness and reports to the SROC, to act as the DoD coordinating body for developing strategy to preserve the military's ability to train. A Working IPT, co-chaired by the Office of the Deputy Under Secretary of Defense for Readiness, the Office of the Deputy Under Secretary of Defense for Installations and Environment, and the Office of the Director of Operational Test and Evaluation meets regularly and reports to the IPT. The remainder of this section describes command relationships within the Military Services.

2.3.1. Army

The Headquarters Department of the Army (HQDA) Deputy Chief of Staff (DCS) G-3 has the responsibility as the Army Trainer to establish the priorities and requirements for Army ranges and training lands, plan for their modernization and expansion, and formulate policy for their operation and management. The G-3 at HQDA directly manages and funds the Range and Training Land Program (RTLP). The program consists of range modernization and range operations, as well as the ITAM program, which provides the capability for land management and maintenance.

The HQDA Assistant Chief of Staff for Installation Management (ACSIM), as the Army's overall installation manager, establishes the policy guidance and procedures for installation operations, real property management, and environmental stewardship for all activities and functions within Army garrisons. In that regard, components of the G-3's RTLP and ITAM programs are synchronized with ACSIM's installation management policies as well as with the Army's Range Safety Program, under the direction of the HQDA, Director of Army Safety, and Munitions Management program, under the direction of the HQDA DCS, G-4.

The G-3's priorities and requirements for Army ranges and training lands, as well as day-to-day range operations, are executed at the installation level by garrison staff. Responsibility typically resides within the Directorate of Plans, Training, and Mobilization (DPTM), who reports directly to the garrison commander. The garrison commander operates under the direction of the Army Installation Management Agency's (IMA) regions, which in turn operate under the direction of IMA. Because the Army's training missions are the responsibility of the Major Commands (MACOMs), these organizations also play a role in establishing requirements and priorities for the Sustainable Range Program (SRP).

Mission commanders retain the mission to ensure Army units are trained and ready to fight and win our Nation's wars. As such, senior mission commanders on each installation establish and approve the requirements for ranges and training land that are forwarded through the MACOM to HQDA Office of the Deputy Chief of Staff (ODCS) G-3.

Because ranges are simultaneously integral to installations as both facilities and mission training assets, range control and management require a truly integrated approach. Mission and Garrison Commanders work in coordination with the proponent for Ranges and Training Land, ODCS G-3, and the ACSIM to analyze the adequacy of ranges and training lands to support the mission commander's METL training requirements.

2.3.2. Navy

For administrative purposes, Navy ranges are grouped in geographic complexes. While the specific ranges within those complexes may have different operational chains of command, they have common administrative requirements, such as environmental support, that are unique to each region. Validation of requirements for all training ranges in the United States and its territories falls under the purview of Commander, Fleet Forces Command (CFFC). Various Fleet and Type Commanders control ranges as tenants on the installations where they reside. The Navy has also established a headquarters-level single Range Office with oversight over all Navy ranges, replacing a previously fragmented organizational approach to these responsibilities**.**

2.3.3. Marine Corps

.To coordinate training and education programs, the Training and Education Command (TECOM) was established within the MCCDC in July 2000. Range and installation oversight is accomplished via coordination between the Range and Training Area Management Division (RTAM) of TECOM, and the Deputy Commandant of Installations and Logistics (Logistics and Facilities) (DC I&L (LF)) at Marine Corps Headquarters. RTAM is the executive agent charged with developing systems, operational doctrine and training requirements for Marine Corps forces. DC I&L (LF) has broad responsibilities for all aspects of installation and facilities planning, management and investment. Synchronizing these efforts ensures mission-capable operational ranges are available throughout the Marine Corps.

2.3.4. Air Force

HQ USAF, Deputy Chief of Staff, Air and Space Operations, through the Director of Operations and Training, has designated the Ranges and Airspace Division (HQ USAF/XOO-RA) as the focal point for USAF ranges. The Ranges and Airspace Division develops policy, advocates resources, and manages the oversight of Air Force ranges.

2.4. Current Range Requirements Derived from Training Requirements

This section summarizes current range, operating area, and airspace requirements derived from training requirements.

2.4.1. Army

The Army uses the RTLP process to plan, estimate, and program for the live training facilities (ranges and maneuver/training area) needed to meet its live training requirements. There are two tools used to accomplish this. The first is the Army RTLP Requirements Model (ARRM). ARRM is an automated database that calculates and compares live training assets and requirements. ARRM compares these two data sets and identifies training capacity shortages and excesses of an installation by individual training facility. The second tool is the Installation Training Capacity (ITC) Methodology. It is a standard methodology used to analyze the live training capability of Army installations. It shares the same

database as ARRM, but also includes an evaluation and scoring capability, and a "what if" capability that allows for changes to requirements and assets. Additionally, the ITC contains a two-part qualitative assessment of specific mission essential live training facilities and demographic and environmental factors that affect live training.

The ARRM calculates training requirements for major Army units and schools, including specific training events required, the number of times each needs to be performed, required maneuver acreage, and the duration of each event. It develops total installation land requirements for institutional training (i.e., schools) and operational training (i.e., units). The ARRM calculates maneuver area requirements and range requirements. The ARRM allows the Army to develop detailed training requirements from standard databases and established doctrinal standards.

2.4.2. Navy

To meet IDRC requirements, the Navy has a geographically dispersed set of training complexes on each U.S. coast that provide the areas required to conduct controlled and realistic training scenarios. Today's high-performance aircraft and ships employ weapons of greater capability and complexity, with unique delivery tactics requiring a robust training range/OPAREA infrastructure.

2.4.3. Marine Corps

The Marine Corps requires access to ranges, training areas and airspace that is sufficient to support training to standards across the training continuum. The ultimate objective of Marine Corps training is to provide mission-capable MAGTFs. MAGTF training requirements determine range and training area requirements. The Marine Expeditionary Unit (Special Operations Capable), or MEU(SOC), is the standard, forward deployed MAGTF. Current training requirements for the MEU(SOC) include the following Core Capabilities: Amphibious Operations, MEU-level Maneuver Ashore, Combined-arms Operations, Maritime Special Operations, Military Operations Other Than War (MOOTW), and Supporting Operations. Within these core capabilities, the MEU(SOC) trains to accomplish a spectrum of METs and crisis response operations including over 20 mission areas. Additionally, the Marine Expeditionary Brigade (MEB) is the Marine Corps primary contingency response force and is the smallest MAGTF capable of forcible entry operations. As such, the MEB must be trained in mission essential tasks required of the primary operational-level warfighting force in the theater of operations.

As the Marine Corps' principal warfighting organization, the Marine Expeditionary Force (MEF) must train to conduct and sustain expeditionary operations in any geographic environment. Current training requirements for the MEF, as established in the Marine Corps Task List (MCTL), are (1) conduct MEF maneuver, (2) conduct intelligence operations, (3) employ and coordinate fires, (4) perform logistics and combat service support, (5) exercise command and control, and (6) train in force protection.

2.4.4. Air Force

The Air Force groups its range complexes into three categories: Primary Training Ranges; Combat Training Centers and Combat Readiness Training Centers; and the Major Range and Test Facility Base. These categories reflect the different types of ranges that are required to meet Air Force training requirements. The land space, air space, targets and target arrays, and systems for simulated integrated air defense, scoring, and feedback grow increasing large or complex in the progression through the range categories.

For example, the land space at Primary Training Ranges is generally sized to support basic training events, but often limits the delivery of weapons. For Combat Training Centers and Combat Readiness Training Centers, the land area is generally determined by sensor ranges, with terrain representative of threat areas. For the Major Range and Test Facility Base, the land space is large enough for tactical maneuvers in coordinated, multi-platform, multi-warfare area operations.

Appendix D provides a summary comparison of the types of Air Force ranges, the types of training each can support, and information of different characteristics each range type has to support training.

2.5. Future Range Complex Requirements

Many factors will influence future range complex requirements, and the following sections discuss near-term and long-term future projections for Military Service training range requirements. Two of the most important factors will be the development and implementation of the Joint National Training Capability and the need to establish range requirements that reflect the Department's sustainable ranges initiative.

2.5.1. Army

The Army is planning, programming, and implementing necessary range modernization to accommodate the transformation of six current force units to STRYKER Brigade Combat Teams (SBCTs). The SBCT is an infantry-centric unit with 3,600 soldiers that combines many of the best characteristics of the current Army forces and exploits technology to fill a current operations capability gap between the Army's heavy and light forces. The Army is identifying and addressing potential shortfalls in live-fire training facilities for the SBCTs using the Range and Training Land Program (RTLP) requirements process.

The vision of Army training in 2010 is a networked organization engineered to meet institutional, unit, and modernization training needs for the Army. Training will remain focused on wartime missions. Realistic, sustained, multi-echelon, and totally integrated training will be stressed at all levels. Virtual and constructive simulations and simulators will support the achievement and sustainment of training readiness in units. The vision is to build synthetic training environments, integrate them with live training, and use automated training management tools to provide trainers with a menu of structured exercises, to include mission-rehearsal capabilities, driven by a flexible, METL.

By 2015, the Army will have transformed to the Future Force. The FF is characterized by an integrated Joint, Interagency, and Multinational (JIM) Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architecture, a revolutionary architecture with linkages to the current, STRYKER, and JIM forces. FF systems support decisive dominant maneuver – horizontal and vertical, day and night – in all weather and terrain as dismounted or mounted combined arms teams and provide the best combination of low-observable, ballistic protection, long-range acquisition and targeting, and first round hit-and-kill technologies.

Based on the Operational and Organization (O&O) Plan for the FF Maneuver Unit of Action, the System Training Plan for the Future Combat System, and the System Training Plan for the Future Infantry Combat Weapon (FICW), the Army estimated the live training requirements for the Future Combat System (FCS) Equipped Unit of Action (UA) and facilities necessary to support those requirements.

Army installations that may become home stations for FF UAs will be evaluated against live training facility requirements. By estimating these requirements early in the transformation process, the Army can make efficient use of existing installation resources when making Future Force stationing decisions and

plan and program for future facility modernization requirements. The Army has made no stationing or sequencing decisions for transforming current units to the FF.

2.5.2. Navy

Navy training ranges will continue to play a critical role in supporting IDRC training for operational forces. Strategic planning for Navy range complexes will include future training operations derived from new Naval platforms and weapons, as well as improvements to infrastructure to support the JNTC. These issues will be addressed in the forthcoming Navy Fleet Training Range Strategy and individual Range Complex Management Plans (RCMPs) under development for each Navy range complex under the Tactical Training Theater Assessment and Planning (TAP) program. In conjunction with the development of RCMPs, a Range Capabilities Document (RCD) will be created to assess the infrastructure and technological needs of ranges to support specific warfare areas. The Navy will use these plans to implement the Office of the Secretary of Defense Sustainable Range Guidance, and evaluate new requirements throughout the planning, programming, budgeting, and execution process.

2.5.3. Marine Corps

Future tactics, techniques, procedures, and training requirements are evolving to leverage new capabilities. The Marine Corps T&E continuum will evolve to meet these diverse and changing operational needs. Capabilities for Expeditionary Maneuver Warfare (EMW, the Marine Corps' capstone concept for the early 21st Century) will enhance MAGTF mission capabilities. Future MAGTF training requirements will be driven by expected operational contexts and EMW operational concepts, and likely will be characterized by: (1) extended-range training operations to exercise EMW capabilities, (2) MEB live-fire and maneuver exercises, (3) increased Military Operations in Urban Terrain (MOUT) training requirements, (4) enhancement of T&E through instrumented ranges and target systems, (5) increased reliance on MAGTF sustainment training during deployment, and (6) increased joint training.

The *Strategic Plan*, *Management Initiative Decision (MID) 906,* approved by the Deputy Secretary of Defense (January 2003), specifies seven major JNTC training centers for FY 03-05: the Marine Air Ground Task Force Training Command (MAGTFTC), 29 Palms; U.S. Army National Training Center; Joint Readiness and Training Center; Fort Bliss Exercise Roving Sands training range; U.S. Navy Fleet East training area; U.S. Navy Fleet West training area; and U.S. Air Force Nellis test and training ranges. Additional instrumentation is needed to integrate MAGTFTC into the JNTC; *MID 906* provides substantial funding for design and development of advanced training technologies and emphasizes that allocations are not for "[b]asic service modernization efforts."

The Marine Corps is committed to full JNTC participation, and required range capability planning is underway. TECOM leads Marine Corps JNTC initiatives, supported by the Marine Corps Systems Command (MARCORSYSCOM) and the Bases and Stations. TECOM (G-3) leads the Marine Corps' JNTC exercise design and requirement identification process for participating range certification and chairs the Range Instrumentation System Working Group (RISWG), which develops policies, priorities and requirements for Range Instrumentation Systems implementation. TECOM–Technology Division (Tech Div) is the lead for range instrumentation technology and plays key roles in range modernization programs and JNTC. Tech Div develops range instrumentation requirements documents and coordinates with MARCORSYSCOM to support RISWG requirements and with other Services to support Range Instrumentation System design and acquisition. Tech Div is actively developing requirements jointly with the Army. In conjunction with the Tactical Training Exercise Control Group at 29 Palms, RTAM develops requirements and priorities for range instrumentation, modernization and investment. RTAM also defines range instrumentation requirements of other Marine Corps bases and stations for inclusion in the budget process and coordinates with TECOM Tech Div to identify solutions to requirements

developed by the RISWG. Aiding this process in the future will be the RTAM-initiated RCD range requirements assessment. This document, to be completed in the first quarter of FY04, describes current and anticipated range training requirements and will be critical to range transformation efforts. Marine Corps Bases and Stations, with TECOM G-3, TECOM Tech Div, and RTAM, identify training range modernization requirements and assist in budget development.

The Marine Corps' premier combined-arms training center, 29 Palms, is one of the initial JNTC venues identified in MID 906 and will be linked with other Service's major Western Range Complex JNTC training centers. To meet JNTC objectives, significant planning and substantial investment supporting enhanced MAGTF training in the Combined Arms Exercise (CAX) Program will be required. To develop, program, and establish a Range Instrumentation System at MAGTFTC to enhance combat realism, present a realistic Opposing Force (OPFOR) profile, and provide ground truth and feedback is a priority. These initiatives support the CAX Program and will meet the criteria for JNTC accreditation. Pursuant to Training Transformation guidance, the MAGTFTC Range Instrumentation System is to be included in future budgets, so that fully instrumented CAX training at 29 Palms is possible by FY 2008.

2.5.4. Air Force

Whenever there is a change in air power doctrine or introduction of a new weapons system, the design, location, and infrastructure supporting training ranges and related airspace must be updated and new training must be developed. In general, this relationship occurs in two steps: first, there is the change in doctrine or systems; second, there are changes in the supporting training infrastructure.

As changes in equipment and doctrine are made they are translated into specific tasks that aircrews must master. This process occurs during development of the Mission Area Plans (MAPs) for each of the core competencies of the Air Force: Air and Space Superiority; Information Superiority; Global Attack; Precision Engagement; Rapid Global Mobility; and Agile Combat Support. The MAPs identify key training events to allow for comparison against existing infrastructure and force-basing plan. From such an analysis, it would be possible to quickly and efficiently identify any limitations in the existing infrastructure that would constrain the ability of a unit to meet its new training objectives. Using new processes the Air Force has been able to translate key emerging operational capabilities and tasks identified in the MAPs into training capabilities and tasks required for ranges and airspace.

The F/A-22 and Joint Strike Fighter (JSF) are the next generation in fighter aircraft, and have unique capabilities that result in new infrastructure needs in areas as diverse as environmental compliance and IADS simulation. Similarly, the Unmanned Aerospace Vehicle (UAV) and Unmanned Combat Aerospace Vehicle (UCAV) will undoubtedly drive changes in military flight training. Infrastructure changes required to support these systems are still being documented; however, modernization initiatives are in place to improve supporting infrastructure.

In addition to requirements driven by the introduction of new aircraft, introduction of new or improved weapons can also result in changes in the supporting testing and training infrastructure. Among the recently developed weapons are the Joint Direct Attack Munition (JDAM) and the Joint Stand-off Weapon (JSOW). New weapons are becoming ever more precise, have an increased standoff distance, and have very large Weapons Safety Footprints that cannot normally be contained on PTRs. Such changes result in significantly different requirements related to the design and configuration of ranges where aircrews will practice with these weapons deliveries. Introduction of more advanced weapons, such as directed energy weapons and airborne lasers will change the physical layout of ranges and affect other aspects of testing and training range operations such as target array design, attack profile configurations, and the ability to operate over additional lands owned by other stakeholders.

Finally, the increasing importance of integrated air, space, and information operations (ASIO) will drive changes in testing and training requirements. As these technologies advance, the need for a full integration of ASIO with current air operations training increases. As this integrated testing and training matures, the complexity and fidelity of the range and airspace requirements will expand.

3. SERVICE RANGE INVENTORY

Appendix E provides maps and an inventory of DoD range complexes, individual ranges not in complexes, and special use airspace. The inventory presented in Appendix E draws from the databases and inventories that the Military Services use for the management of range complexes, installations, airspace, and operating areas. The Military Services have made substantial progress in developing the inventories.[11]

3.1. DoD Operational Range Inventory

As discussed earlier, under Title 10 the Military Services are principally responsible for the management of range complexes. As a result, our existing training range inventories and databases have generally been created and managed by the Services to meet Service unique requirements. As the Department carries out its Training Transformation Implementation Plan, we expect this situation to evolve.

The increased emphasis placed on joint military operations by the Secretary of Defense, the Chairman of the Joint Chiefs of Staff, the Combatant Commanders, and the Military Services must be reflected in increased joint training at our range complexes, and our associated management tools must grow accordingly. We plan to build on the Military Services' existing range inventories and management information systems to fully support the joint training and warfighting reflected in our Training Transformation efforts, while continuing to meet Service-specific requirements. DoD continues to work toward an enterprise level range and training information system.

3.1.1. Army

The U.S. Army Environmental Center (USAEC) is the program manager for the Army Range Inventory and develops and maintains the Army Range Inventory Database (ARID). The Training Directorate (DAMO-TR) of the Office of the Deputy Chief of Staff for Operations (ODCSOPS), as the Headquarters, Department of the Army (HQDA) proponent for ranges and training land, is responsible for assisting in overseeing the Army range inventory. The Army developed and maintains the ARID through a comprehensive process involving the ODCSOPS, the Assistant Chief of Staff for Installation Management (ACSIM), Regional Support Centers (RSCs) for the ITAM program, major commands, and almost 500 installations.

The Army range inventory was conducted between June 2000 and December 2003. It documented 10,530 active and inactive ranges occupying over 15 million acres of land at 479 installations and training sites located in all U.S. States, Puerto Rico, American Samoa, Korea, Germany, Italy, and Belgium. Army range complexes and individual ranges are listed in Appendix E.

3.1.2. Navy

Navy range complexes and individual ranges not in a complex are summarized below and listed in Appendix E. Most Navy ranges are grouped into geographical complexes. Those ranges not in a complex are the Brownwood military operating areas (MOAs) in Central Texas and the Major Range and Test Facility Base (MRTFB) ranges.

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11 *The GAO recommended the further development of these inventories. See **Military Training: DOD Lacks a Comprehensive Plan to Manage Encroachment on Training Ranges**. GAO 02-614, June 11, 2002, p . 31.*

The Navy MRTFB consists of T&E facilities, including ranges. The MRTFB ranges supplement Navy-training needs in multiple areas in concert with their primary mission of acquisition support. The MRTFB Ranges serve a primary mission of acquisition support. They supplement Navy-training needs in multiple areas. The Navy MRTFB ranges include the NAVAIR Atlantic Test Range, the NAVAIR Point Mugu Sea Range, the NAVAIR China Lake Ranges, and the Atlantic Underwater Test and Evaluation Center.

The Navy defines training range capabilities in terms of the ability to support training to the Naval Warfare Mission Areas (Anti-Air Warfare, Amphibious Warfare, Anti-Surface Ship Warfare, Anti-Submarine Warfare, Command and Control Warfare, Logistics, Mine Warfare, Naval Special Warfare, and Strike Warfare) and range capacity as the ability to support the three levels of the IDRC (basic, intermediate, and advanced).

The Navy's training range complexes include the Hawaiian Islands, Whidbey Island, San Francisco, Fallon Southern California complex, El Centro, Boston Area, Virginia Capes (VACAPES), Atlantic City, Narragansett, Cherry Point, Jackson and Charleston, Key West, Gulf of Mexico (GOMEX), and Meridian complexes in the United States, and the Okinawa, Japan, Marianas, and Diego Garcia sites abroad. Short descriptions of each of these range complexes are provided at Appendix F.

3.1.3. Marine Corps

Marine Corps infrastructure includes 15 major bases and stations, several smaller installations, and 185 reserve facilities in the United States and Japan. These installations include bases, recruit depots, air stations, logistics command installations, and Marine Forces Reserve / MCRSC facilities. Marine Corps range inventory comprises an array of range complexes and associated airspace. The Ground/Air-to-Ground Range Complexes are: MCB Quantico, MCB Camp Lejeune, MCB Camp Pendleton, MAGTFTC 29 Palms, MCB Hawaii, and MCB Camp Butler, Japan. The Air Combat/Air-to-Ground Ranges include MCAS Cherry Point, MCAS Yuma/Bob Stump Training Range Complex (former Yuma Training Range Complex, (YTRC)), MCAS Beaufort/Townsend Range, MCRD Parris Island, MCAS Miramar, MCLB Albany, and MCLB Barstow.

Marine Corps' major bases and stations are strategically located near air and seaports, major truck routes and railheads for fast and efficient movement of Marines and material. Due to links to operating forces and associated readiness, the base and station condition–the MAGTF's "fifth element¨–is of vital importance. Because integrated force training capability is an essential requirement, infrastructure development and range management planning seek to afford efficient yet capable facilities, training areas, and ranges. In light of encroachment and fiscal pressures, the Marine Corps faces significant challenges to provide and maintain a well-organized and able infrastructure. Appendix E summarizes the Marine Corps's range complexes.

3.1.4. Air Force

This first report for Sections 366 and 320 lists all Air Force testing and training ranges within the United States. These ranges are located in 24 States and are distributed across the country. The Air Force ranges listed in Appendix E have a combined total acreage of 7,703,117 acres. Of this, 5,891,078 acres are either owned or directly controlled by the Air Force, and include public lands that are withdrawn from public use. To give a broader perspective, another 1,812,039 acres are owned or controlled by other entities, including the Departments of the Army and Navy.

Users from various units, installations, and Services share airspace controlled by the Air Force. For this reason, a simple one-to-one linking of airspace to installation does not show the full picture of airspace usage.

As a general rule, Appendix E links units of SUA to the installation responsible for scheduling their use. A full discussion of the management of SUA is beyond the scope of this report. Readers should therefore interpret the airspace information in Appendix E with appropriate caution. The Air Force will include a fuller discussion of airspace needs relating to ranges in subsequent Section 366 and 320 reports.

3.2. Range Capacities and Capabilities

The Department is currently collecting data and conducting analyses for the 2005 round of military base realignments and closures (BRAC 2005).[12] As an integral part of the BRAC 2005 effort, the Department is conducting detailed analyses of DoD installations, including training ranges. The results of all BRAC 2005 analyses cannot be released until May 2005, when the Department presents its BRAC 2005 recommendations to the independent Defense Base Closure and Realignment Commission.

This report addresses range capacity using a variety of data sources and methods currently available or in use within the Department. As DoD proceeds in the BRAC 2005 process through May 2005, it may develop new data sources and methods to measure, analyze, and report range capacity. Accordingly, BRAC 2005 analyses of range capacity may reflect information, metrics, analytical methods, and conclusions that could vary from those presented in this report.

DoD's range complexes, SUA, and ocean operating areas provide a wide variety of capabilities to support military training requirements. The capabilities offered by our range complexes allow all of our military forces to train for all of their assigned operational missions. For example, ground forces can train in operational maneuver; air forces can train for air-to-air, air-to-ground, and other missions; and naval forces can train for strike and anti-surface, anti-submarine, anti-air, and amphibious warfare. Special forces can train to practice their missions. All forces can receive essential live fire training in safe conditions and train for command, control, communications, and intelligence tasks. Forces can train jointly to prepare for joint operations.

Some capabilities are inherent in the physical characteristics of the range complexes themselves. For example, a certain tract of land provides capabilities merely by virtue of its size, terrain, and climate. An ocean operating area presents capabilities by virtue of its depth, proximity to land, and normal sea conditions. A unit of SUA offers capabilities by virtue of its length, width, height, and its general climate.

Other capabilities arise from investments that our nation has made in these facilities. For example, the Military Services have purchased complex systems to score training activities – from training ground forces in firing the M-16 rifle to training pilots in air-to-air combat and bomb delivery – and provide critical feedback. Targets simulate enemy systems and facilities. Emitters simulate the electronic warfare environment. At the DoD's largest training centers, highly capable opposition forces challenge military units undergoing training in complex exercises.

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12 *BRAC 2005 is authorized by the Defense Base Closure and Realignment Act of 1990, Public Law 101-510, as amended through the National Defense Authorization Act for Fiscal Year 2004. For more information about BRAC 2005, see the Department's BRAC web site: www.defenselink.mil/brac*

3.2.1. Army

The capabilities and capacities of the ranges in the Army inventory are best communicated by the facility descriptions of each of the range types (by facility category code, FCC). Appendix G contains descriptions of each type of range and training land in the current Army range inventory and descriptions of the 15 newly proposed ranges the Army anticipates the Future Force will require at their eventual home station installations. Where appropriate, the description includes the number of firing points or lanes that are in the standard Army design for each range type. This provides some insight into how many soldiers or crews can train on the facility at one time. It should be noted, however, that due to topography and space constraints most ranges in the Army inventory are not constructed with the standard numbers of firing points or lanes. This is particularly true for ranges located at remote reserve component (Army National Guard and Army Reserves) sites rather than at major training installations.

3.2.2. Navy

The capacity and capability of Navy training range complexes and individual ranges not in a complex are described above in the Section entitled "Operational Range Inventory" and listed in the inventory provided at Appendix E. The Navy defines range capabilities as the ability to support training in the Naval Warfare Mission Areas: Anti-Air Warfare, Amphibious Warfare, Antisurface Ship Warfare, Antisubmarine Warfare, Command and Control Warfare, Logistics, Mine Warfare, Naval Special Warfare, and Strike Warfare.

3.2.3. Marine Corps

The Marine Corps relies on an extensive portfolio of land and airspace resources to accomplish training at all levels of the continuum–entry and individual, unit, MAGTF, and Joint training. The major "Marine Corps owned and operated" training ranges comprise a suite of range complexes at the portfolio's core. The Marine Corps also depends on extensive cross-Service utilization and access to non-Marine Corps training lands and airspace. Additionally, the Marine Corps relies on foreign ranges, non-DoD federal lands (e.g. Bureau of Land Management [BLM] property), and non-federal lands.

Assessing range capabilities requires consideration of a range's role in supporting the training continuum and Training and Readiness (T&R) Program and variables affecting range capability. Such variables include training "battlespace" size, terrain, weather, safety, available targets and instrumentation, and encroachment impacts. These variables affect a range's training value and role in the training continuum. Enhancements to the Range Management System will incorporate training standards from the T&R Program, encroachment information, and other range constraints data, providing a mechanism to assess Marine Corps ranges in terms of relative training values. Appendix H identifies representative range capabilities of Marine Corps installations and associated ranges.

Appendix H depicts representative range capabilities in terms of the level and type of T&R events that can be supported. These tables do not reflect range capabilities in terms of training value.[13] Planned enhancements to the Range Management System will incorporate training standards from the T&R Program, encroachment information, and other range constraints data, providing a mechanism to assess Marine Corps ranges in terms of training value and readiness.

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13 *For example, MCB Hawaii and Camp Pendleton are both depicted as supporting amphibious operations, but Camp Pendleton's capability in this area is greater, due to its more extensive beaches and inland maneuver corridors. Each of these installations, and the Marine Corps, is aggressively pursuing initiatives to enhance training capabilities in these and other areas.*

In addition to the major "Marine Corps owned and operated" training ranges, the Marine Corps also depends on extensive and extended access to non-Marine Corps training lands and airspace, and in particular, it engages in extensive cross-Service utilization. In addition to access to other Services' ranges and airspace, the Marine Corps relies on other nations' ranges, non-DoD federal lands such as BLM property, and non-federal lands – both public and private.

For example: A typical MEU (SOC) from I MEF will train in amphibious tactics at Camp Pendleton and in naval gunfire techniques at the Navy's San Clemente Island Range Complex, conduct air combat and CAS exercises at the MCAS Yuma / YTRC ranges, conduct a combined-arms exercise at MCAGCC 29 Palms, train in mountain warfare at the Marine Corps Mountain Warfare Training Center, Bridgeport, and engage in an urban training exercise using non-federal resources in a major metropolitan area. The 22nd MEU recently completed a month-long training event at the Army's Fort A.P. Hill. The 13th MEU recently conducted MOUT training at host-nation facilities in Singapore. The 1st Marine Division's Desert Scimitar exercise utilizes BLM land and has included a tactical bridging exercise across the Colorado River. Development of an expeditionary force training capability at Eglin Air Force Base is a priority, and the Marine Corps proposes to execute two ten-day training exercises with a MEU(SOC) at Eglin each year.

The following is a partial list of non-Marine Corps training resources that are used for Marine Corps training:

Fuji Maneuver Area (FMA), Camp Fuji, Japan

The FMA supports training for III MEF forces in each maneuver and live-fire MAGTF element.

Eglin AFB, FL (USAF)

Eglin AFB provides live-fire training (alternative training capability to that lost at Vieques) for eastern U.S. Naval Expeditionary Forces/Expeditionary Strike Groups (ESG) and their embarked MEU(SOC)s.

San Clemente Island (SCI) Range Complex, CA (USN)

Marine Corps operations and training at SCI exercise all MAGTF elements. SCI is the only West Coast range that supports naval surface live-fire training.

Fort Bragg, NC (USA)

Operations and training at Fort Bragg exercise MAGTF artillery and engineer elements at all levels, including the annual artillery exercise, Rolling Thunder.

Fort A.P. Hill, VA (USA)

Utilized year-round, operations and training at Fort A.P. Hill exercise combat elements of a MEU(SOC) and live-fire and maneuver training.

Fort Pickett, VA (USA)

The operations and training conducted at Fort Pickett focus on qualification and firing of the 2d Marine Division / II MEF armored vehicle and tank assets (i.e. 120mm tank main gun and the 25mm chain gun training).

Pohakuloa Training Area (PTA), Marine Corps Base Hawaii (MCBH), (USA)

Marines of the III MEF stationed at MCBH use the PTA for MAGTF live-fire combined arms training. The PTA accommodates small arms, artillery, anti-armor, explosives/demolitions, and inert aviation ordnance.

Non-military and Foreign Training Areas

The 1st Marine Division conducts annual command and communication capabilities training (Desert Scimitar) on federally-owned or managed (BLM) land near 29 Palms, CA and Yuma, AZ. The Marine Corps also trains on host-nation lands (e.g. Scotland, Norway, Korea, Denmark, Australia, and the Horn of Africa and West Africa).

3.2.4. Air Force

Capacities are defined as the suitability of range complexes for accomplishing testing and training missions. Capacity can also explain the amount of activity that can be accommodated. The testing and training capacity of each range is dictated by a number of factors. The most important variable in evaluating capacity is whether or not a range has the capability to support a given task. It should be readily apparent that if a range cannot support a specific task (e.g., no live munitions use is allowed), its capacity in that area is zero. If a range can support a specific activity, one important variable is the operating period of the range (i.e., number of hours per day and number of days per year). Other important variables are the number of aircraft that can be supported during a given sortie and the communications capacity of the range. The advent of modern data systems that track and record events for subsequent analysis has placed greater demands on the communications infrastructure. Information on the capacities of each of the ranges in the United States is presented in Appendix I.

Capabilities are defined as major attributes of range complexes. Information on the capabilities of these ranges is presented in Appendix I. For each range, Appendix I lists the types of aircraft that normally use the range to meet training requirements and specific training activities that can be supported on each range (e.g., training with live ordnance, inert ordnance, whether it has threat emitters).

3.3. Encroachment

> "While the effect varies by service and individual installation, in general encroachment has limited the extent to which training ranges are available or the types of training that can be conducted."[14]

This is a conclusion that the General Accounting Office reached in its June 2002 report on encroachment and military training ranges. Today, encroachment constrains the Department's ability to take full advantage of our investment in training capabilities.

The SROC, which DoD created in 1993, is the senior-level DoD forum for readiness policy and oversight, including encroachment and related issues. The SROC is comprised of high-level military and civilian officials and is chaired by the Deputy Secretary of Defense. The SROC convenes monthly to review the readiness of military forces. The SROC provides quarterly readiness reports to the Congress.

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14 ***Military Training: DOD Lacks a Comprehensive Plan to Manage Encroachment on Training Ranges***. *GAO 02-614, June 11, 2002, p. 9.*

In November 2000, the SROC identified 17 encroachment issues affecting military training and testing. These encroachment issues impact training and testing by restricting range activities and capacities. Such restrictions affect combat readiness. Eight of the seventeen encroachment issues were identified as especially critical for action and presently have action plans in place. This section discusses these eight issues, plus three more major sources of encroachment and their impacts.

3.3.1. Endangered Species and Critical Habitat

Military lands provide habitat for more than 300 federally listed threatened and endangered species that must be protected under the Endangered Species Act (ESA). Many military installations and ranges are surrounded by urban development, and often become the only large undeveloped areas available to support endangered species. At the same time, new weapons systems are being introduced with increased standoff, survivability and lethality capabilities. Warfighting strategies are changing for more widely disbursed, highly mobile units with very long-range firepower. Base realignment and closure has resulted in the concentration of units at remaining bases. Forces stationed overseas have been redeployed to U.S. installations. Thus, environmental concerns arise as a result of greater use of military ranges and operating areas in the Continental U.S. As land use restrictions increase in order to protect endangered species, there is the potential for reduced flexibility to use military lands for training and testing.

Changes in the ESA that the Congress enacted in Section 318 of the National Defense Authorization Act for Fiscal Year 2004 will improve the Department's ability to balance the conservation of protected species and military readiness. The provisions in Section 318 will allow the Department to manage protected species through the implementation of integrated natural resource management plans required by Section 101 of the Sikes Act, rather than through the designation of critical habitat.

3.3.2. UXO and Munitions

Ranges and training areas are critical to DoD's ability to conduct realistic, live-fire training and weapon systems testing. Live-fire is, and will remain, the cornerstone of Service training and testing. Military live-fire training and testing activities by necessity deposit unexploded ordnance (UXO) and munitions constituents onto military lands. CERCLA, RCRA, the Clean Water Act (CWA), and the Safe Drinking Water Act have implications for the use of military munitions, to include UXO and munitions constituents on operational ranges. There is a growing recognition that the application of these environmental laws in ways unanticipated or unintended when first enacted can reduce range access, availability, capacity, and capability. Restrictions on training and testing can increase the extent to which military readiness is compromised. Furthermore, uncertain application and inconsistent enforcement of legislation and regulation limit DoD's ability to plan, program, and budget for UXO and munitions compliance.

3.3.3. Frequency Encroachment

With very few exceptions, training and testing rely heavily on the radio frequency (RF) spectrum. The RF spectrum is essential for the operation of national defense systems such as Global Positioning System (GPS), precision guided munitions, tactical radio relay communication systems, and air combat training systems. These systems and emerging technologies are becoming increasingly more complex and data-intensive, resulting in an increased demand for RF bandwidth. Commercial spectrum uses are increasingly coming into conflict with military RF requirements. Since 1992, DoD has lost approximately 27 percent of the total RF spectrum allocated for aircraft telemetry as a result of congressionally mandated spectrum reallocations and other regulatory mechanisms to accommodate commercial devices. The reallocation of this spectrum and increased commercial RF interference, along

with military systems demands for bandwidth, put important training and testing activities at an increased risk.

3.3.4. Maritime Sustainability

Training and testing at sea is complicated by the demands of regulatory compliance, which can adversely affect the ability of U.S. Naval forces to sustain operations, training exercises, and testing in the maritime environment. For example, the Marine Mammal Protection Act (MMPA), seeks to "protect from harm" sensitive habitats and living marine resources such as marine mammals, sea turtles, and coral reefs. But overly restrictive interpretation of this goal can, and has, inhibited naval readiness activities globally. For example, regulatory compliance efforts require DoD to consult with United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) or National Oceanic and Atmospheric Administration (NOAA) Fisheries, and state regulators when a proposed action may "affect" a protected resource. The consultation process in turn can result in stringent restrictions on DoD activities. Such measures restrict training and testing activities essential to Naval readiness and marginalize the Navy's ability to sustain future training and testing affiliated with emerging technologies.

Section 319 of the National Defense Authorization Act for Fiscal Year 2004, amended the MMPA by clarifying definitions, authorizing a national security exemption that can be invoked by the Secretary of Defense, and requiring the consideration of the impact of MMPA mitigation on military readiness activities. These changes will help the Department address maritime encroachment issues.

3.3.5. Air- and Land-space Restrictions

DoD requires SUA to conduct realistic airpower training, weapons employment, and critical test and evaluation of future aircraft, weapons, and systems. SUA is vital to military training and testing but is in conflict with the growing demands of the deregulated commercial airlines and general aviation that compete with military aviation activities for the same airspace. Moreover, new and emerging weapons platforms and systems will require more rather than less airspace for realistic training and testing. SUA will become more critical with emphasis on near real-time management. Such management will require a more integrated Federal Aviation Administration (FAA)/DoD process to increase the efficacy of SUA practices and to sustain military SUA for the future.

With substantial land-based forces, the U.S. military needs land to train. Lack of required access to sufficiently large contiguous pieces of land to conduct doctrinally sound maneuver training is the single most critical external constraint facing land-based training. Modernization has increased our combat units' speed, range, and mobility and has dramatically improved the command and control capabilities of commanders. They no longer require line-of sight, but increasingly rely on technology to employ their units. Constraints on the availability of training land are largely a factor of existing installations footprints, urban growth, and natural resource conservation requirements.

3.3.6. Air Quality

Readiness limitations can arise due to application of the Clean Air Act (CAA) to emissions generated on military installation and ranges. The two most common concerns are opacity rules and air conformity requirements. Opacity rules can restrict or prohibit some training and testing activities such as smoke and mounted maneuver training and can limit prescribed fires to manage vegetation. Opacity is a sensitive issue with the public, especially near parks and designated wilderness areas. Further, the "general conformity" requirements of the Clean Air Act, applicable only to federal agencies, threatens the Department's ability to deploy new weapons systems and relocate existing ones, despite the fact that only

minor levels of emissions are involved. Therefore, opacity and conformity standards may restrict certain training and testing operations, as well as restationing or deploying new weapons systems in non-attainment areas.

3.3.7. Airborne Noise

Noise associated with military readiness (e.g., aircraft operations, small and large caliber weapons firing, rocket launches, engineer detonations, and sonic booms) is an issue at installations, under low-level flying routes, and at training and testing ranges. The pivotal issue of noise is the impact or perceived impact of noise on people, animals (both wild and domestic), structures, and land use. The degrees to which there are noise restrictions are directly related to the presence of people, wildlife, and noise-sensitive land near military installations, ranges, and low-level aircraft training routes.

3.3.8. Urban Growth

Urban growth in close proximity to active military installations can lead to operational challenges for the installation and ranges, and may constitute health and safety threats to the community. Such growth is the root cause of many other encroachment concerns. Aircraft operations have adverse noise and safety implications. Ground training, such as artillery fire, also generates noise that can adversely affect the surrounding community. Residential areas and places of public assembly (e.g., schools, churches, restaurants, theaters, and shopping centers) often are not compatible with military activities when located close to military installations and ranges. At night, light emanating from nearby communities may interfere with training in the use of night vision equipment. Public pressure to reduce noise and the residual effects of military training and testing activities and to ensure safety often forces installations and ranges to restrict those operations deemed disturbing to the community. In general, such restrictions are put into place during certain portions of the days or when the activities exceed established noise thresholds or safety criteria. In areas with adequate land space, community planners can acquire buffer zones between urban areas and military rangelands that provide noise and safety barriers to military operations.

3.3.9. Cultural Resources

Cultural resources are prevalent on military installations and ranges. As such, they are subject to the provisions of Federal and state legislation and regulation, including the Native American Grave Protection and Repatriation Act (NAGPRA), the National Historic Preservation Act (NHPA), and the Archeological Resources Protection Act (ARPA). These statutes direct the conservation and preservation of Native American, European, African/American and other cultural resources sites. Military installations and ranges must accommodate these sites by protecting or mitigating interference with them according to Federal and state compliance requirements. In some cases, the cultural sites may interfere with training and testing activities by limiting access to areas where sites are found. In such cases, range management and operations must adjust to regulatory compliance by providing training workarounds and range sustainment alternatives.

3.3.10. Clean Water

Water quality is an environmentally sensitive issue for all stakeholders on and near military training and testing ranges. The CWA, the legislation that regulates discharges of pollutants into the waters of the United States, gives the Environmental Protection Agency (EPA) the authority to implement pollution control programs such as setting wastewater and water quality standards. Private litigants have alleged

the CWA applies to military lands where munitions constituents released during the course of testing and training may discharge into water sources. If these litigants prevail on this theory, the act of using munitions during the course of testing and training on operational ranges could be subject to CWA permitting requirements and, depending on the regulatory controls imposed, could significantly interfere with training and testing.

3.3.11. Wetlands

Some military ranges contain wetlands, considered a scarce and valuable natural resource. They are vital fish and wildlife habitats, some surrounded by upland with no apparent surface water outlet. Wetlands are unique ecosystems sensitive to disturbance. They are protected under the National Environmental Protection Act (NEPA), the North American Wetlands Conservation Act, CWA, and other laws. EPA manages wetlands in the Office of Wetlands, Oceans, and Watersheds. Military operations normally avoid using wetlands during tactical operations because they are unsuitable for maneuver warfare. Moreover, because they are protected, they require management attention. Range management and operations must consider the impacts of wetlands on current training and testing and must develop range sustainment strategies to accommodate training and testing requirements for evolving operational missions and emerging technologies.

3.4. Training Constraints and Impact Factors

Recent experience at DoD range complexes indicates that encroachment degrades training in the following ways:

- Creates avoidance areas. Encroachment requires military forces to avoid certain areas of land, airspace, or sea space. For example, ground troops may not be able to train in certain areas due to the presence of endangered species; or aircraft may have to avoid certain areas to limit noise. Avoiding these areas can degrade the quality of training.
- Reduces usage days. Training is restricted or prohibited on some days in some areas. For example, Navy ships may not be able to operate in certain areas at specified times because of migrating marine life. Aircraft training may be prohibited at certain times to avoid migratory birds or to avoid interfering with the mating season of certain species.
- Prohibits certain training events. Encroachment may prohibit certain training events. For example, ground troops may be prohibited from digging into the ground to create realistic fighting positions, aircraft may be prohibited from using flares or chaff, and ships may be prohibited from using sonar equipment. In these cases, the training must be conducted at other locations, or work arounds must be developed.
- Reduces range access. Encroachment can reduce access to ranges. For example, encroachment may reduce approaches to target areas to certain specified corridors, rather than permitting access from multiple approaches. Such limitations may degrade the realism and value of the training event.
- Segments training and reduces realism. Encroachment may mean that training events that should naturally follow in sequence, to mirror their occurrence in combat, might have to be segmented in training. For example, aircraft might have to practice ordnance delivery and evasive maneuvers at different times, rather than together. Ground forces might have to practice ship-to-shore maneuvers at one time, and assaults on enemy positions at another. Segmentation of training reduces realism and the value of training experiences.

- Limits new technologies. Concerns about encroachment may limit training with new technologies. For example, encroachment may limit the military's ability to conduct realistic training with unmanned aerial vehicles (UAVs), which are now a standard tool on the battlefield. Limitations on training could very well translate into limited applications in combat, as forces apply technologies as they have in training, and perhaps not to the technology's full potential.
- Restricts flight altitudes. Civilian use of higher altitudes may prevent military forces from taking full advantage of SUA. In training, aircraft may be forced to fly in artificially low altitudes, which reduces realism and may cause pilots to adapt practices that must be "un-learned" in actual combat. In other cases, aircraft may be forced to fly in artificially high altitudes to reduce noise or to avoid obstructions such as cellular telephone towers, power lines, and energy-producing windmills.
- Inhibits new tactics development. By restricting maneuver areas, approaches to targets, altitudes, technologies, and the like, encroachment inhibits the creative development of new tactics.
- Complicates night and all weather training. Community development near training ranges complicates night and all weather training. For example, in combat, we enjoy an overwhelming advantage when we fight at night. Nighttime training, therefore, is essential to force readiness. Nighttime, however, is also the time when residents near military installations are especially sensitive to noise. Voluntary or mandatory restrictions on military training at night, therefore, may foster better community relations, but they pose especially critical limits on militarily essential training.
- Reduces live fire proficiency. Encroachment from community development, endangered species, environmental regulations and other factors reduce opportunities for the use of live fire ordnance, thereby reducing proficiency. While the use of simulation and inert ordnance can replace some live fire training, training with live ordnance remains essential for adequately preparing military forces for combat.
- Increases personnel tempo. Encroachment increases personnel tempo when forces must deploy away from their home station to receive effective training. For example, forces stationed at Fort Lewis, Washington, must conduct essential training at the Yakima Training Center.
- Increases costs or risks. Encroachment can increase costs in a variety of ways. Examples include transportation and other costs for units to train away from their home station when encroachment limits training there; fuel costs for aircraft training missions that must be aborted because of the occasional presence of wildlife in target areas; and the costs of natural resource conservation projects.

3.5. Inventory and Encroachment Summary

Encroachment issues will challenge the Department of Defense for many years to come. Realistic military training will continue to require substantial amounts of airspace, land, water, and frequency spectrum. DoD will continue to serve as a responsible steward of our nation's resources, and to work with stakeholders to provide the sustainable installations and ranges that are essential for training and readiness. We will continue the management improvements that enable these efforts, such as maintaining and improving the inventory at Appendix E, and documenting the effects of encroachment on training and readiness.

4. ADEQUACY OF CURRENT AND FUTURE SERVICE RANGE RESOURCES IN THE U.S. AND OVERSEAS

Today, the Department has good insight into the adequacy of its range resources. As described later in this chapter, each of the Military Services has methodologies and information systems to evaluate range adequacy. Ongoing efforts across DoD and within each of the Military Services will improve upon today's methodologies and processes.

Assessing range adequacy is a complex undertaking. It requires the identification, collection, and analysis of a wide variety of data on factors such as training requirements, capacity, capabilities, encroachment, location, and access. The assessment must consider and balance these and other factors, such as the need to allocate training resources between Service-unique and joint training requirements.

Although the Department has many concerns about range adequacy, in general our range complexes allow military forces to accomplish most of their current training missions. In general, constraints at overseas range complexes pose more difficult encroachment and training challenges, a finding consistent with a recent GAO audit.

Today and in the future, many factors threaten the adequacy of our range complexes, including:

- The encroachment factors and impacts described in Chapter 3, which present enormous challenges to range adequacy.
- The growing need for military forces to train in combined arms and joint operations, especially in large multi-echelon exercises.
- The need to sustain, restore, and modernize range infrastructure, such as scoring systems, targets, and threat emitters.
- New weapon systems and technologies with capabilities that stress the existing training range infrastructure.

The fact that our ranges are generally adequate today is a testament to the cooperation the Department has received from the Congress and many states, Native American tribes, local governments, and nongovernmental organizations. It is also a testament to the dedication of our military and civilian personnel, who have worked hard to ensure that military forces can accomplish their training missions in the face of substantial limitations resulting from encroachment and other obstacles.

In the future, the adequacy of our range complexes will erode without substantial efforts to address encroachment, adequate investments in our training range infrastructure, robust range sustainment programs, and the continued cooperation of others. We must work together to preserve the adequacy of our range complexes. If we fail to do so, the resulting impacts on military readiness will be unacceptable. The next sections address the adequacy of the Military Services' range complexes.

4.1. Army

Although the Army carries a large inventory of ranges and training land, there are substantial shortages of key "modernized" or "automated" ranges. Based purely on range count, the Army carries significant overages of range facility types. This is attributable to a large number of older ranges that do not fully meet current doctrinal requirements. The large number of small arms ranges also addresses the Army's need to accommodate its Reserve Component training requirements by minimizing time and distance

requirements from armories and centers to ranges. In addition, the Army conducts training with substantially less maneuver area than required by established standards.

In addition to an assessment of whether or not the Army has adequate numbers of ranges and acreage of maneuver land, it is necessary to examine the condition of those assets to determine whether the ranges and land adequately meet the Army's mission requirements. The Army developed the Installation Status Report (ISR) in 1994 as a way to assess installation level conditions and performance against Army-wide standards. Data is provided annually from all Army installations to develop a three-part report consisting of Infrastructure, Environment and Services. To report these ratings the ISR uses the familiar "C" rating system similar to the Unit Status Report (USR).

Appendix J contains the condition rating for the categories of range facilities as assessed in the 2002 ISR report. When taken in conjunction with delta between the number of ranges on hand and the requirement for ranges, the condition ratings provide a better indication of the adequacy of the Army's range and land assets. The condition ratings are summarized in Table 4-1.

Condition Rating	Number of Range Categories by Condition Rating in 2002 Army Installation Status Report Part 1
C1	0
C2	7
C3	21
C4	7
Total	35

Table 4-1: Summary of Condition Ratings for Range Categories from 2002 Installation Status Report

NOTES:

C1 = Almost all (≥ 95%) required facilities on hand; meets unit/activity needs and Army standards; very minor, if any function deficiencies; infrastructure fully supports mission performance.

C2 = Most (≥ 80%) required facilities on hand; meets unit/activity needs and partly meets Army Standards; minor functional deficiencies; infrastructure supports majority of assigned missions.

C3 = Majority of (≥ 60%) required facilities on hand; meets majority on unit/activity needs; does not meet Army Standards; some functional deficiencies; impairs mission performance

C4 = Less than 60% of required facilities on hand; facilities do not meet unit/activity needs or Army Standards; major functional deficiencies; significantly impairs mission performance.

Overall, 28 of the 35 range categories have some or major functional deficiencies, do not meet Army standards, or impair or significantly impair mission performance. The range categories with the lowest condition ratings are field fire ranges (automated and non-automated); field artillery direct fire ranges; tank/fighting vehicle scaled gunnery ranges; tank/fighting vehicle stationary gunnery ranges; engineer qualification ranges (non-standardized and automated/standardized); infiltration courses; and aerial harmonization ranges.

4.2. Navy

The Navy is developing a systematic approach for evaluating the adequacy of its range resources. Two parallel efforts are well underway that will result in range complex specific assessments of range assets. One effort is the development of a range evaluation tool to facilitate range management decision-making and to ensure that the Navy maintains adequate range resources to train Naval forces. In addition, the Navy has initiated a program to develop RCMPs at all training range complexes, and a key component of

each RCMP will be an analysis of range encroachment and its impact on training. RCMPs will also include the measures and resources needed to address encroachment and resultant training impacts.

4.2.1. Methodology

The Navy is using the Center for Naval Analysis (CNA) to develop a methodology for quantifying training range support for readiness and to identify the role that encroachment plays in degrading necessary training. To initially develop an encroachment methodology for OSD, CNA studied a Carrier Air Wing training event occurring on a portion of the Fallon Range Training Complex. The Navy actively supported the OSD effort and has subsequently employed CNA to develop more fully the approach and to provide an analytical tool to determine range adequacy. The CNA approach consists of a skills-based range resource assessment that focuses on the Navy Warfare Areas and the resulting effects from encroachment. The assessment of each range complex will capture lost training due to insufficient resources.

4.2.2. Analysis

A methodology has been developed and approved, and a prototype evaluation conducted. The next step in the development of the skills-based plan is to apply the methodology across one entire warfare area on all the ranges of the West Coast of the United States. As part of this practical application, CNA will develop an analytical tool that upon completion will be provided to the Fleet commands in order to allow them to apply the methodology across all warfare areas and range complexes. RCMPs will also address constraints.

4.3. Marine Corps

Marine Corps combat readiness depends on continued provision of realistic, mission-oriented training by ranges and training areas. The Marine Corps has identified six Cornerstone Objectives for transforming ranges and training areas: (1) preserve and enhance the live-fire combined-arms training capabilities, (2) recapture MAGTF and unit-training capabilities, (3) leverage technology to support every level of training to provide timely and objective training feedback, (4) honor commitments to both environmental protection and military readiness, (5) ensure training complexes are available to, and capable of supporting Joint forces, and (6) guarantee pertinent common range infrastructure and systems architecture to support the JNTC.

4.3.1. Range Planning and Management

The Marine Corps Sustainable Ranges process integrates "all functional elements of installations and range and training area management, which provide for the Marine Corps bases' and stations' long-term viability and ability to support realistic training." Analytical tools for range assessment currently in use or scheduled for development include:

Commanding Officers Readiness Reporting System (CORRS)

This system is designed for facility condition and readiness reporting to improve resource management for installation readiness needs. CORRS assesses installation conditions using Marine Corps-wide standards and estimates resource requirements, and it articulates Marine Corps needs through program and project prioritization and resource allocation assistance. CORRS assesses installation mission

capabilities in terms of both training range quantity and quality. Appendix K summarizes the 2002 CORRS results.

Range Complex Management Plans (RCMPs)

These documents will provide range complex descriptions, characterize training operations, and develop a 10-year range operations strategic vision. The process will (1) identify and analyze encroachment and sustainment challenges, (2) outline range complex sustainable management practices, and (3) identify investment needs for sustaining, upgrading and modernizing ranges.

Range Environmental Vulnerability Assessment (REVA)

The REVA process will evaluate areas in operational ranges potentially vulnerable to regulatory action due to potential human health and environmental threats. REVA supports compliance with Department of Defense Directives 4715.11 and 4715.12, Environmental and Explosive Safety on Operating Ranges, and the FY04 Defense Planning Guidance. REVA is analogous to the Navy's Range Sustainability Environmental Program Assessment (RSEPA) and the Army's Regional Range Study Program.

A primary purpose of REVA is to afford robust environmental assessment and range complex management planning. Potential range vulnerabilities across a broad spectrum of environmental and encroachment issues will be assessed. To discharge these responsibilities, the Marine Corps has initiated a Training Range Real Property Analysis as part of a broad assessment of Marine Corps real property management programs. The Training Range Real Property Analysis Study goals are to (1) review current training range real property management, (2) include category codes revisions, management criteria, and inventories, and (3) recommend improved asset visibility, sustainment and criteria development.

Range Management System (RMS)

This system is a scheduling, reporting, and training management tool that allows for assessment and management of encroachment concerns, range modernizations, and investments. This system will also be the backbone of the Safe Range System, an automated aviation ordnance "footprint" tool used to orchestrate training events and safe range operations. Plans for the RMS also include relating range and training area capabilities and limitations to the T&R program, which provides commanders with a standardized format for training, reviewing and revising, and promulgating their training standards. This enhancement will allow the RMS to quantify and relate range value to operational readiness.

Range Facility Management Support System (RFMSS) 2002

This system includes real-time airspace management and GIS modules and improves reporting and range management modules. It will provide a powerful tool to schedule training, assess training resources, and plan range improvement and investment.

4.3.2. Range Transformation: Sustainment, Upgrading, and Modernization

The Marine Corps aggressively supports the RRPI. Through RRPI, Congress paved the way for the Military Services to acquire buffer lands to combat encroachment and preserve the operational viability of the Marine Corps bases. Under the "encroachment partnering" authority provided through "Agreements to Limit Encroachments and other Constraints on Military Training" (10 U.S.C. section 2684A), the Marine Corps already has achieved notable progress in partnership with various non-governmental organizations. Buffer lands conservation forums have been formed and acquisition efforts are underway

at Camp Lejeune and Camp Pendleton. Similar forums are also being formed at MCAS Beaufort, Townsend Range, GA, and MCB Quantico.

4.4. Air Force

4.4.1. Current

There are several key conditions that must be met for a range and its associated airspace to be considered adequate to meet test and training requirements:

- The range should be close enough to the aircrew's installation to avoid or minimize the need for refueling during a mission.
- The range and airspace configurations must be conducive to the testing or training task (i.e., appropriate horizontal and vertical dimensions).
- The range must have the appropriate infrastructure (i.e., if the task is to simulate action against an IADS, the range needs to have an appropriate mix of threat emitters).
- There should be no externally imposed constraints on operations that preclude accomplishment of the mission.
- The range must have sufficient total and daily operating hours to allow accomplishment of all tasks.

Over the last few years the Air Force has been increasingly concerned about the adequacy of ranges to meet testing and training requirements. In 2000, Air Combat Command, concerned about the increasing competition for use of a limited infrastructure, saw a need to begin to shift from deficiency-based approach for determining range and airspace infrastructure needs to a requirements-based approach. One of the first efforts along these lines is documented in the 2001 RAND Corporation report titled *Relating Ranges and Airspace to Air Combat Command Missions and Training.* That report is one of the first attempts to relate missions and training requirements to the supporting infrastructure through comparison of existing training requirements to existing training resources.

The study found that while all current annual air-to-air sorties can be flown in the area near installations without refueling, for fighter air-to-ground sorties, 19 percent exceeded the maximum free cruising distance (MFCD). The analysis suggests that exceeding the MFCD is an indicator that those aircrews are receiving reduced training value.

With respect to bomber aircrew training, it was determined that the bomber aircrews at Barksdale AFB, Ellsworth AFB, and Minot AFB have no convenient access to a range to deliver live weapons. For this reason, these crews rely on simulated drops against electronic scoring sites.

The Combat Air Forces *(CAF) Mission Support Plan (MSP)* evaluates Air Force ranges to determine how well each range meets MDS-specific training requirements. Criteria for evaluation include the types of targets and ordnance available for use on a given range and the capability of the range to simulate attacking an IADS. In general, this evaluation shows that all Air Force ranges except the Nevada Testing and Training Range have at least one constraint that has an impact relatable to a specific training requirement.

In addition to the information from the *CAF-MSP,* input was sought from the MAJCOMs via a questionnaire sent out in July 2003. In the responses from the MAJCOMs, 31 cases of encroachment constraint were identified as affecting operations at Air Force ranges in the U.S.

4.4.2. Future

Urban expansion and population growth around ranges and installations place predictable constraints on Air Force operations. Training can be affected by transportation infrastructure (especially air transport), advances in telecommunications (which affect the available communications bandwidth), and quality of life issues (such as noise and environmental impacts).

The Air Force also has an ongoing initiative to evaluate the potential for constraints being imposed on testing and training ranges. This effort, application of a methodology referred to as the *Resource Capability Model,* seeks to quantify requirements in terms of the resources required, and then compare that requirement to the resources available to meet that requirement. Using the model, constraints can be described in sufficient detail to allow for action to attempt to resolve the limitation. This model has been pilot-tested at several Air Force installations, and additional installations will be evaluated in the coming year. As appropriate, information from these evaluations will be presented in subsequent reports.

The Air Force's review of overseas ranges is still underway. Therefore, an adequacy evaluation would be premature. Results of the evaluation will be published in subsequent Section 366 and 320 reports.

5. COMPREHENSIVE PLAN TO ADDRESS TRAINING CONSTRAINTS

The Department is developing and implementing comprehensive plans to address training constraints. Under Title 10 of the United States Code, the Military Services have principal responsibility for training military forces and for training range complexes. It is appropriate, therefore, for the Military Services to develop and implement comprehensive plans that best meet their needs, while ensuring an appropriate amount of consistency. This is precisely the approach that DoD is undertaking.

DoD Directive 3200.15, "Sustainment of Ranges and Operating Areas," establishes requirements for comprehensive and integrated planning for the sustainment of range complexes and operating areas. The directive states that it is DoD policy that the planning process incorporate considerations from all relevant functional offices, including installation, range, OPAREA, munitions management, and range users, as well as environmental, legal, public affairs, safety, and medical staff. Among other things, the Directive requires the Under Secretary of Defense for Personnel and Readiness to provide guidance and oversight, and the Military Services and other DoD Components to prepare management plans for range complexes and OPAREAs. Conducting outreach to promote range sustainment and resolve encroachment issues is a key element of DoD policy and the range management plans.

The Department recognizes the importance of making sure that the Service plans address requirements for joint training. Oversight by the Under Secretary of Defense for Personnel and Readiness and reviews by the SROC, the Sustainable Ranges IPT, and the Sustainable Ranges Working IPT ensure that joint issues are addressed in the plan development process.

The Military Services are carrying out the planning required by the Directive. Each Service is implementing a planning process that is best suited to its requirements and ranges. Although the specific approaches differ, the general characteristics of the Service planning processes are similar. The planning processes establish Service-level program priorities and require detailed, structured reviews of individual installations, range complexes, and OPAREAs. The intensive reviews are carried out in a phased approach. The Services are defining investment priorities for sustainment, modernization, and other range related issues on the basis of the programmatic reviews and assessments of individual range complexes and OPAREAs.

5.1. Army

The Sustainable Range Program (SRP) is the Army's overall approach to improving the way it designs, manages, and uses its ranges to meet its Title 10 training mission. The SRP has two core programs: the RTLP and ITAM. The SRP core programs are integrated with the facilities management, environmental management, munitions management, and safety program functions that support the doctrinal capability to ensure the availability and accessibility of Army ranges and training lands.[15]

To ensure that it sustains a trained and ready force, the Army must improve the way in which it designs, manages, and uses its ranges to meet its Title 10 responsibilities. The foundation for this improvement is the strategy contained in the SRP. The SRP is the roadmap that advances the Army from its current range management performance levels to improved performance levels. The SRP is founded on three tenets:

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[15] *Within the Army Test and Evaluation Command (ATEC), SRP is defined by its test ranges and ITAM programs and is similarly integrated with the programs described in the preceding statement.*

- **Information Excellence**. Information excellence ensures the Army has the best available spatial and temporal data and science to support the operational, environmental, and infrastructure characteristics of its ranges and land assets. Information excellence also includes an increased understanding of the impacts of the Army's live-fire operations on the environment.
- **Integrated Management**. Integrated management ensures that the major management functions directly affecting ranges and land assets (i.e., operations, facilities, and environment) are integrated to support the training and testing missions.
- **A Dedicated Outreach Program**. A dedicated outreach program educates the public on the need for live-fire training and improves the Army's understanding of public concerns related to Army training and range operations.

The SRP goal is to maximize the capability, availability, and accessibility of ranges and training land to support doctrinal training and testing requirements, mobilization, and deployments under normal and surge conditions.[16] Eight objectives support the SRP goal.

- **Objective 1 – Range Facilities.** Modernize training and testing range facilities to sustain live training execution in accordance with OPTEMPO, Flying Hours Program, STRAC, and other training strategy requirements through military construction (MILCON) investments, New Missions, Revitalization, and the Army Facilities Strategy.
- **Objective 2 – Range Operations.** Resource range and training land operations**.**
- **Objective 3 – Range Maintenance.** Sustain range and training facilities. DAMO-TRS is the lead for ITAM Land Rehabilitation and Management (LRAM) and range operations maintenance that includes repair of targetry and equipment.
- **Objective 4 – Encroachment.** Maximize the accessibility of ranges and training land by minimizing restrictions brought about by encroachment factors.
- **Objective 5 – Environmental Responsibilities.** Focus the capability of the environmental program to fully support force readiness by sustaining the accessibility of ranges and training land.
- **Objective 6 – Outreach.** Develop and implement the SRP Outreach Program to improve public and stakeholder understanding of the Army's live training and testing requirements and clearly articulate and underscore activities supporting national security.
- **Objective 7 – Integrated Management.** At all echelons of the Army, establish an interdisciplinary approach to sustainable range management that integrates operational, facilities management, environmental, and safety functions.
- **Objective 8 – Professional Development.** Establish a multi-disciplined career program for range operations personnel that supports sustainable range management.

[16] *Within SRP: Capability refers to the SRP core functions – the RTLP and ITAM program; .Availability refers to the non-environmental facility management functions; Accessibility refers to the environmental compliance and management functions.*

5.1.1. The Range and Training Land Program (RTLP)

RTLP, under the management of HQDA G-3, DAMO-TRS, provides a range operations and modernization capability for the central management and prioritization and the planning and programming of live-fire training ranges and maneuver training lands, including the design and construction activities associated with them.

The RTLP planning process integrates mission support, environmental stewardship, and economic feasibility and defines procedures for determining range projects and training land requirements to support live-fire and maneuver training. The RTLP defines the quality assurance and inspection milestones for range development projects and the standard operating procedures (SOPs) to safely operate military training, recreational, or approved civilian ranges under Army control and support commanders' METL and Army training strategies. RTLP also establishes the procedures and means by which the Army range infrastructure is managed and maintained on a daily basis in support of the training mission.

HQDA G-3, working with the SRP Executive Agent, also maintains the Army Master Range Plan (AMRP), which serves as the prioritized list of Army-approved range and training land projects.

5.1.2. The Integrated Training Area Management (ITAM) Program

The ITAM program, under the direction of DAMO-TRS, provides Army range managers with the capabilities to manage and maintain training and testing lands by integrating mission requirements derived from the RTLP with environmental requirements and environmental management practices. The goals of the Army's ITAM program are to:

- Achieve optimal sustained use of lands for the execution of realistic training and testing by providing a sustainable core capability that balances usage, condition, and level of maintenance.
- Implement a management and decision-making process that integrates Army training and other mission requirements for land use with sound natural resources management.
- Advocate proactive conservation and land management practices by aligning Army training land management priorities with the Army training and readiness priorities.

5.1.3. Resource Enhancement Proposals

The Army Range and Training Land Strategy provides a framework for analyzing and addressing current and future range and training land shortfalls. The strategy provides the Army with a framework for ensuring the long term sustainability of its training land and ranges in light of Army Transformation, Training Transformation, encroachment, and the Army Stationing Strategy. The Range and Training Land Strategy serves as the mechanism to prioritize investments to installations based on mission and doctrinal training requirements. It provides a framework and methodology to identify priorities for range modernization, training land acquisitions, and compatible land use buffers.

The Strategy is based on a structured methodology for assessing mission factors to assess installations' relative value to the Army, training transformation factors to assess training transformation opportunities, and installations capacity to expand. It recognizes the need to transform and selectively modernize home

station training in light of the limited capacity of the Army's three major combat training centers.[17] To maximize the usefulness of the Army's training land and ranges, the Strategy also focuses on investments that can increase their flexibility, effectiveness, cost-efficiency, and throughput.

Since very few Army installations can meet the maneuver requirements of the FF UA, it is necessary for the Army to adopt a strategic view of its available training lands and determine where installations can acquire lands and how multiple installations can be leveraged, to include other Service installations to meet future training requirements. The Army must also look to further integrate the live training environment with virtual and constructive technologies to provide sustainment training. The Strategy provides the framework and a long-range plan to meet the doctrinal training land challenges of today and the future.

The Army is taking several steps to prevent incompatible resource allocations and uses near ranges. The compatible land use buffers authorized by Section 2811 of the National Defense Authorization Act for Fiscal Year 2003 provide the Army with an important tool for addressing incompatible land use, range sustainability, and protecting existing and future investments. To support the Strategy and implementation of the law, the Army developed a methodology to evaluate installations' ability to benefit from such buffers and provide a prioritization of those installations.

First, the Army is continuing a strong management emphasis on its SRP. The Army uses an IPT approach at all echelons to focus and coordinate efforts to support sustainable ranges. At headquarters, the Army Range Sustainment Integration Council (ARSIC) supports range sustainability and develops and implements the SRP. The ARSIC includes representatives from several Army offices, from installations and environment to safety and command, control, communications, and computers, to ensure the integration of range sustainment and mission accomplishment. Among other things, the ARSIC continuously reviews the SRP objectives and their status to determine their sufficiency and adequacy for achieving SRP goals. Similar IPTs exist at the MACOM, IMA, IMA region, and installation levels.

Second, the Army embeds planning or sustainable ranges in standard installation planning processes. The Army ensures that coordinated installation planning takes into account the need for sustainable ranges.

Third, the Army is developing new information tools and applying existing information tools to facilitate compatible use, and thereby prevent incompatible uses. For example, the Army is developing an automated range development plan, which will provide installations with a more robust decision making capability by graphically displaying range and training land requirements along with all installation requirements that impact the mission. Other tools used include the Installation Training Capacity, Environmental Climate Model, and the Installation Status Report systems.

The Army has developed goals, milestones, planned actions, and progress metrics for the SRP. The goal of the SRP is to maximize the capability, availability, and accessibility of ranges and training land to support doctrinal training and testing requirements, mobilization, and deployments under normal and surge conditions.

The Army has developed metrics and milestones for eight objectives: range facilities, range operations, range maintenance, encroachment, environmental responsibilities, outreach, integrated management, and professional development. Army analyses validate critical training land shortfalls at nine installations that have some land available for acquisition. These installations are constrained by factors that prevent them from meeting the FF Maneuver Requirements. However, these installations are of strategic importance to

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17 *The CTCs are the National Training Center at Fort Irwin, the Joint Readiness Training Center at Fort Polk, and the Combined Maneuver Training Center in Germany.*

maintaining readiness and the Army will pursue acquisitions at these installations to enhance existing capabilities and ensure their future viability. The nine installations are Fort Polk, Fort Bragg, Fort Stewart, Fort Hood, Fort McCoy, Fort Campbell, Fort A.P. Hill, Fort Drum, and U.S. Army, Hawaii. The Army recognizes the importance of local interests and will work with community leaders to provide the best local solutions to meeting the Army's and the community's needs.

The Army is developing additional scoring systems, targetry, and instrumented range suites to maximize live training value and allow integration of the virtual and constructive training environments.

The Army is making a variety of investments in its range operations. It is fielding and enhancing the Range Facility Management Support System (RFMSS), which provides automation of accurate tracking of training assets and utilization. It is making extensive use of geographic information systems to create, analyze, display, and print information about ranges and training lands. The Army is developing the Automated Range Development Plan to provide installation training land and range managers a decision support tool for strategic, mid- and near-term planning and management.

The Army needs highly trained range managers to (1) replace an aging workforce preparing to retire, (2) manage ranges of increasing complexity, and (3) manage new requirements of the Army Range Modernization Program and the FF. To provide highly trained range officers and training land managers, the Army is implementing an education and training program with tremendous flexibility to support the Army training community with skills needed to manage training ranges now and into the future.

Army installations are developing and implementing Munitions, Unexploded Ordnance, and Range Residue Management Plans to ensure that ranges remain capable, accessible, and available to meet requirements. The plans address munitions requirements; issuance, receipt, accountability, and turn-in; recording of munitions expenditures; explosives safety; operational range clearance; restrictions; and other munitions management issues. In addition, they will support and be integrated with other installation range management efforts.

Army installations are required to assess safety hazards associated with military munitions, including procedures to manage UXO hazards on ranges. Ranges identify and maintain permanent records of areas known or suspected to contain UXO. Army installations must maintain permanent records of all locations of UXO removal operations, explosives ordnance disposal (EOD) incidents, and open burn and open detonation (OB/OD) operations. Access to areas known or suspected to contain UXO is prohibited, except to authorized personnel for specific range-related purposes. Army installations remove UXO from ranges where access is necessary, in accordance with safety and other relevant requirements.

Army installations are required to periodically clear operational ranges of military munitions (i.e., UXO and munitions debris) and other range-related debris to allow safe access to range areas for range maintenance, modernization, training, or testing operations; preclude accumulation of used military munitions (e.g., UXO) and other range-related debris that would impair or prohibit the continued use of the range for its intended purpose; or facilitate reasonably anticipated future land uses if all or a portion of the range has a finite end-use date. (e.g., as stipulated in a lease agreement, land withdrawal language, or other land use agreement).

The Army continues to modernize and restructure in fulfillment of Transformation. The Range and Training Land Strategy establishes broad prioritization for live fire training investments. Range and training land requirements for the FF will be addressed as stationing and systems information becomes available. As requirements are analyzed, MACOMs must ensure ranges and training lands can be managed and maintained for long-term sustainability.

Environmental support for ranges and training land is established through the use of a cross functional network of programs supporting the long-term sustainability of training lands. The Army Environmental Program renders direct and focused environmental support to the Army's range operations.

The Army is implementing the SRP Outreach Program to equip Army personnel with the skills to improve public understanding of the Army's live training mission and its importance to readiness. The Army recognizes the importance of effective outreach to stakeholders.

5.2. Navy

5.2.1. Resource Enhancement Proposals

The Navy has a well-established, funded program to identify training constraints and ensure sustainable range management. In 2001, the Navy began building the TAP, a five-part Fleet training range-sustainment program. The Navy range sustainability program is designed to ensure the Navy maintains access to its existing ranges and OPAREAs and can expand the capabilities of range/OPAREA infrastructures to continue to support the training requirements of evolving missions, tactics, and technologies. TAP focuses on integrated planning and management to ensure training assets meet critical future mission support capabilities, and provides a systematic investment strategy for Navy training ranges/OPAREAs to achieve sustained Fleet readiness.

The following are TAP's five components and their functions:

- **Range Complex Management Plans (RCMPs).** RCMPs address long-term sustainable use, management procedures, and record keeping to support current and future operations. All collected data will adhere to standardized formats (GIS, ACCESS) to ensure future compatibility with a proposed Navy range management system. The RCMPs include:

  1. Complete description of all training areas
  2. Comprehensive baseline of current range operations
  3. Strategic vision on 10-year planning horizon
  4. Analysis of encroachment and sustainment challenges
  5. Environmental planning requirements
  6. Community involvement blueprint
  7. Range investment strategy

  RCMPs were initiated for the Cherry Point (in coordination with the Marine Corps) and Southern California complexes in FY-2003. RCMPs for all training range complexes will be initiated by FY-2006.

- **Marine Species Density Data (MSDD).** The MSDD compiles existing marine species information and collects new information through surveys to determine marine species population densities in OPAREAs. This population density information is required to make accurate assessments of potential impacts to marine species from planned training operations. The development of MSDD for all Navy OPAREAs will be coordinated with the Fleet Commands and OPNAV to ensure consistency in (1) outreach and coordination with the regulatory community, (2) the methodology/ algorithms used to extrapolate literature and citing data for calculating densities, and (3) maintenance of all data in a centralized data repository.

Marine Resource Assessments (MRAs) are the first step in the process and consist of in-depth literature reviews of existing information that focus on ocean areas where Navy routinely trains. MRAs have recently been completed for many East Coast OPAREAs to support development and/or updates of comprehensive environmental planning documentation. MRAs were completed during FY-2003 for the Key West, Virginia Capes, Cherry Point, and Jacksonville complexes.

- **Operational Range Clearance (ORC).** ORC establishes a plan for routine clearance and disposal of UXO/munitions and target debris, and maintains operational ranges by minimizing potential for possible future contamination. The resources available through the range-sustainment program are in addition to the clearance currently conducted at Navy training ranges to maintain the safety of the range.
- **Environmental Planning (NEPA)**. Implementing the RCMP may trigger environmental planning requirements. The environmental planning will be conducted and documented as required by the NEPA or Executive Order (EO) 12114 for action occurring overseas. Integrated operational and environmental planning is essential to ensuring that operations and maintenance of ranges and OPAREAs are conducted in a manner that is (1) protective of human health and the environment, (2) consistent with current and future readiness requirements, and (3) compliant with existing environmental legal requirements. A large part of the environmental planning effort will be to ensure that all required supporting studies and analysis of training operations under NEPA and EO 12114 are current.
- **Range Sustainability and Environmental Program Assessments (RSEPA).** The RSEPA program will determine environmental impacts of munitions use on Navy ranges, address issues of land-based range compliance and the potential for off-range release of munitions constituents. The primary goals of the RSEPA process are to (1) identify and eliminate the potential for off-range impacts to human health and the environment, (2) comply with applicable laws and regulations, and (3) actively engage regulators and build public confidence.

The Navy has developed protocols and policies for implementing the RSEPA program that are being tested through three prototypes applications at SOCAL, San Clemente Island Range Complex (SCIRC); Fallon Training Range Complex (FTRC); and Virginia Capes (VACAPES) in FY-2003. Two more range complexes will initiate the RSEPA process in FY-2004.

5.2.2. Analyze Shortfalls

As the range analysis tool under development by CNA (discussed in Section 3.1) is put into use on all the complexes, the Navy will identify ranges' shortfalls with regard to providing training, now and in the future. The RCMPs will include investment strategies for each range to prioritize their resources to meet the shortfalls encountered. These two tools will provide ranges and Navy leadership the ability to identify and address training shortfalls.

5.2.3. Prevent Incompatible Resource Allocations and Progress Metrics

The Encroachment Partnering program, authorized in the FY-2003 Defense Authorization Act, allows the military to enter into land use agreements with local governments and non-Governmental organizations. The Encroachment Partnering program can aid in providing buffer areas for ranges by preventing commercial development and protecting military use of the range. The Navy is preparing an instruction delineating responsibilities for this program. Constraints resulting from incompatible land use and other causes will be identified through the development of the RCMP and an appropriate remedy identified.

5.2.4. Goals and Milestones for Planned Actions and Progress Metrics

The Navy Range Sustainment Program as implemented through TAP is phased across the Future Year Defense Program (FYDP), and as the programs are developed they put in place a consistent system across the Navy. The Implementation Plan starts the process at two range complexes per coast each year, with high-use complexes scheduled first. The next milestone is to execute the program at the four training range complexes identified for FY-2004.

Many goals and milestones have already been achieved. Policy for preparing environmental documentation for training range complexes is being finalized. The policy for conducting the RSEPA process is final. The Navy Fleet commands have funded the completion of several Marine Resource Assessments (MRAs), have funded initials efforts to develop a Navy-wide Range Management System, have initiated field-testing of the RSEPA process, and have funded development of two prototype RCMPs. The Navy program is well under way.

5.2.5. Planned Action Funding Requirements

The Navy's range-sustainment program TAP, discussed in Section 4.1, is included in the President's Budget for FY-2004 and is currently funded at $98.9M across the FYDP. This cost will continually undergo assessments as the results of the RSEPA program and the implementation of the RCMPs discussed in Section 4.1 are completed through the FYDP.

5.2.6. Current and Future Service Investment Strategies

The Navy will continually update the training range investment strategy as it prepares the RCDs generated under the RCMP portion of TAP. These range-specific investment strategies will delineate what infrastructure and technology the ranges require to support specific warfare area training during the three levels of the IDRC. These strategies will provide prioritized resource allocation structures for seven RCMP investment categories: air, land, and water; instrumentation; targets and target arrays; range operations; facilities; environmental; and outreach.

5.3. Marine Corps

Assessing the adequacy of Marine Corps training resources is an ongoing process involving multiple variables, including range capability, range capacity, range location, and access (relative to other assets). The process is complex, in that assessment metrics for these variables are only just emerging (as with the Marine Corps's encroachment studies), or may be quite difficult to develop. The Marine Corps has identified five priority concerns regarding shortfalls in the Marine Corps range complex portfolio: (1) lack of training ranges to support MEB-level fire and maneuver exercises, (2) lack of a MAGTF (MEB-level) MOUT facility, (3) inadequate instrumentation/feedback systems and targets, (4) constrained maneuver space at littoral training bases (Cam Lejeune and Camp Pendleton), and (5) antiquated school training facilities.

Overall the Marine Corps's T&E continuum and its supporting programs are equipped to accomplish their mission. Nevertheless, the Marine Corps has areas of significant concern. Specifically, the Marine Corps needs to upgrade existing ranges and facilities–particularly combined arms training ranges–and invest in new range instrumentation, targets, and simulation technologies. Some range complex configurations are not optimal for today's training requirements or future weapon systems and may lack sufficient space for unconstrained MAGTF training. TECOM (RTAM) recently initiated a Marine Corps-wide range requirements assessment that produced a Marine Corps RCD, including a set of unconstrained current and

anticipated range training requirements. The RCD, to be completed in the first quarter of FY04, will supply information integral to range transformation efforts.

5.3.1. MEB Training Area Initiative & MAGTF MOUT Facility

Marine Corps Strategy 21 and *Expeditionary Maneuver Warfare* describe and define the Marine Corps' mission to provide combatant commanders with scalable, interoperable, combined arms MAGTFs that can quickly deploy and operate in an expeditionary environment across the spectrum of conflict. These capstone concepts also identify MAGTFs as the primary Marine Organizations that fulfill its warfighting responsibilities and designate the MEB as the Marine Corps's premiere response force for smaller-scale contingencies. However, the Marine Corps does not have a range capable of supporting MEB-level fire and maneuver combined-arms exercises.

MAGTFs supporting Operation Enduring Freedom conducted sustained combat operations in an extended Joint Operations Area spanning over 650,000 square miles nearly 400 miles from their sea-based logistics bases. In the current national security environment, the employment of MEBs in support of joint operations under similar conditions is more likely than ever. However, the Marine Corps lacks a training facility capable of supporting all MEB (or MEF) elements realistically. The Marine Corps's largest training facility, the Combat Center at 29 Palms, accommodates only MEU-sized MAGTF and MAGTF element Battalion Landing Team (BLT) training. Thus, MEB commanders, staffs and subordinate commanders must rely on unrealistic classroom training, command post exercises and simulation. Therefore, the Marine Corps is initiating planning for a MEB training facility that will provide sufficient space and infrastructure to train large MAGTFs, to optimize MEB effectiveness and utility in the Joint environment.

MEBs must be versatile, across the spectrum of conflict, both tactically and operationally. The MEB must be prepared for littoral operations, which increasingly are characterized by highly populated urban areas. Urban environments present conventional enemy forces and asymmetric threats, non-linear battlefields, and unclear delineations between combatants and non-combatants. To operate effectively, the MEB (or other MAGTF) must conduct fluid, maneuver intensive operations over extended distances, employ closely coordinated, precision fires, and sustain organic logistical support. In parallel, as new systems (e.g. the Expeditionary Fighting Vehicle, MV-22 Osprey, and High Mobility Artillery Rocket System) become operational, EMW concepts such as Ship-to-Objective-Maneuver will mature into core MAGTF capabilities. These and other systems with new operational concepts will expand the joint battlespace by increasing maneuver range and target engagement distances.

Successful integration of MEB elements can only be achieved through training that replicates operating conditions the MEB may encounter. To ensure MEBs are fully trained and capable, the Marine Corps requires a MEB training facility with sufficient contiguous training area to conduct full-scale MEB. Required capabilities of a JNTC-integrated MEB Training Facility include:

- Support day and night live-fire air and ground maneuvers on a MEB scale for extended exercise periods.
- Allow deep-battle shaping operations by providing ample space for aviation and strike and fire assets.
- Provide MEB live-fire/maneuver areas for current and future fire capabilities for a five-day exercise.
- Provide ample maneuver area for sustained, long-range logistics operations in a rear battle environment.

- Provide easy access to troop concentrations to facilitate deployments and minimize transportation costs.
- Provide virtual scenario simulation with digital linkage to other (Joint) training centers.
- Provide modernized targets, position-location and feedback systems, and live-fire ranges.

The Marine Corps's ranges do not have the capability to support MAGTF training in the urban environment, which is one of the defining operational contexts for its training continuum. Developing a MAGTF (MEB-level) MOUT facility is a high priority. By the year 2025, up to three-quarters of the world's population will live in urban areas, the majority of them in the world's littoral regions. Preparation to conduct complex military operations in urban terrain is, and for the foreseeable future will remain, a core requirement for MAGTF mission readiness. Operations in urban terrain must be expected to range across the spectrum of conflict, from Humanitarian Relief / Disaster Relief and other MOOTW, to smaller-scale contingencies, to Major Theater War. To effectively prepare for urban operations, MAGTFs must conduct large-scale urban combined-arms operations as part of a Joint force.

The Marine Corps must improve its urban combat training capability. Existing urban training facilities can only effectively support individual and small unit tactical ground force training and individual skills training for attack pilots, and lack support for combined-arms training. The Marine Corps requires, but lacks, a realistic MAGTF training area. Analysis and requirements development for establishing a MAGTF MOUT training capability are underway via the EFDS. Combined with the MEB facility, the MAGTF MOUT training facility will provide:

- Training operations that integrate and exercise all elements of the MEB.
- Training various urban combat settings and scales, and enable combined arms exercises for all MEB elements, including infantry company-level urban combat live-fire training.
- Adequate area within individual MOUT components and within the entire MOUT envelope that considers the total battle space geometry required for MEB-level operations.
- An environment that replicates the conditions, challenges, and uncertainties of urban warfare.
- Diverse elements and features to achieve training objectives for units of various sizes.
- Sustainability and cost considerations in building and configuring MOUT components and elements.
- Targets and feedback systems for maximum training effectiveness.

According to operational doctrine (FM 3-06.11, Combined Operations in Urban Terrain), in offensive operations an infantry company would have an attack frontage of one city block. Depending on the training scenario, the ground combat element (GCE) of a MEU(SOC) would have an attack frontage of up to three city blocks. The GCE of a MEB would then have a frontage of from six to nine city blocks. Combined-arms doctrine would require training space to accommodate offensive ground force operations including supporting fires, and the air combat element in assault and close air support roles. Such capability advances will require substantial resources.

5.3.2. Range Instrumentation and Targets and Antiquated School Facilities

Increasing training range value by upgrading and modernizing inadequate instrumentation, feedback systems, and targets is a priority, for all training levels, and for Joint training and JNTC participation. Requirements include: (1) multi-site, training evolutions combining units from various bases and technology investment linking live, virtual, and constructive training to enhance MAGTF elements, (2)

range instrumentation and targets to provide timely and objective training feedback, (3) integrated position-location indicator systems to ensure maximum training efficiency and effectiveness, and (4) common range infrastructure and systems architecture supporting the JNTC.

The Marine Corps's school training facilities are a collection of the new and old structures. Many schools are pre-WWII structures or 1940's era temporary metal buildings. While this has not prevented training requirement achievement, many schools lack technological resources needed for effective instruction. Funding for a new Basic Reconnaissance Course training facility at Expeditionary Warfare Training Group Pacific in San Diego was approved and is proposed for new Recruit Training facilities at MCRD Parris Island.

The Deputy Commandant for Installations and Logistics (DC I&L) is the Marine Corps Advocate for the Supporting Establishment in the EFDS. The Facilities and Services Division of I&L, designated DC I&L(LF), is the Marine Corps' Executive Agent for Installations. As such, DC I&L(LF) broadly oversees installation and facilities planning, programming, management, and investment. With regard to ranges and training areas, DC I&L (LF) provides policy, planning, systematic guidance, and central direction for real estate matters, environmental compliance, natural and cultural resources, compatible land use and community planning, and encroachment control throughout the Marine Corps. DC I&L (LF) conducts long-range facilities and infrastructure master planning and, as the Executive Agent, is the lead for MILCON.

The Marine Corps actively pursues initiatives and programs aimed at achieving compatible land use of public and private property near its installations and ranges. These programs depend upon partnerships with local community and governmental agencies to prevent incompatible land use near installations and training ranges. Marine Corps Community Plans and Liaison Offices (CPLO) lead these efforts, while I&L (LF) provides guidance and support to CPLOs and oversees programs and coordinates with federal agencies at a national level.

Marine Corps bases and stations are the "fifth element" of the MAGTF because of their close link to operating forces. Installations, especially range assets and capabilities, must be continuously available to support operations and training requirements. This is critical during the current platform, weapon, technology, and doctrine transition.

Training, operations, and installations compete for scarce resources. Installations and ranges, historically, are bill payers for other requirements. *Installations 2020* identifies the need to reverse this by investing in installations so that infrastructure development keeps pace with mission requirements and modernization. Managed by TECOM, the Range Investment Strategy is key to realizing that vision. The Range Investment Strategy adheres to DoD guidance, as reflected in the June 26, 2003, Memorandum from the Undersecretary of Defense for Personnel and Readiness to the Service Secretaries regarding "Guidance for Fiscal Years 2006-2011 Sustainable Range Programs," and has three main pillars: Sustainment, Upgrading, and Modernization/Transformation.

Range sustainment initiatives are required to stem range capability erosion to ensure "today's training today" is accomplished. Example range sustainment projects include improvements of existing training devices, targets, and control equipment not accomplished within existing O&M budgets. The Range Investment Strategy for FY-06 through FY-11 advocates Range Management System implementation and funding for the Ground Range Sustainment Program (GSRP), RCMPs, Range Control and Safety Initiatives, and Range Maintenance Programs.

RTAM and Marine Corps Systems Command established the GRSP, effective FY-03. GRSP fills a gap in the range funding process by identify, prioritizing, and funding ground range sustainment requirements.

Historically, the Navy-administered Systems Replacement and Modernization Program (SRAM) provided funding to aviation training ranges projects. Marine Corps ground ranges have lacked an analogous program. The GRSP complements SRAM by meeting range requirements indirectly linked to aviation training and identifies, prioritizes, and funds potential projects and completes costing and engineering efforts. The GRSP's main priority is to sustain existing capabilities by supporting unexpected requirements that would not be funded expeditiously via the Program Objective Memorandum (POM) budget cycle. GRSP project material and installation costs are typically below $200,000 and include systems capability expansion, existing component upgrades, enhancing operational/maintenance efficiency, sustaining ground range and training area capabilities, and providing personnel safety and ground range system security.

Range upgrade investments aim to enhance ranges' capabilities to support current and future training requirements. This will be accomplished by state-of-the-art range technology investments (e.g. threat emitters, shoot-back devices, and the remote engagement target system (RETS)). Range upgrade programs (FY06-FY11) advocated in the Range Investment Strategy are mainly home-station instrumented ranges, focusing on RETS, Portable Infantry Target System (PITS), and Location of Miss and Hit (LOMAH).

Range transformation supports emerging and JNTC training requirements and seeks to afford tomorrow's training tomorrow. Training requirements driving transformation will be developed in the context of Expeditionary Maneuver Warfare and related operational concepts and weapon systems. The Expeditionary Force Development System (EFDS) will identify and implement EMW capabilities driving range modernization. Facilities and ranges must be planned, constructed, and acquired to afford future training abilities. Modernization investments include instrumentation supporting MAGTF and Joint exercises, development of MEB-level combined arms training areas and a MAGTF MOUT training facility, and optimization of littoral training capabilities.

The on-going SRAM program provides the Navy's Tactical Training Ranges with minor instrumentation and support equipment closely linked to aviation. The SRAM program maintains the current quality of tactical training support provided by range instrumentation during infrastructure downsizing and new range instrumentation system development. The SRAM program replaces low-cost tactical training instrumentation, and provides minor equipment to maintain current Fleet training capabilities.

5.4. Air Force

The Air Force has an integrated operational and engineering approach to range management. Air Force Instruction (AFI) 13-212 *Range Planning And Operations* (7 August 2001) is the primary document governing Air Force planning as it relates to ranges. AFI 13-212 consists of three volumes, each addressing a different aspect to range management: (1) Range Planning and Operations, (2) Range Construction and Maintenance, and (3) SAFE-RANGE Program Methodology.

AFI 13-212 requires that all major actions to establish, change use, modify, or close test or training space (including ranges or permanent airspace) are subject to review at the installation, MAJCOM, and Headquarters, Department of the Air Force levels. The entity that seeks to make the change (i.e., the "proponent") is required to describe the concept or action and alternatives to that action in a brief document designed to facilitate from the outset the airspace and range review process. This must be completed prior to start of the formal aeronautical and environmental evaluations. The process requires the development of a *Description of Proposed Actions and Alternatives* (DOPAA). This document provides the framework for assessing the environmental impact of a proposal, describing the purpose and

need for the action, the alternatives, and the rationale used to arrive at the proposed action. The DOPAA includes a *Background/Purpose* statement, a section detailing the *Need*, a *Proposed Action* section, and a section listing the *Alternatives*. The remaining three sections reiterate the *Decision to be Made*, provide the *Identification of the Decision Maker*, and outline any *Anticipated Issues* to provide an accurate portrayal of the proposed action and alternatives.

A Comprehensive Range Plan provides guidance on short and long-term needs. For new ranges, this must occur before the range is operational. A Comprehensive Range Plan will address:

- Land
- Airspace
- Range facilities
- Targets
- Instrumentation (including scoring devices)
- Range operations
- Safety
- Environmental factors
- Geography
- Local community and government use of adjacent land (regional development agreements)
- Legal liability
- Rehabilitation
- Range clearance/ decontamination
- Target lists
- Authorized ordnance
- Weapon safety footprint analysis
- Future plans or other actions that may have an impact on the range

5.4.1. Investment Strategy to Resolve Existing Constraints

The Combat Air Forces Mission Support Plan (CAF-MSP) defines the Air Force investment strategy for resolving existing training constraints related to ranges and airspace. The plan presents an investment strategy focused on 10 major areas:

- Land
- Airspace
- Environmental
- Unexploded Ordnance and Range Residue Removal
- Physical Plant (Real Property and Infrastructure)
- Scoring and Feedback Systems
- Communications Systems
- Integrated Air Defense Systems Training
- Targets and Target Arrays
- Management

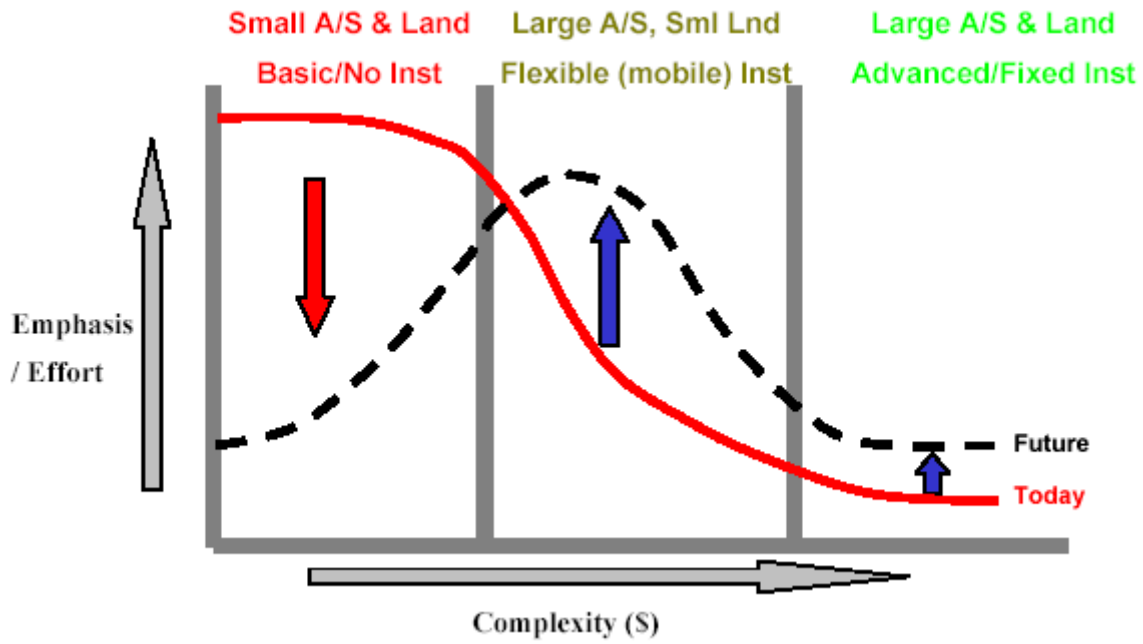
One of the objectives of the evaluation of the ranges conducted to create the CAF/MSP was to determine and document existing constraints (i.e., “deficiencies” in the lexicon of the *CAF-MSP*) and proposed investment areas. The majority of investment areas will see marked improvement in the ability to support realistic training. US Air Forces Europe (USAFE) as the theater air component and the major U.S. user of airspace in Europe has taken the first step in developing and implementing a comprehensive plan to address aircrew training requirements in Europe. USAFE is preparing an overall strategy to co-exist and

engage in the future European airspace environment. The goals and objectives presented in the draft *Airspace Strategy in Europe* were designed to improve USAFE posture in gaining access to the airspace it needs for its varied missions. Additional information on the plans to ensure the long-term viability of U.S. training on overseas ranges will be presented in subsequent reports.

5.4.2. Plans for the Future of Air Force Ranges

The evolution of air, space, and information warfare and the growing list of new military missions, applications, and systems drive the need for flexible and adaptive training methods. Standardization and seamless interoperability are imperative for the future of Air Force training. The Air Force supports the USD (P&R) S*trategic Plan for Transformation of DoD Training* and the Joint National Training Center's (JNTC) vision to create "A global network of joint training enablers; comprised of live, virtual, and constructive components that will provide a seamless joint training environment across a broad spectrum of joint training requirements."

Accomplishing the full spectrum of training and exercises requires moving from the current "stovepipe training systems, and their architectures" to a "system of training systems" with an open architecture. This change will promote interoperability with Joint and Coalition forces, and demands the development of technology to "… immerse the warfighter in realistic operational environments." A few of the key enabling technologies are summarized below.



The Next Range Instrumentation (NexRI) program is an Air Combat Command-lead effort to develop a standards based business mode, that will provide open, non-proprietary solutions to bring about interoperability of Live-Virtual-Constructive (L-V-C) training systems without needing to acquire new range instrumentation systems or develop new range instrumentation technology. NexRI has gained solid support from the OSD led JNTC office and from NATO with participation from the F/A-22 and JSF program offices. NexRI will develop a set of standards that provides a robust live instrumented combat training capability using a set of open standards including Standing NATO Agreement (STANAG) to allow acquisition and integration of interoperable range instrumentation (RI) from multiple sources. NexRI is not an acquisition program for new range instrumentation systems nor is it an R&D program for new range instrumentation technology.

Another future direction for training is embedded threat training. Embedded threat training is defined as the utilization of a weapon platform's inherent capabilities to conduct readiness training while the platform is being employed in a simulated environment for which it is designed. Air Combat Command, in conjunction with the Air Education and Training Command and other agencies, is to begin a detailed analysis of alternatives to tetherless IADS training capabilities. The Synthetic Theater of War (STOW) is an ongoing effort to integrate live, constructive, and virtual elements into a seamless environment. This will expand training opportunities from the operational level to the tactical level and from the sensor to the shooter. The live elements will focus on integrating C2, intelligence, and live participants; the virtual elements will seek to achieve a distributed network of man-in-the-loop simulations to provide realistic tactical training; and the constructive elements will seamlessly enhance legacy simulations with high level STOW entities for JFACC battle staff training. Air Force STOW goals will focus on Air Force and DARPA efforts to enhance air and space representations throughout all Air Force roles and missions.

5.4.3. Legislative or Regulatory Proposals to Resolve Constraints

The Air Force supports the ongoing efforts under the RRPI. The Air Force will present any legislative or regulatory proposals as necessary. The Air Force may seek to continue the sole National Security exemption, granted by President Bush on September 16, 2003, Presidential Determination No. 2003-39, for the Air Force's operating location near Groom Lake, Nevada. Should the existing constraints be proven impossible to resolve, the Air Force may be forced to seek such an exemption, or request for amendment of such statutes and regulations as are necessary to ensure that aircrew training continues to support readiness and our Nation's security.

5.5. Planned Action Funding Requirements

Funding to support sustainable ranges comes from many sources:

- Military construction funds pay for the construction and major alterations of range facilities. Construction funds pay for essential projects such as new training facilities, buildings to house simulators, and firing ranges.
- Procurement funds pay for range instrumentation, support equipment, targets, and training ordnance. These items are essential for realistic training. They create simulated threat environments, enable live fire training experiences, and provide accurate information and objective feedback on training performance.
- Research and development funds pay for the development of electronic, telecommunications, and instrumentation systems for training. They also pay for the development of threat emitters and systems, simulation systems, and environmentally preferable training systems and practices.
- Operation and maintenance (O&M) funds pay for base operations support and facilities sustainment, restoration, and modernization at training ranges. O&M funds also pay for many environmental programs that directly contribute to range sustainability.

The Department's spending on all issues directly or indirectly related to range sustainment is included in numerous program elements throughout the defense budget, making it difficult to develop a unique accounting for these efforts. DoD will continue to work to improve the visibility of financial information related to its sustainable range initiatives.

5.6. Designation of a Responsible Range Office Within Each Military Department

In accordance with Section 366's requirements, Table 5-2 identifies an office within the Office of the Secretary of Defense and in each of the military departments that will have lead responsibility for overseeing implementation of the comprehensive plan.

Organization	Office with Designated Responsibility
Office of the Secretary of Defense	Office of the Deputy Under Secretary of Defense for Readiness
Army	Office of the Deputy Chief of Staff, G-3 Training Directorate Training Simulations Division (DAMO-TRS)
Navy	Office of the Deputy Chief of Naval Operations Fleet Readiness and Logistics (N4) Fleet Readiness Division Navy Ranges and Fleet Training Branch
Marine Corps	Commanding General, Training and Education Command Range and Training Area Management Division[a] Deputy Commandant, Installations and Logistics Facilities and Services Division[b]
Air Force	Deputy Chief of Staff, Air and Space Operations Office of the Director of Operations and Training Ranges and Airspace Division

Table 5-2: Offices with Designated Responsibility for the Range Sustainment Comprehensive Plan

a. Executive Agent for Ranges.
b. Executive Agent for Installations.

6. OBSERVATIONS

The transformation of our military forces is driving many changes in the Department of Defense. As we implement these changes, however, some of our basic tenets remain constant. To provide ready military forces to meet our country's national security needs, our personnel must train as they would fight. This is especially true for combined arms and joint training. To train as we would fight requires reliable access to adequate land, air, sea space, and frequency spectrum resources. Today, encroachment effectively reduces the amount of these resources that the Department has to support essential military training.

And while predicting the future can be an uncertain business, all indicators point in the same direction: tomorrow's encroachment problems will be substantially worse than today's without effective management and broad cooperation. As our weapon systems grow in capability, they detect at greater distances, travel faster, cover wider areas, and process more information. These trends suggest training needs for more land area, airspace, sea space, and frequency spectrum. At the same time encroachment diminishes the availability of these resources.

The Department plans to continue to work with the Congress, other federal agencies, the states, Native American tribes, local governments, host nations abroad, and non-governmental organizations to address today's encroachment problems and preventing them from getting worse. The Department is grateful for the support that the Congress has provided thus far on the Readiness and Range Preservation Initiative, and we look forward to continuing to work with the Congress on the remaining RRPI items.