



# MARINE CORPS TRAINING RANGES

## REQUIRED CAPABILITIES DOCUMENT

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## EXECUTIVE SUMMARY

The Marine Corps range infrastructure, which is characterized by dispersed geographic locations and dissimilar capabilities and capacities, must support a broad spectrum of mission essential warfighter training. The diversity of this range infrastructure has made it difficult to assess the ability of individual ranges or the combined infrastructure to meet current and emerging training requirements. These difficulties have been highlighted in the Government Accountability Office (GAO) report, “Better Planning and Funding Priority Needed to Improve Conditions of Military Ranges” (GAO-05-534, June 2005). Perhaps more importantly, the absence of an overarching Marine Corps strategy for ranges was allowing encroachment factors to threaten the long-term sustainability of many of the Marine Corps ranges.

In Fiscal Year (FY) 2002, Commander, U.S. Atlantic Fleet developed a long-term range-related initiative called the Tactical Training Theater Assessment and Planning (TAP) process. The purpose of TAP is to promote use and management of ranges in a manner that supports national security objectives, ensures a high state of combat readiness for deploying units, and enhances the long-term viability of range assets while protecting human health and the environment. The first TAP project initiative was a joint project with the Marine Corps Range and Training Area Management office to develop a prototype a Range Complex Management Plan (RCMP) for the Camp Lejeune (CL) and Cherry Point (CP) range complexes. The CL/CP RCMP was intended to be a proof of concept of the ability to catalogue a range’s total usage and develop sustainability and investment strategies for that range. However, efforts to develop investment strategies for the CL/CP ranges were hampered by the lack of quantitative standards of required capabilities against which the existing capabilities of the CL/CP ranges could be measured.

While there have been previous attempts to describe the requirements associated with specific elements of Navy and Marine Corps ranges, there has been no previous effort to categorize the required capabilities for the entire range infrastructure. Citing the lack of existing quantitative standards and the difficulties encountered in developing investment strategies for the CL/CP RCMP, in FY03 Commander, Fleet Forces Command and the Marine Corps Training and Education Command (TECOM) directed the development of a Ranges Required Capabilities Document (RCD) under the TAP umbrella. The stated objective of the RCD was to define quantitatively the previously undefined required capabilities that will allow Navy and Marine Corps ranges to support mission essential training in an unconstrained environment for a 10-year planning horizon.

This RCD responds to the TECOM direction by capturing, for the first time within a single document, a description of the required capabilities for the entire Marine Corps range infrastructure. The required capabilities contained in the RCD are the result of extensive document research and interviews with warfighters. We relied heavily on contemporaneous documents, like platform- and warfare-peculiar Training and Readiness matrices, and draft and final Operational Requirements Documents related to training ranges. During the interviews, we encouraged the warfighters to reflect upon their most

recent deployment (and in almost all cases, combat) experience and “think outside the box” to help us create a training range environment that would provide the highest level of training fidelity. This RCD reflects, therefore, a combination of documented previous attempts and a forward vision of the required capabilities for ranges.

The RCD defines the required capabilities for four classes of ranges, based upon the size (or Level) of the unit to be trained; specifically, Individual Level, Unit Level, Marine Air Ground Task Force (MAGTF) Marine Expeditionary Unit (MEU) Level, and MAGTF Marine Expeditionary Battalion (MEB) Level.

The Individual Level training range supports the set of core and core plus skills associated with the USMC Individual Training Standards (ITS) for each element of a MAGTF. Accordingly, the Individual Level training range provides and supports the most basic training environment associated with the MAGTF Aviation Combat Element (ACE), Ground Combat Element (GCE), and Combat Service Support Element (CSSE). The Individual-Level training range also reinforces the basic infantry combat skills taught at School of Infantry (SOI). The Individual Level training range will also support those specific training requirements and skills associated with progressive USMC ITS and the program of instruction at each USMC Formal School.

The Unit Level training range supports the set of friendly force small unit offensive and defensive tactics and operations associated with expeditionary MAGTF forces against hostile or potentially hostile forces. The Unit Level training range supports all types of aircraft, weapons, special operations forces, landing forces, and ground forces employed in concerted military efforts described by the Marine Corps’ Expeditionary Maneuver Warfare (EMW) doctrine, which includes Operational Maneuver from the Sea (OMFTS) and Ship To Objective Maneuver (STOM). As a result, the Unit Level training range supports tactics and operations associated with all training phases of small unit level missions of a MAGTF.

The MAGTF MEU Level training range supports the set of friendly force offensive and defensive tactics and operations associated with expeditionary MAGTF forces against hostile or potentially hostile forces. The MAGTF MEU Level training range also supports all types of aircraft, weapons, special operations forces, landing forces, and ground forces employed in concerted military presence and engagement efforts described by the USMC’s EMW doctrine, to include OMFTS and STOM.

The MAGTF MEB Level training range supports the set of friendly force offensive and defensive tactics and operations associated with small-scale contingency expeditionary MAGTF forces against hostile or potentially hostile forces. The MAGTF MEB Level training range supports all types of aircraft, weapons, special operations forces, landing forces, and ground forces that will be employed in concerted crisis response military efforts that are characterized by high-density, high-risk operations.

The RCD identifies a “Suite of Ranges” to describe the range “attributes,” or required capabilities, for each range class. These attributes include three range operational elements (Airspace, Sea Space, and Land Area) and a set of range-related systems that include Scheduling, Communications, Meteorological, Target, Instrumentation, and

Opposition Force. The RCD also identifies Thresholds (minimum required capabilities to allow training to a C-2 readiness level), Objectives (desired capabilities to support training to allow training to a C-1 readiness level), and Key Performance Parameters (KPPs), which can be used to measure critical Thresholds and Objectives.

The RCD presents the required capabilities in five sections and related appendices. Section SIX (and Appendix B) describes the set of range requirements that are common to all of the four range classes. Sections SEVEN through TEN (supported by Appendices C through F) describe the required capabilities associated with the four range classes.

The RCD also discusses the requirements associated with joint training, especially JNTC, and the ongoing DOD Training Transformation Program. The Marine Corps has nominated and JFCOM has approved MAWTS-1, MAGTFTC, MCMWTC and MSTP as JNTC training programs. Subsequently, MAWTS-1 has completed the JNTC accreditation and certification process. MSTP is scheduled for accreditation and certification in October 2006, and the remaining two programs during 2007. Some sites, such as Camp Pendleton, will most likely undergo JNTC certification in the future. The accreditation and certification processes are designed to ensure that the Service-nominated programs, sites and systems are able to provide the training audience a realistic joint training environment. Therefore, the required JNTC capabilities are not prescribed but are dependent on each site, system and training program.

The Marine Corps RCD is a not a stand-alone document. Rather, it is one of several pillars in larger on-going Marine Corps range initiatives that will determine the future direction and sustainability of the Marine Corps training range infrastructure. Other pillars in these Marine Corps range initiatives include the Marine Corps Section 366 Report to Congress, the Marine Corps Ranges Strategic Plan, the Navy Ranges RCD, and a plan to develop a RCMP for every Navy and Marine Corps range complex.

The Marine Corps will use the Marine Corps Ranges Strategic Plan and the Section 366 Report to identify the roles and missions for every Marine Corps range. For existing ranges, Headquarters Marine Corps will identify which level(s) of training should be supported. A gap analysis will be conducted for each range (as an independent effort or as part of a RCMP) to compare that range's current capabilities in assigned roles and missions against the RCD required capabilities. Shortfalls between a range's current capabilities and RCD required capabilities would identify necessary short-term and long-range investments.

The RCD might also support the development of a new Marine Corps training range. Depending upon the desired roles and missions for the range, the RCD's required capabilities, Thresholds, Objectives, and KPPs will provide the framework for the acquisition strategy. For example, the RCD will identify how much Airspace or Land Area, as well as the types of clearances or authorizations required for that Airspace or Land Area. Similarly, the RCD will identify specific required systems and related capabilities. The Thresholds, Objectives, and KPPs associated with those capabilities could be used to develop the procurement specification.

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**ACRONYMS AND ABBREVIATIONS**

2-D	Two Dimensions	FSCC	Fire Support Control Center
3-D	Three Dimensions	FXP	Field Exercise Publication
A-A	Air-to-Air	FY	Fiscal Year
AAA	Anti-Aircraft Artillery	GCE	Ground Combat Element
AAR	After Action Review	HHQ	Higher Headquarters
AAW	Anti-Air Warfare	ID	Identification
ACE	Aviation Combat Element	IER	Information Exchange Requirement
A-G	Air-to-Ground	ITS	Individual Training Standards
AGL	Above Ground Level	JFCOM	Joint Forces Command
BSTRC	Bob Stump Training Range Complex	JMETL	Joint Mission Essential Task List
C	Constructive	JNTC	Joint National Training Capability
CAS	Close Air Support	JTT	Joint Tactical Task
CE	Combat Element	KPP	Key Performance Parameter
CJCSI	Chairman, Joint Chiefs of Staff Instruction	L	Live
CMC	Commandant of the Marine Corps	LATT	Low Altitude Tactics Training
CNO	Chief of Naval Operations	LSD	Landing Support Detachment
CSG	Carrier Strike Group	LTTIR	Live Tactical Training Range Instrumentation Roadmap
CSS	Combat Service Support	LZ	Landing Zone
CSSE	Combat Service Support Element	M&S	Modeling and Simulation
D/L	Datalink	MAC	MOUT Assault Course
DAS	Defensive Air Support	MAGTF	Marine Air Ground Task Force
DASC	Direct Air Support Center	MCAGCC	Marine Corp Air Ground Combat Center
DC I&L	Deputy Commandant for Installations and Logistics	MCAS	Marine Corps Air Station
DMPI	Desired Mean Point of Impact	MCB	Marine Corps Base
DoD	Department of Defense	MCCDC	Marine Corps Combat Development Command
DoN	Department of the Navy	MCLB	Marine Corps Logistics Base
DZ	Drop Zone	MCMWTC	Marine Corps Mountain Warfare Training Center
EA	Electronic Attack	MCRD	Marine Corps Recruit Depot
EC	Electronic Combat	MCT	(1) Marine Combat Training (2) Marine Corps Task
EC&C	Exercise Control and Coordination	MCTL	Marine Corps Task List
EMW	Expeditionary Maneuver Warfare	MEB	Marine Expeditionary Brigade
EOB	Electronic Order of Battle	MEF	Marine Expeditionary Force
EP	Electronic Protect		
ESG	Expeditionary Strike Group		
EW	Electronic Warfare		
FAA	Federal Aviation Administration		
FCCC	Fire Control Coordination Center		
FMA	Fuji Maneuver Area		
FRS	Fleet Replacement Squadron		

MET	(1) Mission Essential Tasks (2) Weather Observing and Reporting	SOI	School of Infantry
		S-S	Surface-to-Surface
MEU	Marine Expeditionary Unit	STOM	Ship to Objective Maneuver
MOOTW	Military Operations Other Than War	SUA	Special Use Airspace
		T2	Training Transformation
MOS	Military Occupational Specialty	T&R	Training and Readiness
MOUT	Military Operations in Urban Terrain	TENA	Test & Training Enabling Architecture
MP	Military Police	TSD	Transportation Support Detachment
NBC nm	Nuclear, Biological, & Chemical nautical mile	TSPI	Time, Space, and Position Information
NTTL	Navy Tactical Task List	TTRP	Tactical Training Ranges Program
NRMS	Navy Range Management System	UJTL	Universal Joint Task List
NSFS	Naval Surface Fire Support	US	United States
OAS	Offensive Air Support	USMC	U.S. Marine Corps
OC	Operational Communications	V	Virtual
OCE	Officer Conducting the Exercise	V/STOL	Vertical/Short Take-off and Landing
OCS	Officer Candidate School		
OMFTS	Operational Maneuver From the Sea		
OPAREA	Operating Area		
OPFOR	Opposition Force		
P <sub>K</sub>	Probability of Kill		
POTUS	President of the United States		
RCD	Required Capabilities Document		
RD	Range Debriefing		
RDCPS	Range Data Collection and Processing System		
REW	Range Electronic Warfare		
RF	Radio Frequency		
RMP	Range Management Plan		
RMS	Range Management System		
RO	Range Operations		
RS	Range Scheduling		
RC	Range Control		
RCT	Regimental Combat Team		
RLT	Regimental Landing Team		
RT	Range Tracking		
RTKN	Real Time Kill Notification		
S-A	Surface-to-Air		
SAM	Surface-to-Air Missile		
SDZ	Surface Danger Zone		
SIM	Range Simulation		
SOC	Special Operations Capable		

## SECTION ONE: BACKGROUND

### 1.1 OVERVIEW

Combat readiness is of the utmost importance to the Marine Corps. The U.S. Marine Corps (USMC) Range and Training Area Management Division (RTAM) of the Marine Corps Training and Education Command (TECOM) is responsible for the development and implementation of programs to sustain, upgrade, and modernize Marine Corps training ranges that support the achievement and maintenance of combat readiness.

### 1.2 MARINE CORPS RANGE PROGRAM

The Marine Corps has embarked upon a major investment program to sustain and modernize the Marine Corps training range infrastructure. For reference purposes, the following definitions are applicable:

Range Sustainment: Investments that allow the Marine Corps to continue to support its existing training requirements. These investments might include: one-for-one replacement of failed equipment, and increase in the total number of small arms ranges, and additional numbers of Air-to-Ground (A-G) Strafe Scoring Systems (SSS).

Range Upgrade: Investments that improve a range's ability to support existing training requirements. These investments might include: replacement of failed legacy equipment with state-of-the-art equipment with the same function/capability, new ranges that would allow installations to provide autonomous support for Multipurpose Machine Gun training requirements, and adding an A-G live-fire target area to an existing "Combat Town" or Military Operations in Urban Terrain (MOUT) training area.

Range Modernization: Investments that will allow the Marine Corps to train for tomorrow's requirements. These investments might include: providing programmable, reactive targets; thermal targets; expanding an existing MOUT training facility from a couple of square city blocks to at least a square mile of urban area, along with several square miles of rural area; and, providing the equipment and supporting infrastructure necessary to integrate key Marine Corps training ranges into the Joint National Training Capability (JNTC).

Range Training Area (RTA): A designated government facility or land, water, and airspace set aside, managed, and used for training and recreational purposes, research and development, testing and evaluation of military munitions and explosives, other ordnance or weapons systems, and instruction of military personnel in their employment.

## **1.2.1 Situation**

### **1.2.1.1 Section 366 Report to Congress**

In response to Congressional inquiry per HR 4546L Conference Report of the National Defense Authorization Act for Fiscal Year (FY) 2003, Section 366, *Training Range Sustainment Plan, Global Status of Resources and Training System, and Training Range Inventory*, and pursuant to guidance by the Undersecretary of Defense (Personnel and Readiness), the Marine Corps developed a standalone 366 Report. The 366 Report contains information and analysis concerning:

- Assessment of current and future training requirements with projections through 2024
- Planning to address operational constraints that result in adverse training impacts caused by limitation on use of or access to land, water, air and spectrum
- Implementation of a Service range inventory system that includes:
  - All available operational training ranges
  - Training capacities and capabilities available at each range
- Identification of training constraints caused by limitations on the use of lands, water areas, air, and spectrum at each range and associated installation
- Evaluation of the adequacy of current Service resources to meet current and future training requirements in the United States and overseas. Such resources include unencumbered and non-degraded access to land, water, air, and spectrum needed to perform all facets of test and training missions

The 366 Report, and its subsequent annual updates, provides information on transformation in progress—on programs, processes, and initiatives designed to ensure that Marine Corps ranges “fully and continuously meet the needs of the warfighter” in the 21<sup>st</sup> Century, and that the operating forces retain full access to those ranges.

## **1.2.2 Mission**

### **1.2.2.1 Marine Corps Training Ranges RCD**

The purpose of the Range Capabilities Document (RCD) is to define the required capabilities that will allow Marine Corps training ranges to support mission essential tasking in an unconstrained environment over a 10-year planning horizon. The RCD describes those unconstrained required capabilities against which the Marine Corps can develop investment strategies over the same 10-year planning horizon. Headquarters Marine Corps (HQMC), TECOM, Marine Corps Combat Development Command (MCCDC), and each individual training range will then assess the capabilities of component elements of each training range complex against the required capabilities for the applicable range classes described in the RCD. Shortfalls between existing and required capabilities will form the basis for current and future range investment strategies.



### **1.2.2.2 Marine Corps Mission Capable Ranges Vision**

The Vision provides a solution to the requirement for greater resource allocation on ranges and training areas from new weapon systems and combat techniques, and usage limitations from increased urbanization, environmental restrictions, and an aging range infrastructure. This vision embraces ranges, airspace, and training areas that incorporate improved instrumentation, enhanced feedback, and target systems that support the individual Marine and the most capable Marine Air Ground Task Force (MAGTF). It also necessitates the appropriate balance between realistic, effective training and environmental stewardship. Guiding the achievement of the vision is the Range Master Plan (RMP), which is grounded on the six cornerstone objectives that will fully support the modernization of ranges, airspace, and training areas:

- Preserve and enhance live-fire combined arms training
- Recapture littoral training capabilities
- Leverage technology to support all levels of training in order to provide feedback for better training
- Mitigate encroachment
- Facilitate cross-Service utilization
- Support the Joint National Training Capability (JNTC)

Achieving the vision requires a commitment of resources for investments in ranges and training infrastructure, to include range instrumentation, target systems, and simulation technologies.

### **1.2.3 Execution**

#### **1.2.3.1 Marine Corps Range Master Plan**

The Marine Corps RMP is a comprehensive Service-level plan to sustain, upgrade, and modernize USMC ranges and training areas. The objective of the RMP is to combine the range and training area initiatives at HQMC and TECOM/RTAM with the current and planned capabilities of USMC Range Complexes and Operating Forces.

The RMP will include a review of USMC Training Requirements, USMC Range Policies and Planning Initiatives, USMC Range Capabilities and Shortfalls, JNTC and Joint Mission Essential Task List (JMETL) requirements, and USMC specific range issues. Particular emphasis is focused upon:

- The preservation and enhancement of the live-fire combined arms training capabilities of MAGTF Training Command, 29 Palms, and Marine Corps Air Station, Yuma
- The recapture of unit-training capabilities at the USMC's two premier littoral training areas, Camp Lejeune and Camp Pendleton
- The goal of providing timely and objective feedback to the training audience by leveraging technology to support every level of USMC training
- The preservation and enhancement of USMC's ability to conduct live training while honoring its commitment to protecting the environment

- The assurance that USMC training complexes are available to, and capable of supporting, Joint Forces Training and Operations

The RMP will coordinate all Marine Corps range functions to include: document and track range capabilities; ensure current range capabilities adequately support unit and individual training standards; identify range requirements resulting from the introduction of new doctrine, force structure, and equipment; and to assess deficiencies and develop recommendations for alternate training resource strategies utilizing USMC and Other-Service facilities.

## **1.2.4 Administration and Logistics**

### **1.2.4.1 MCO 3550.10, Range Management**

MCO 3550.10 establishes the responsibilities and prescribes the policies and procedures pertaining to safety and management of ranges, training areas, and associated training facilities within the Marine Corps. It further defines and describes the functions associated with ranges and training areas, and the responsibilities attendant to those functions.

### **1.2.4.2 MCO 3550.9, Range Certification and Recertification**

MCO 3550.9 is an integral part of the Marine Corps' overarching ground range safety program. Range certification is the function by which safety and environmental compliance are enhanced without compromising training requirements and standards. The order defines the certification and re-certification process that meets an approved set of requirements applicable to an assigned role and mission. Applied appropriately, the range certifications/re-certification will allow for the effective and efficient use of existing ranges, while not compromising safety and the environment.

### **1.2.4.3 Range Management System (RMS)**

The Range Management System (RMS) is a web-enabled, institutional-level, centrally managed system that provides commanders, operating units, range managers, and all cross-Service users with the metrics to relate range capabilities to specific training requirements using both established and developing data metrics and software. RMS allows its users with the resources to:

- Schedule, report, plan, and manage training on Marine Corps ranges and training areas
- Schedule, report, plan, and manage Special Use Airspace (SUA)
- Access and schedule Marine Corps and Army ranges and training areas
- Define USMC range inventory and training assets
- Reference institutional guidance on range operations
- Relate range and training area capabilities and limitations to standardized training and readiness requirements and tasks
- Assess and manage range encroachment

- Identify encroachment impacts on training and readiness
- Assess, define, and identify required range capabilities
- Identify required range capabilities and capability shortfalls
- Reference institutional guidance to ensure Ground and Aviation safe range operations
- Produce range and weapon system Surface Danger Zones (SDZs), custom range maps, natural and cultural resource locations, and range complex training restrictions
- USMC Investment Strategy, funding sources, and investment prioritization

The RMS also serves as the Marine Corps' integrated range inventory that is continuously updated and shared among range users, managers, and planners. The RMS identifies all available training resources, specific training capacities and capabilities, and those specific training constraints initiated by encroachment. It will also begin to marry Marine Corps Training and Readiness (T&R) requirements with specific ranges and USMC and Department of Defense (DoD) facility category codes. When utilized at full capability, the RMS provides managers and planners at all levels of command with the essential information to develop comprehensive training sustainment plans to sustain, upgrade, and modernize Marine Corps ranges.

### **1.3 PORTFOLIO OF MARINE CORPS TRAINING RANGE RESOURCES**

The Marine Corps relies on an extensive portfolio of land and airspace resources to accomplish training at all levels of the continuum—individual, unit, MAGTF, and Joint training. Marine Corps owned and operated training range complexes comprise the core of the portfolio. The Marine Corps also depends on extensive and extended access to non-Marine Corps training lands and airspace, and 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 Bureau of Land Management (BLM) property, and non-Federal lands—both public and private.

Each component of the range, airspace, and training area portfolio is vital to Marine Corps training programs. Retaining continued access to the entire portfolio is a continued priority in the Marine Corps' training and range management efforts.

#### **1.3.1 Marine Corps Range Complexes and Ranges**

The Marine Corps range inventory comprises a complex of range complexes and associated airspace:

- Ground/A-G Range Complexes
  - Marine Corps Base (MCB) Quantico
  - MCB Camp Lejeune
  - MCB Camp Pendleton
  - Marine Corps Air Ground Combat Center (MCAGCC) 29 Palms
  - MCB Hawaii
  - MCB Camp Butler, Japan

- Air Combat/A-G Ranges
  - Marine Corps Air Station (MCAS) Cherry Point
  - MCAS Yuma/Bob Stump Training Range Complex (BSTRC)
  - MCAS Beaufort/Townsend Range
- Other Installations (small-arms ranges only)
  - Marine Corps Recruit Depot (MCRD) Parris Island
  - MCAS Miramar
  - MCAS Iwakuni, Japan
  - Marine Corps Logistics Base (MCLB) Albany
  - MCLB Barstow

### **1.3.2 Cross-Service Ranges and Other Training Areas**

Cross-Service ranges and other training areas utilized by Marine Corps training units include:

- Marine Corps Mountain Warfare Training Center (MCMWTC), Bridgeport, California—U.S. Forest Service
- Camp Fuji, Fuji Maneuver Area (FMA), Japan—Japanese Self Defense Force
- Eglin Air Force Base, Florida—U.S. Air Force
- San Clemente Island Range Complex, California—U.S. Navy
- Fort Bragg, North Carolina—U.S. Army
- Fort A.P. Hill, Virginia—U.S. Army
- Fort Pickett, Virginia—U.S. Army
- Pohakuloa Training Area, Hawaii—U.S. Army
- Southern California and Western Arizona—BLM
- Foreign Training Areas
  - Scotland—Naval Surface Fire Support (NSFS) Qualification
  - Norway—Cold Weather Training and Maritime Prepositioning Force (MPF) Operations
  - Korea—Mountain Warfare Training
  - Denmark—Electronic Warfare Training Operations
  - Australia—MAGTF Fire-and-Maneuver Training
  - Horn of Africa and West Africa—Sustainment Training

## **SECTION TWO: MARINE CORPS DOCTRINE AND OPERATIONS**

### **2.1 OVERVIEW**

Marine Corps training must address all elements of the Marine Corps warfighting doctrine—movement to contact, attack/offensive operations, defensive operations, and withdrawal. Within this context, Marine Corps training includes air, land, sea, and service support training modules.

The Marine Corps air training module encompasses all aspects of Navy Air-to-Air (A-A) and A-G training because of the requirement for Marine Corps fixed-wing aircraft squadrons to augment Carrier Air Wings assigned to deploying Carrier Strike Groups (CSGs). In addition, Marine Corps air training includes additional fixed- and rotary-wing training that emphasizes integrated/combined arms and Close Air Support (CAS) training related to Expeditionary Strike Group (ESG) operations.

The Marine Corps land training module includes many of the training events/components found in U.S. Army ground warfare training, plus training in operating environments unique to the Marine Corps—littoral warfare and amphibious operations.

The Marine Corps service support-training module is unique because every Marine is, first and foremost, a warfighter.

### **2.2 MARINE CORPS OPERATIONS AND DOCTRINE**

Title 10 responsibilities are the touchstone for Marine Corps training requirements, and by extension, for range and training area management planning. Title 10 and implementing directives, including DoD Directive 5100.1, define the primary functions of the Marine Corps as:

- Developing amphibious tactics, techniques, and equipment used by landing forces
- Organizing, training, and equipping to provide Fleet Marine Forces of combined arms
- Organizing, training, and equipping Marine Corps forces to conduct, among other missions:
  - Prompt and sustained combat operations at sea, including sea based and land-based aviation
  - Land, sea, air, and space operations essential to a naval campaign, including seizure and defense of advanced naval bases
  - Amphibious training of all forces assigned to Joint amphibious operations

#### **2.2.1 Expeditionary Maneuver Warfare (EMW)**

Expeditionary Maneuver Warfare (EMW) is the Marine Corps' capstone concept for developing the forces, tactics, techniques, and systems required by the operational context of the 21<sup>st</sup> century. The EMW operational concepts provide a roadmap for

transformation. EMW capability requirements serve as the driving force in the development of weapons, systems, equipment and platforms; tactics, techniques, and procedures; and the training standards and associated range requirements.

EMW is built on the Marine Corps' core competencies and focuses those competencies, evolving capabilities, and innovative concepts to prepare the Marine Corps, as a "total force," to meet the challenges and opportunities of a rapidly changing world.

### **2.2.2 Marine Corps Core Competencies**

The Marine Corps' contribution to national security and its role within a naval expeditionary force rest upon five unique core competencies. These core competencies allow Marines to conduct expeditionary operations across the spectrum of crisis and conflict. The core competencies are:

- *Warfighting Culture and Dynamic Decision-making*: Training seeks to make Marines and provide the MAGTF that will win battles. Training, education, and experience foster decisiveness in high tempo operations, even in absence of ideal information
- *Expeditionary Forward Operations*: Marines are continuously deployed around the world near potential trouble spots where they can deter aggression, respond quickly to crises or contingencies, and resolve them whenever called
- *Littoral Power Projection*: In partnership with the Navy, today's MAGTFs can access the world's littoral regions on short notice, responding quickly with a force tailored to a specific mission
- *Combined Arms Integration*: Marine employment of combined arms at the tactical and operational levels

### **2.2.3 Ship to Objective Maneuver**

Ship to Objective Maneuver (STOM) is the tactical implementation of Operational Maneuver from the Sea (OMFTS). It incorporates the philosophy of maneuver warfare, which is based upon pitting strength against the enemy's weaknesses by avoiding defenses and exploiting gaps. STOM is a radical departure from the traditional linear approach to amphibious operations. In STOM, the Landing Force will have the freedom to launch its attack from over the horizon at sea, well beyond the range of enemy direct fire weapons. Elements of the Landing Force will maneuver during the approach to the beach under the orders of their tactical commanders, just as they would if attacking on land. Commanders of Landing Force subordinate units will select specific littoral penetration points for their individual units—based on the changing tactical situation—even as they approach the shore.

In STOM, surprise is critical to success. Unlike traditional amphibious operations, which are typically preceded by lengthy and deliberate battlespace preparation, to include mine/obstacle reconnaissance, marking, breaching, and clearing, STOM operations will be planned to achieve tactical surprise. Any pre-assault preparations will be performed

clandestinely; many of the functions traditionally performed prior to the amphibious assault will be conducted "in stride."

STOM also includes tactical incursions into target areas located significant distances inland from the coastal area.

#### **2.2.4 Live-Fire Training**

Live-fire training is training wherein Marine Corps air, ground, and service support elements fire ordnance, in a training environment, from the aircraft, artillery, armored vehicles, mortars, and crew-served and individual weapons that they will use in the real world. The training of the critical tasks that aircrew, crews, platoons, and companies have to accomplish to be combat ready is related directly to the availability and capability of live-fire ranges.<sup>1</sup> The Marine Corps therefore considers live-fire training (whether conducted using live or inert ordnance) indispensable to the effective training of Marine Corps warfighters. Live-fire training may be conducted in stand-alone training events or in conjunction with virtual, constructive, and non-live-fire maneuver training events.

### **2.3 MARINE AIR GROUND TASK FORCE (MAGTF)**

The MAGTF is the Marine Corps' principle organization for the conduct of all missions across the range of military operations. MAGTFs are a balanced, combined arms force comprised of command, ground combat, aviation combat, and combat sustainment elements.

#### **2.3.1 Command Element (CE)**

A MAGTF Command Element (CE) is the standing headquarters for the MAGTF. It is organized to provide command and control capabilities, to include intelligence and communications assets, required for effective planning, direction, and execution of MAGTF operations.

#### **2.3.2 Aviation Combat Element (ACE)**

A Marine Corps Aviation Combat Element (ACE) is composed of fixed- and rotary-wing platforms, aircrew, and maintenance personnel. An ACE is organized to support the MAGTF mission and is capable of performing the six functions of Marine aviation: Offensive Air Support (OAS); Anti-Air Warfare (AAW); Assault Support; Air Reconnaissance; Electronic Warfare (EW); and Control of aircraft and missiles. It is normally organized with appropriate air command and control, combat, combat support, and Combat Service Support (CSS) units. The ACE can vary in size and composition and can transition and operate effectively from ships, expeditionary airfields, or austere forward operating sites.

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<sup>1</sup> U.S. Army Training Circular 25-8

### **2.3.3 Ground Combat Element (GCE)**

A Marine Corps Ground Combat Element (GCE) is the organic ground force tasked to conduct ground operations in support of the MAGTF mission. The GCE is normally organized around an infantry organization and subsequently reinforced with requisite artillery, reconnaissance, armor, and engineering forces.

### **2.3.4 Combat Service Support Element (CSSE)**

A Marine Corps Combat Service Support Element (CSSE) provides the full range of CSS functions and capabilities needed to support the readiness and sustainability of the MAGTF. The CSSE is organized around a CSS headquarters and augmented with various units capable of supporting supply, maintenance, transportation, deliberate engineering, services, and health services.

## **2.4 MARINE CORPS TRAINING CONTINUUM**

Marine Corps training is built along a continuum that is well-defined and structured to provide combat-ready Marines, Marine units, and MAGTFs. This continuum is constantly adapting to internal forces (e.g., funding availability, personnel manning levels, and societal changes), as well as external forces and identified threats, such as those highlighted by the Global War on Terror.

The training continuum is comprised of five major parts:

- Individual-level training
- Common skills training
- Skill progression training
- Professional military education
- Unit collective training

The continuum is firmly anchored in our core competencies and the Marine Corps' capstone concept of EMW.

Marine Corps training is based on defined tasks, conditions, and standards developed to ensure that training focuses on core competencies, is relevant in terms of expected missions and operations environments, and implements EMW doctrine and operational concepts. Training requirements are derived from the fundamental mandate to provide combat-ready units as the Nation's expeditionary force-in-readiness. The Marine Corps training system provides the means to attain exacting level of combat readiness across the entire spectrum of military operations

### **2.4.1 Training and Readiness Programs**

The Marine Corps has established official T&R Programs for its Ground and Aviation units. The purpose of the T&R Program is to provide the commander with approaches to individual and collective training for Marines, Marine units, and the MAGTF. The goal is



to develop unit warfighting capabilities, so that Marine units can perform as part of a MAGTF, and the MAGTF is capable of performing its missions as part of a Joint Task Force. Because unit readiness and individual readiness are interrelated, in that the purpose of individual training is to enhance unit readiness, the T&R Programs contain both individual and collective events.

The Marine Corps T&R concept is built upon the following tenets:

- Building block approach to training
- Focus on expected missions
- Focus on Unit Core Capabilities and Individual Core Skills
- Organize training tasks into executable events
- Sustainment of training
- Unit Training Evaluation
- Training tasks organized in executable events

#### **2.4.1.1 The Building Block Approach**

The goal of training is to achieve and maintain a threshold level of combat readiness in Core Capabilities for units/sections and Core Skills for individuals by accomplishing a series of progressively more challenging training events. The level of challenge for the individual and the unit increases as each training event builds on the preceding ones. Unit training begins at the small unit level with simple exercises progressing to the larger units in an ever more complex training environment.

#### **2.4.1.2 Focus on Expected MAGTF Missions**

Training requirements are determined by expected missions. The T&R Programs focus on training for successful accomplishment of MAGTF missions across a spectrum on conflict, from Military Operations Other Than War (MOOTW), to contingency operations, to Major Theater War, and across the spectrum of operational environments such as Military Operations in Urban Terrain (MOUT), extreme environments, and littoral warfare.

The operational environment greatly affects how the Marine Corps plans and executes its training and education programs. In particular, the factors of uncertainty, complexity, and the increasing concentration of the world's population within littoral and urban environments impact the continuum. The combination of these factors results in a marked increase in the number and types of tactical and operational tasks Marine must be trained to execute.

#### **2.4.1.3 Focus on Core Skills and Capabilities**

In its building block approach to training, the T&R Program identifies Core Skills and Core Capabilities for each Military Occupational Specialty (MOS) and unit to be trained. Core skills are essential individual skills that enable a Marine to perform in combat and qualify that Marine for an MOS. Core plus skills are those combat-focused skills that are

environment, mission, rank, or billet specific, and are developed upon a Marine's assignment to an operational unit. Core Capabilities are the essential collective functions that a unit must be capable of performing during extended contingency or combat operations. Core plus capabilities are advanced functions that are environment, mission, or theater specific.

#### **2.4.1.4 Train Through Executable Events**

Training requirements for each type and level of training are contained in the series of T&R Manuals, which describe specific training events to be accomplished to achieve combat readiness. T&R Manuals are based on specific performance standards for Mission Essential Tasks designed to ensure proficiency in core competencies. Using the building block approach to training, T&R events are categorized according to the nature and scope of the training objectives.

- One Hundred Level Events—Initial MOS are core skills training conducted at formal schools, such as the Schools or Infantry (SOI) and Fleet Replacement Squadrons (FRS)
- Two Hundred Level Events—Events normally conducted at the lower echelons (e.g., sections, teams, squads). Two hundred level training raises the proficiency of the Marine and the small unit, and builds upon core skills introduced in formal schools
- Three Hundred Level Events—Events normally conducted at the higher echelon (e.g., company or battalion for ground units) and, for aviation, training that addresses advanced combat tasks
- Four Hundred Level Events—Events to train advanced capabilities that are low-density, high-risk, low-probability-of-execution events that go beyond the defined Core Capabilities of the unit

#### **2.4.1.5 Sustainment of Training and Unit Evaluation**

Periodic demonstration of capabilities is required to ensure perishable skills are maintained so that the unit can accomplish its mission as part of the MAGTF. Two measures of training are established in the T&R Programs: (1) proficiency and (2) currency. Proficiency is a function of unit capability and individual skill that must be demonstrated to an evaluator. Currency, as described by a T&R event's "sustainment interval" is the periodicity within which skills must be refreshed and re-evaluated.

### **2.4.2 Training Requirements**

#### **2.4.2.1 Individual-Level Training**

Individual-level training is a transformation process that takes young men and women and molds them into quality citizens and Marines capable of winning the Nation's battles. This transformation process is founded upon commonly shared individual-level training experiences that begin in Recruit Training or Officer Candidate School (OCS), continue

through MOS skill training, and culminate when Marines arrive at their first operational unit.

Individual-level training involves extensive physical training, marksmanship instruction, and demanding field problems designed to teach and assess Marine Corps core values and basic concepts.

#### **2.4.2.2 Collective Training: Common Skills and Skill Progression**

Upon assignment to a unit, Marines undergo training in collective skills based on tightly focused requirements defined by their unit's Mission Essential Tasks (METs). As Marines progress, they continue to receive training specifically designed to reinforce and supplement their MOS skills. They also receive professional military education commensurate with advances in range to increase their understanding of warfighting. Increasingly, as they move along the continuum, Marines focus less on individual skills and more on collective and unit-level skills, with emphasis on their role as part of a MAGTF.

#### **2.4.2.3 MAGTF Training**

##### *Marine Expeditionary Unit (Special Operations Capable)—MEU(SOC)*

The Marine Expeditionary Unit (Special Operations Capable) (MEU[SOC]) is the standard, forward deployed Marine expeditionary organization. Current training requirements for the MEU(SOC) include training in the following Core Capabilities:

- Amphibious Operations
- MEU-Level Maneuver Ashore
- Combined-Arms Operations
- Maritime Special Operations
- MOOTW
- Supporting Operations

Within those core capabilities, the MEU(SOC) must train to accomplish over 20 mission areas that comprise a broad spectrum of tasks and operations.

##### *Marine Expeditionary Brigade (MEB)*

In addition to the core capabilities and essential missions of the MEU, 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 to perform those tasks that are inherent in its role as the primary operational-level warfighting force in the theater of operations. These tasks include forcible entry, amphibious operations, employment of combined arms combined with MEB-Level maneuver, and operational logistics at the theater level. The MEB must also train to perform as both a Joint Task Force Headquarters, and the Rear Area Operations Group.

### Marine Expeditionary Force (MEF)

As the Marine Corps' principal warfighting organization, the Marine Expeditionary Force (MEF) must train to conduct and sustain expeditionary operations globally in any geographic environment. Current training requirements for the MEF, as established in the Marine Corps Task List (MCTL), include:

- Train to Conduct MEF Maneuver
- Train to Conduct Intelligence Operations
- Train to Employ and Coordinate Fires
- Train to Perform Logistics and Combat Service Support
- Train to Exercise Command and Control
- Train in Force Protection

### **2.4.3 Future Training Requirements—Evolving Marine Corps Tasks**

The Marine Corps' training continuum will change as needed to provide Marines capable of meeting these diverse and challenging operational environments. Tasks, conditions, and standards for future MAGTF training requirements will be driven by expected operational contexts and EMW operational concepts employing new systems and weapons, and characterized by:

- Extended range training operations to exercise EMW capabilities
- MEB live-fire and maneuver exercises
- Increased requirements for both small and large unit MOUT training
- Significant enhancements to training and feedback/evaluation through instrumented ranges and target systems
- Increased reliance on MAGTF sustainment training during deployment
- Increased Joint training

### **2.4.4 Training & Readiness Standards and Range Requirements**

EMW capabilities will enhance MAGTF mission capabilities. Tactics, techniques, and procedures are evolving to leverage new capabilities. Future training requirements will evolve across the range of Marine Corps tasks. As mission capabilities increase in complexity from individual-level tasks, to small unit events, to MAGTF training, range requirements for land, sea, and airspace increase proportionally.

## SECTION THREE: TRAINING REQUIREMENT IDENTIFICATION

### 3.1 TRAINING REQUIREMENT IDENTIFICATION

In addition to supporting Title 10 guidelines, the Marine Corps must also be prepared to support tasking from the President of the United States (POTUS), the DoD, and resulting DoD Universal Joint Task List (UJTL), Joint Tactical Tasks (JTTs), and the Marine Corps Task List (MCTL). The UJTL, JTTs, and MCTL are the basis for all Marine Corps training requirements and weapons system development programs.

Based upon POTUS tasking, DoD develops a set of high-level required strategic warfighting capabilities, called the UJTL. The Joint Forces Commander (JFCOM) uses the UJTL to develop specific statements of required tactical capabilities (the JTTs). As of 31 July 2003, JFCOM listed 13 high-level required joint capabilities (JTTs), grouped into seven major task categories. The current list of high-level JTTs is presented in Table 3-1.

**Table 3-1. The Joint Tactical Task (JTT) List**

JTT	JTT Description <sup>1, 2, 3, 4</sup>
TA 1	Deploy/Conduct Maneuvers
	TA 1.2 Conduct Passage of Lines
	TA 1.3 Conduct Countermining Operations
	TA 1.4 Conduct Mine Operations
TA 2	Develop Intelligence
	TA 2.4 Disseminate Tactical Warning Information and Attack Assessment
TA 3	Employ Firepower
	TA 3.3 Coordinate Battlespace Maneuver and Integrate with Firepower
TA 4	Perform Logistics and Combat Service Support
	TA 4.2 Distribute Supplies and Provide Transport Services
	TA 4.4 Conduct Joint Logistics Over-The-Shore Operations (JLOTS)
TA 5	Exercise Command and Control
	TA 5.6 Employ Tactical Information Operations
TA 6	Protect the Force
	TA 6.2 Conduct Joint Personnel Recovery
	TA 6.3 Conduct Rear Area Security
	TA 6.4 Conduct Noncombatant Operations
	TA 6.5 Provide for Combat Identification
TA 7	Operate in a Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) Environment
	TA 7.1 Conduct Mission Operations in a CBRNE Environment

Notes:

<sup>1</sup> Not a complete list of applicable JTTs.

<sup>2</sup> Sequential JTTs not listed above (for example, JTTs TA 1.1 and TA 2.1 through 2.3) have been deleted in JFCOM's latest version of JTTs.

<sup>3</sup> There are applicable "3-digit" JTTs below many of the "2-digit" JTTs listed above.

<sup>4</sup> There are also applicable stand-alone "3-digit" JTTs (like TA 1.1.1, TA 1.1.2, and TA 1.1.4) below some of the cancelled "2-digit" JTTs (like TA 1.1).

The Department of the Navy (DoN) refines the UJTLs and JTTs applicable to naval warfare into statements of required tactical capabilities for Marine Corps units. These statements of required Marine Corps tactical capabilities comprise the MCTL, which consists of 343 specific Marine Corps Tasks (MCTs), grouped into six general categories applicable to specific warfighting concepts. A brief discussion of the six MCTL categories and examples of range-related MCTs associated with each is provided in paragraphs 3.2.1 through 3.2.6.

An analysis of the 343 MCTs identified 46 MCTs that could impact or be impacted by the Marine Corps' training range infrastructure. Table 3-2 cross-references the high-level JTTs to the applicable range-related MCTs. Table 3-3 provides a summary of the applicability of the range-related MCTs to the four Marine Corps range classes.

## **3.2 MCTL CATEGORIES**

### **3.2.1 MCT 1.0—Maneuver**

*To move forces to achieve a position of advantage with respect to enemy forces.*

This category of tasks includes the employment of forces on the battlefield in combination with fire or fire potential. Maneuver is a dynamic element of combat, the means of concentrating forces at the decisive point to achieve surprise, psychological shock, physical momentum, and moral dominance which enables smaller forces to defeat larger ones. This category also includes movement of combat and support forces. Specific examples of MAGTF training range-related MCT 1.0 activities include: conduct amphibious operations, conduct offensive actions, conduct defensive actions, conduct mobility and counter-mobility operations, and deploy and redeploy forces.

### **3.2.2 MCT 2.0—Conduct Intelligence Operations**

*To develop intelligence required for planning and conducting tactical operations (including analyzing the enemy's capabilities, intentions, and vulnerabilities) and the environment, to include weather and the application of tactical decision aids and weather effects matrices on friendly and enemy systems and terrain.*

This category includes the development of counterintelligence information. Aerial, tactical, engineer, zone, and area reconnaissance, as well as reconnaissance in force, are examples of training range-related MCT 2.0 activities.

**Table 3-2. JTTs Cross-referenced to Range-related MCTs**

<b>General Category</b>	<b>JTT</b>	<b>MCTs</b>	
Deploy/Conduct Maneuver	TA 1	MCT 1	Maneuver
		MCT 1.1	Conduct Amphibious Operations
			MCT 1.1.1 Conduct Ship-to-Objective Maneuver
			MCT 1.1.3 Conduct Operational Maneuver
			MCT 1.1.6 Conduct Amphibious Assault
		MCT 1.2	Conduct Offensive Action
			MCT 1.2.0.18 Conduct Noncombatant Evacuation Operations
			MCT 1.2.1.16 Conduct Mobility Operations
			MCT 1.2.2.2 Conduct Assault Support
			MCT 1.2.2.3 Conduct TRAP
		MCT 1.3	Conduct Defensive Action
			MCT 1.3.17 Conduct Countermobility Operations
			MCT 1.3.18 Conduct Anti-Air Warfare
Develop Intelligence	TA 2	MCT 2	Conduct Intelligence Operations
		MCT 2.2	Collect Information
			MCT 2.2.2 Conduct Reconnaissance and Surveillance
Employ Firepower	TA 3	MCT 3	Fires
		MCT 3.0	Destroy an Enemy Force
			MCT 3.0.1 Attack Aircraft and Missiles (Offensive Anti-Air Warfare)
			MCT 3.0.2 Attack-by-Fire an Enemy Force
			MCT 3.0.5 Provide Fires in Support of Maneuver
		MCT 3.1	Conduct Direct Fires
		MCT 3.2	Conduct Indirect Fires
			MCT 3.2.1 Attack Deep Targets
			MCT 3.2.2 Employ Close Air Support
			MCT 3.2.3 Disrupt an Enemy Force
			MCT 3.2.4 Conduct Suppression of Enemy Air Defenses
			MCT 3.2.5 Conduct Surface Fires Interdiction of Enemy Forces
			MCT 3.2.6 Conduct Air Interdiction of Enemy Forces

**Table 3-2 (continued). JTTs Cross-referenced to Range-Related MCTs**

<b>General Category</b>	<b>JTT</b>	<b>MCTs</b>	
		MCT 3.3	Conduct Non-Lethal Engagement
			MCT 3.3.2      Conduct Electronic Attack
Perform Logistics and Combat Service Support	TA 4	MCT 4	Perform Logistics and Combat Service Support
			MCT 4.0.1      Maintain and Operate Logistics Over-the-Shore
			MCT 4.1.2      Conduct Bulk Fuel Operations
			MCT 4.1.2.1    Conduct FARP Operations
			MCT 4.1.3      Conduct Aerial Delivery
			MCT 4.2.1.7    Conduct Aerial Refueling
			MCT 4.2.4      Coordinate Offload, Transport, and Staging of Equipment/Material
		MCT 4.4	Provide Expeditionary Engineering Support
Exercise Command and Control	TA 5	MCT 5	Exercise Command and Control
		MCT 5.2	Communicate
			MCT 5.2.4.1    Relay Communications
			MCT 5.2.9      Conduct Electronic Warfare
		MCT 5.3	Direct Operations
			MCT 5.3.2      Control Combat Formations
			MCT 5.4.2      Conduct Continuous Operations
Protect The Force	TA 6	MCT 6	Protect the Force
			MCT 6.1.1      Conduct Counter-Reconnaissance
			MCT 6.1.2      Establish Perimeter Security
			MCT 6.1.6      Conduct Air and Missile Defense
		MCT 6.3	Establish NBC Protection in Marine Force Area of Operations



**Table 3-3. Applicability of Range-related MCTs to Marine Corps Range Classes**

MCTs	Definition	Marine Corps Range Classes			
		Individual Level	Unit Level	MAGTF Battalion/MEU Level	MAGTF Regimental/MEB Level
MCT 1	Maneuver				
MCT 1.1	Conduct Amphibious Operations			X	X
MCT 1.1.1	Conduct Ship-to-Objective Maneuver			X	X
MCT 1.1.3	Conduct Operational Maneuver	X	X	X	X
MCT 1.1.6	Conduct Amphibious Assault			X	X
MCT 1.2	Conduct Offensive Action		X	X	X
MCT 1.2.0.18	Conduct Noncombatant Evacuation Operations			X	X
MCT 1.2.1.16	Conduct Mobility Operations		X	X	X
MCT 1.2.2.2	Conduct Assault Support			X	X
MCT 1.2.2.3	Conduct TRAP			X	X
MCT 1.3	Conduct Defensive Action		X	X	X
MCT 1.3.17	Conduct Countermobility Operations		X	X	X
MCT 1.3.18	Conduct Anti-Air Warfare	X	X	X	X
MCT 2	Conduct Intelligence Operations				
MCT 2.2	Collect Information			X	X
MCT 2.2.2	Conduct Reconnaissance and Surveillance		X	X	X
MCT 3	Fires				
MCT 3.0	Destroy an Enemy Force		X	X	X
MCT 3.0.1	Attack Aircraft & Missiles (Offensive Anti-Air WF)			X	X
MCT 3.0.2	Attack-by-Fire an Enemy Force		X	X	X
MCT 3.0.5	Provide Fires in Support of Maneuver			X	X
MCT 3.1	Conduct Direct Fires	X	X	X	X
MCT 3.2	Conduct Indirect Fires	X	X	X	X
MCT 3.2.1	Attack Deep Targets	X		X	X
MCT 3.2.2	Employ Close Air Support	X	X	X	X
MCT 3.2.3	Disrupt an Enemy Force		X	X	X
MCT 3.2.4	Conduct Suppression of Enemy Air Defenses		X	X	X

**Table 3-3 (continued). Applicability of Range-related MCTs to Marine Corps Range Classes**

MCT	Definition	Marine Corps Range Classes			
		Individual Level	Unit Level	MAGTF Battalion/MEU Level	MAGTF Regimental/MEB Level
MCT 3.2.5	Conduct Surface Fires Interdiction of Enemy Forces			X	X
MCT 3.2.6	Conduct Air Interdiction of Enemy Forces			X	X
MCT 3.3	Conduct Non-Lethal Engagement			X	X
MCT 3.3.2	Conduct Electronic Attack		X	X	X
MCT 4	Perform Logistics and Combat Service Support				
MCT 4.0.1	Maintain and Operate Logistics Over-the-Shore		X	X	X
MCT 4.1.2	Conduct Bulk Fuel Operations		X	X	X
MCT 4.1.2.1	Conduct FARP Operations		X	X	X
MCT 4.1.3	Conduct Aerial Delivery		X	X	X
MCT 4.2.1.7	Conduct Aerial Refueling	X	X	X	X
MCT 4.2.4	Coordinate Offload, Transport, and Staging of Equipment/Material			X	X
MCT 4.3	Provide Maintenance			X	X
MCT 4.4	Provide Expeditionary Engineering Support		X	X	X
MCT 5	Exercise Command and Control				
MCT 5.2	Communicate		X	X	X
MCT 5.2.4.1	Relay Communications			X	X
MCT 5.2.9	Conduct electronic Warfare		X	X	X
MCT 5.3	Direct Operations		X	X	X
MCT 5.3.2	Control Combat Formations		X	X	X
MCT 5.4.2	Conduct Continuous Operations		X	X	X
MCT 6	Protect the Force				
MCT 6.1.1	Conduct Counter-Reconnaissance		X	X	X
MCT 6.1.2	Establish Perimeter Security		X	X	X
MCT 6.1.6	Conduct Air and Missile Defense		X	X	X
MCT 6.3	Establish NBC Protection in Marine Force Area of Operations		X	X	X

### **3.2.3 MCT 3.0—Fires**

*To apply firepower against air and ground targets.*

The collective and coordinated use of target acquisition data; direct and indirect fire weapons, armed aircraft of all types, and other lethal and non-lethal means against air, ground, and sea targets. This category of tasks includes artillery, mortar, and other non-line-of-sight fires, naval gunfire (to include NSFS, CAS, electronic attack, strike, air warfare, counter air, and interdiction). Specific examples of training range-related MCT 3.0 activities include: conduct targeting, conduct direct and indirect fires, conduct non-lethal engagement, and destroy an enemy force.

### **3.2.4 MCT 4.0—Perform Logistics and Combat Service Support**

*To sustain forces in the combat zone by arming, fueling, fixing equipment, moving, supplying, manning, maintaining visibility over, and by providing personnel and health services.*

This category of tasks includes logistic support, as necessary, to U.S. agencies and friendly nations and groups. Specific examples of training range-related MCT 4.0 activities include: supply the force, plan and coordinate transportation services, maintain and operate logistics over the shore, and provide expeditionary engineering support.

### **3.2.5 MCT 5.0—Exercise Command and Control**

*To exercise authority and direction over assigned or attached forces in the accomplishment of the mission.*

This category of tasks involves maintaining visibility over and arranging personnel, equipment, and facilities during the planning for and conduct of military operations. Specific examples of training range-related MCT 5.0 activities include: communicate; conduct planning; direct operations; and coordinate and integrate joint, multinational, and interagency support.

### **3.2.6 MCT 6.0—Protect the Force**

*To protect the tactical force's fighting potential so that it can be applied at the appropriate time and place.*

This category of tasks includes those measures the force takes to remain viable and functional by protecting itself from the effects of or recovery from enemy activities. Specific examples of training range-related MCT 6.0 activities include: protect/secure operationally critical installations, facilities, and systems; establish Nuclear, Biological, and Chemical (NBC) protection in the Marine Force Area of Operations; combat terrorism; and establish perimeter security.

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## **SECTION FOUR: MARINE CORPS TRAINING RANGES AND ATTRIBUTES**

### **4.1 OVERVIEW**

The required capabilities for Marine Corps training ranges are divided into four separate range classes; specifically, Individual Level Training Range, Unit Level Training Range, MAGTF MEU Level Training Range, and MAGTF MEB Level Training Range. The range classes are aligned with types of training conducted and the size of the units conducting the training.

### **4.2 MARINE CORPS RANGE CLASSES**

#### **4.2.1 Individual Level Training Range**

The Individual Level training range supports the set of core and core plus skills associated with the USMC ITS for each element of a MAGTF. Accordingly, the Individual Level training range provides and supports the most basic training environment associated with the MAGTF ACE, GCE, and CSSE. The Individual Level training range also supports the basic infantry combat skills taught at SOI and specific training events associated with other formal schools.

#### **4.2.2 Unit Level Training Range**

The Unit Level training range supports the set of friendly force small unit offensive and defensive tactics and operations associated with expeditionary MAGTF forces against hostile or potentially hostile forces. The Unit Level training range supports all types of aircraft, weapons, special operations forces, landing forces, and ground forces employed in concerted military efforts described by the Marine Corps' EMW doctrine, which includes OMFTS and STOM. As a result, the Unit Level training range supports tactics and operations associated with all training phases of small unit level missions of a MAGTF.

#### **4.2.3 MAGTF MEU Level Training Range**

The MAGTF MEU Level training range supports the set of friendly force offensive and defensive tactics and operations associated with expeditionary MAGTF forces against hostile or potentially hostile forces. The MAGTF MEU Level training range also supports the aircraft, weapons, ordnance, special operations forces, landing forces, and ground forces employed in concerted military presence and engagement efforts described by the USMC's EMW doctrine, to include OMFTS and STOM.

#### **4.2.4 MAGTF MEB Level Training Range**

The MAGTF MEB Level training range supports the set of friendly force offensive and defensive tactics and operations associated with small-scale contingency expeditionary

MAGTF forces against hostile or potentially hostile forces. The MAGTF MEB Level training range supports all types of aircraft, weapons, special operations forces, landing forces, and ground forces that will be employed in concerted crisis response military efforts that are characterized by high-density, high-risk operations.

### **4.3 MARINE CORPS RANGE ATTRIBUTES**

The required capabilities for the Marine Corps training range infrastructure are measured using common attributes; specifically, operational elements, System of System characteristics, and Information Exchange Requirements (IERS) and Interoperability.

#### **4.3.1 Operational Elements**

The Marine Corps training range infrastructure includes three operational elements: Airspace, Sea Space, and Land Area.

##### **4.3.1.1 Airspace**

Airspace refers to any one of several types of controlled and uncontrolled airspace required to support range operations. Types of airspace could include Restricted Areas, Warning Areas, or Military Operating Areas, Air Traffic Control Assigned Airspace, Altitude Reservations, etc. Airspace is defined by horizontal, area, vertical, and temporal measurements wherein activities must be confined because of their nature and/or wherein limitations may be imposed on non-participating aircraft. The horizontal and area measurements are in nautical miles (nm) and square nm (nm<sup>2</sup>), respectively. The vertical measurement is a linear measure described in feet, measured upward from the surface of the earth to some altitude above ground level (AGL). The temporal measurement is in days, hours, and minutes.

##### **4.3.1.2 Sea Space**

Sea Space is an operating area defined by horizontal, area, and temporal measurements. The horizontal and area measurements are in nm and nm<sup>2</sup>, respectively. The temporal measurement is in days, hours, and minutes.

##### **4.3.1.3 Land Area**

Land Area is an operating area defined by horizontal, area, and temporal measurements. The horizontal and area measurements are in feet/miles and square miles/acres, respectively. MOUT training imposes special considerations associated with Land Area. When discussing MOUT, the Land Area will also include a vertical dimension because of the requirement to accommodate both above- and below-street level training. The temporal measurement is in days, hours, and minutes.

### **4.3.2 System of Systems Characteristics**

The Marine Corps range infrastructure includes a System of Systems composed of six major systems.

#### **4.3.2.1 Scheduling System**

The scheduling system includes all necessary components and elements (including software applications) of a common range management system endorsed and fielded by HQMC. The scheduling system is used by range personnel and range users to determine range capability, availability, and assignment for use. The scheduling system also includes those components and elements that assist range management personnel in capturing and reporting range usage data.

#### **4.3.2.2 Communications System**

The communications system includes all necessary components and elements used by range personnel to establish and maintain secure and/or non-secure two-way point-to-point, Surface-to-Surface (S-S), and A-G communications with range operators, range maintainers, and range users. The communications system, which could also include inter-range communications not covered by IERs and Interoperability, includes radio transmitters, receivers, transceivers; communications antennas; interface devices; and cryptologic equipment.

#### **4.3.2.3 Weather Observing and Reporting (MET) System**

The weather observing and reporting (MET) system includes all necessary components and elements used by range personnel and users for determining and displaying current weather conditions. The MET system includes weather observing equipment, weather data transmission systems, and weather information storage and display systems.

#### **4.3.2.4 Target System**

The target system includes all necessary components and elements associated with presenting and controlling fixed and mobile land and air targets. The target system includes the target body, active and passive emitters and augmentation mounted on the target, and target control systems. The target system could also include virtual targets, generated by elements of the Instrumentation System. Typical targets include fixed and mobile targets (and their associated ranges), including bulls-eye, strafe, non-tactical, tactical, and time critical targets that support A-G, NSFS, artillery, mortar, anti-armor, and small arms tactics training and weapons expenditure.

#### **4.3.2.5 Instrumentation System**

The instrumentation system includes all necessary components and elements associated with event tracking, Range Control (RC), Exercise Control and Coordination (EC&C),

Modeling and Simulation (M&S), scoring, and debriefing/After Action Review (AAR). The instrumentation system includes, for example, radar, optical, Global Positioning System, and cinetheodolitic tracking systems; data processing and display systems; threat and weapons system simulators, emulators, and employment models; automated and visual scoring systems; and recording, reconstruction, replay, and display equipment and facilities.

#### **4.3.2.6 Opposition Force (OPFOR) System**

The Opposition Force (OPFOR) system includes all necessary live and virtual components and elements associated with presenting friendly event participants engaged in force-on-force and live-fire training with a proactive and reactive “thinking enemy.” The OPFOR is the key component of a training environment that replicates, to the greatest extent practical, the expected enemy order of battle in the planned area of operations. In many instances, the OPFOR described in the RCD will NOT be assigned or co-located with range that is supporting the required range function. However, the OPFOR represents an integral and essential part of any range’s ability to create a meaningful training experience.

A typical OPFOR might be composed of any or all of the below-listed elements:

- Aircraft and aircrew
- Artillery and the crews that operate them
- Armored vehicles and the crews that operate them
- Ground personnel (both combat and support)
- Radar and/or electro-optical tracking equipment
- The weapons systems, performance models (created by the M&S system), and tactics associated with any of the above
- Targets (fixed and mobile)
- An Electronic Combat (EC) capability
- The Command and Control element that allows the OPFOR to perform as a proactive or reactive thinking enemy

EC is one of the elements of an OPFOR that can be characterized quantitatively, regardless of the location where the component is employed. An OPFOR may employ either offensive (Electronic Attack [EA]) or defensive (Electronic Protect [EP]) forms of Electronic Combat. The employment of the EC weapons by the OPFOR creates a characteristic Radio Frequency (RF) signature that is referred to as an Electronic Order of Battle (EOB). The capability of a range to recreate any EC EOB requires that the range be able to simulate or emulate the basic elements of EC, which include:

- Search, acquisition, and tracking radars
- Anti-Aircraft Artillery (AAA) systems
- S-A Missile (SAM) systems
- S-S missile and artillery systems
- RF (including optical) signatures related to weapons guidance systems
- RF and optical jamming



Previous studies, like the Navy Live Tactical Training Range Instrumentation Roadmap (LTTIR), have found it useful to categorize EC (formerly Electronic Warfare [EW]) threats by levels, according to the complexity and/or degree of integration or sophistication. We have recreated below the EC levels described by the LTTIR:

- *EC Threat Level 1* represents a limited number (1-2) of threat weapon system emitters, used primarily for threat signal recognition. EC Threat Level 1 systems generate signals with sufficient realism and fidelity to stimulate friendly platforms' signal recognition, processing, and display systems.
- *EC Threat Level 2* includes sufficient EC emitters to provide multiple coordinated threats with accurate threat replication. EC Threat Level 2 systems support friendly sensor/counter measures employment and targeting.
- *EC Threat Level 3* includes a high-density, multi-axis, coordinated threat environment of various types and capabilities throughout the exercise area. EC Threat Level 3 systems replicate the signal characteristics, geographic placement, operational doctrine, and command and control of associated with coordinated threat operations.
- *EC Threat Level 4* includes a high-density, multi-axis, coordinated threat environment of various types and capabilities throughout the exercise area. EC Threat Level 4 differs from EC Threat Level 3 in that Threat Level 4 provides reactive, coordinated threats from all axes and operators highly proficient in coordinated threat operations and tactics.

### **4.3.3 Information Exchange Requirements and Interoperability**

The Marine Corps range infrastructure IERs reflect the information needs of both the range-related systems and the other (non-range-related) systems supported. The IERs are the basis for ensuring the interoperability of the Marine Corps range infrastructure with other services' ranges, systems, units, and forces in order to be able to operate together effectively.

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## **SECTION FIVE: METHODOLOGY**

### **5.1 OVERVIEW**

The Marine Corps training range infrastructure must support a broad range of mission essential tasking. There has been no previous attempt to provide a complete description of the critical required capabilities associated with this range infrastructure. The purpose of this Marine Corps training range RCD is to define those previously-undefined required capabilities that will allow the Marine Corps training ranges to support mission essential tasking in an unconstrained environment for a 10-year planning horizon.

This RCD uses a common set of range operational elements and range-related systems and subsystems to describe the required capabilities of a range infrastructure that includes a complex mix of geography and equipment to support myriad range users and range operations.

### **5.2 EXISTING RANGE SHORTFALLS**

There have been previous assessments that have articulated the capabilities and shortcomings of the existing DoN range infrastructure used for training.<sup>2</sup> A brief recap of the previously identified shortcomings is provided below.

#### **5.2.1 Inadequate Airspace, Land Space, and/or Operating Environment**

With rare exception, the Marine Corps range infrastructure supporting training, which originated during World War II and evolved during and in response to the Cold War threat, is barely adequate to support today's requirements; specifically, the ranges are typically small (in terms of land area and the volume of SUA), do not have the necessary clearances and authorizations for unrestricted operations, and (on the east coast) lack terrain diversity. For example, while the MCAGCC at 29 Palms and the Barry M. Goldwater Range's Restricted Area 2301W support extensive overland aerial training and/or large land training areas for the west coast, there are no ranges on the east coast that offer the same type of training venue.

#### **5.2.2 Radio Frequency Bandwidth, Communications, and Security**

RF bandwidth and communications requirements associated with most training evolutions are impacted by frequency spectrum encroachment, lack of interoperability, and the inability to affect adequate information exchange. Specifically, frequency

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<sup>2</sup> The subject of range capabilities and deficiencies is addressed in several studies, both within and external to the Department of Defense. The GAO Report, "Better Planning and Funding Priority Needed to Improve Conditions of Military Ranges" (GAO-05-534, June 2005) recommends range planning approaches to range deficiencies. See also, Department of the Navy Air-to-Ground Range Needs Assessment (Draft, September 2000); Department of Navy Live Tactical Training Range Instrumentation Roadmap (LTTIR) (Draft, October 2001).

encroachment by the private sector (especially in the microwave frequency spectrum) is limiting the necessary improvements to existing range instrumentation data transmission systems. In addition, the Federal Aviation Administration (FAA) currently applies severe restrictions on the use of encrypted communications within 50 nm of the coastlines, fearing those communications could interfere with commercial aviation navigation systems.

Because existing range communications systems were typically designed and installed to satisfy range-specific (or “stove pipe”) requirements, most existing ranges lack the ability to effect communications with range event participants that are using HAVE QUICK and Datalink (D/L) for coordination and execution. Also, training events that require support from multiple ranges require separate pre-event and real-time communications with each range for planning, scheduling, and execution.

The most capable range instrumentation systems (like the existing Tactical Air Combat Training System and its replacement Tactical Combat Training System) host weapon “fly-out” and Real Time Kill Notification (RTKN) models in the instrumentation software. This technical approach results in a classified instrumentation system and the need for encrypted two-way communications between the instrumentation system and event participants’ instrumentation system interface equipment.

Finally, few of the existing ranges are fully compliant with the Test & Training Enabling Architecture (TENA), which is a requirement for a range to be certified to host JNTC events that require the exchange of real-time and post-mission data and information among the JNTC enterprise.

### **5.2.3 Representative Threat Environment**

Threat representation, at virtually all-training locations, lacks realistic OPFOR equipment, staffing, signal density, reactivity, variety, and fidelity.<sup>3</sup> The OPFOR typically are either absent entirely or composed of forces that are inadequate in absolute numbers, not equipped with threat equipment, and not trained to employ real-world threat tactics. For example, what ability to simulate or replicate EW threats does exist is limited predominantly to sites within the R2301W SUA associated with the Barry M. Goldwater Range (West) on the west coast and the Mid-Atlantic EW Range at Cherry Point on the east coast. Even with the recent addition of some mobile EW threat systems to augment the existing fixed EW infrastructure, the total number of EW systems is still not adequate to meet the Marine Corps’ training requirements.

### **5.2.4 Instrumentation**

Most ranges used for training use instrumentation systems that were, like range communications systems, designed and installed as stovepipe systems; they were not designed to satisfy either common interface specifications or electronic or communications commonality. Existing range instrumentation systems also use various

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<sup>3</sup> Draft Live Tactical Training Range Instrumentation Roadmap, dated October 2001

technical approaches for computing and reporting participant Time, Space, Position Information (TSPI). The end result is many unique instrumentation systems that afford no opportunity for interoperability.

## **5.3 DEFINITIONS**

### **5.3.1 Threshold**

A Threshold is the minimum acceptable operational performance value of a range-related system or subsystem.

### **5.3.2 Objective**

An Objective is an operationally significant increment of performance value of a range-related system or subsystem above a Threshold. A system or subsystem operational performance Objective may be the same as the system or subsystem operational performance Threshold when the anticipated additional performance values to be achieved through additional cost or development are not considered significant or useful.

### **5.3.3 Key Performance Parameter**

A range-related Key Performance Parameter (KPP) is a system attribute considered essential for successful mission accomplishment. The KPPs for each of the Marine Corps training range classes capture the parameters needed to reach the overall desired capabilities for that range class. Failure to meet a KPP can be cause for a system, subsystem, or approach chosen to satisfy the required capability, to be reevaluated, reassessed, or rejected.

### **5.3.4 Live Training Event/Component**

A Live (L) training event/component involves real people and real systems in a real/natural environment. A live training event/component can be augmented with virtual or constructive training events/components to increase the breadth or depth of the overall training experience.

### **5.3.5 Virtual Training Event/Component**

A Virtual (V) training event/component involves real people and simulated systems. Although a virtual training event/component is typically introduced into a real/natural environment with real people operating real systems, a virtual training event/component could take place as a stand-alone event. In either case, the virtual training event/component increases the breadth and depth of the overall training experience.

### **5.3.6 Constructive Training Event/Component**

A Constructive (C) training event/component involves simulated people and simulated systems. The constructive training event/component can take place as a stand-alone event (for example, a “table-top” or Command Post exercise) or be integrated with a live and/or virtual training event/component to increase the breadth and depth of the overall training experience.

### **5.3.7 Communications Systems**

All range-related two-way voice and data communications between or among range personnel and event participants can be classified into one of three types of communications circuits (or networks): RC, Exercise Communications, and D/L. It is assumed that the requirement for any specific circuit also includes a requirement for sufficient assigned/reserved frequencies for that circuit.

#### **5.3.7.1 Range Control (RC)**

A RC circuit provides two-way communications among range personnel. A RC circuit can use wireless point-to-point, landline, or web-based technology. RC circuits are typically not encrypted, although specific future applications could require encryption.

#### **5.3.7.2 Exercise Communications**

An Exercise Communications circuit provides encrypted or unencrypted two-way voice communications between or among Exercise Control personnel, range event participants, evaluators, and headquarters personnel. EC circuits could use wireless, acoustic, and/or RF relay technologies.

#### **5.3.7.3 Datalinks**

A D/L circuit provides encrypted or unencrypted two-way data communications between the range personnel/systems and event participants. D/L circuits could also be used to support required communications between or among range systems.

### **5.3.8 Range Instrumentation**

Range Instrumentation describes the collection of facilities, equipment, software, and implementation methodologies used to schedule, monitor, deconflict, create, and/or reconstruct the training range environment and on-range events. The instrumentation enterprise at any range or range complex may exist as a stand-alone, dedicated system or as a distributed set of capabilities that are embedded within other existing or stand-alone systems and subsystems.

Regardless of the physical structure, Range Instrumentation will consist of six major elements that contribute to the training range environment: Tracking, Range Control, EC&C, M&S, Scoring, and Event Debrief/AAR.

### **5.3.8.1 Tracking**

Range tracking instrumentation element supports the requirement to detect friendly (Blue force) and OPFOR event participants' location and movement on the range and develop a position history of those movements. These real-time location and movement history data are referred to as TSPI, the fidelity of which will depend upon the source(s) and methods used to collect it. Low fidelity TSPI systems, which have a slow update rate and (typically) less positional accuracy, normally rely upon non-cooperative systems that are external to the participants' platforms. These non-cooperative systems, like ground-based radar and transponder interrogators, collect only "snap shot" data about a participant's position at a point in time. For example, a low fidelity TSPI system may be able to determine a participant platform's position (in latitude, longitude, and altitude), but cannot determine that same platform's heading or maneuvers at an update rate or degree of accuracy typically required for detailed real-time displays and post-mission event reconstruction.

By contrast, high fidelity TSPI is provided by cooperative systems that are often carried by and/or integrated with a participant platform's on-board systems. High fidelity TSPI systems, with inherently higher update rates and degrees of accuracy, would be able to provide not only a participant's position, but also detailed information about the participant's dynamic maneuvers and geospatial relationship to other high fidelity TSPI participants. High fidelity TSPI systems are an essential component for detailed real-time displays and post-mission event reconstruction.

### **5.3.8.2 Range Control**

The RC instrumentation element supports the range scheduling, operations, and safety functions. The RC element provides Range Operations (RO) personnel with the ability to schedule range events, ensure range activities are consistent with range clearances, provide real-time range deconfliction, and observe and collect real-time data related to on-range event activities. Effective RC mandates that RO personnel have a real-time display (in at least two dimensions [2-D]) and the ability to record and replay critical data sets related to on-range activity.

### **5.3.8.3 Exercise Control and Coordination**

EC&C instrumentation element supports event-dependent requirements associated with major exercises. EC&C provides real-time observation and post-mission reconstruction by providing the capability to collect, store, and process data sets of on-range event activity and make those data sets available to on- and off-range activities and observers, including the AAR and the JNTC enterprise. The EC&C instrumentation element may also provide live targets and target control.

#### **5.3.8.4 Modeling and Simulation**

M&S instrumentation element supports the requirement that a range be able to create artificially, in a training venue, an operational environment that replicates to the greatest degree possible the expected area of operations.

The M&S instrumentation element emulates system and equipment performance characteristics (search patterns, pointing angles, weapons “fly-out” profiles, lethality curves, and Probability of Kill [ $P_K$ ]) for both friendly and OPFOR’s weapons systems. This capability, which requires a sophisticated data repository and processing capability, also requires some level of direct interface between the M&S instrumentation element and the participants’ operating systems, as well as a methodology for communicating information between the participants’ weapons systems and the processing and display subsystem of the M&S instrumentation element. The M&S instrumentation element allows range event participants the opportunity to train for the employment of complex and expensive weapons systems without the need to actually expend these weapons. It is also the basis for automated RTKN.

The M&S instrumentation element simulates and stimulates. By simulating weapons systems and their unique RF and spectral signatures, the M&S instrumentation element can stimulate a response in the participants’ combat systems, which in turn cause participants’ on-board sensor displays to present realistic indications to the operators. This capability of the M&S instrumentation element provides a built-in flexibility and growth potential for the range because it affords the range the capability to introduce new weapons systems and threats into the training environment as quickly as the systems can be modeled.

Finally, a fully mature M&S instrumentation element should be able to provide to range participants (through the use of Augmented Reality or similar technologies) visual, aural, and/or olfactory stimuli consistent with a known or anticipated operating environment.

#### **5.3.8.5 Scoring**

The Scoring instrumentation elements supports the requirement to detect and/or report the success and/or the projected lethality (i.e.,  $P_K$ ) of live or virtual training weapons employed on the range. The Scoring instrumentation element is categorized by the Type of scoring (automatic or manual), when the Scoring Feedback is provided (real-time or post-mission), and how the RTKN information (if required) should be conveyed to the participants (automatically or by voice).

#### **5.3.8.6 Event Debrief/After Action Review**

Event Debrief/AAR instrumentation element supports the requirement to recreate EC&C, tracking, M&S, and scoring data from a given event to a degree of granularity that will allow a detailed post-event interactive environment for event participants and observers to review, replay, assess, and critique the participants’ performance. The products of the



Debrief/AAR instrumentation element may be available only at the range facility where the event was completed or distributed to another range facility or some other remote location, such as a Navy or Marine Corps air station, a ship at sea, or a JNTC enterprise facility.

## **5.4 SUITE OF RANGES**

The Suite of Ranges, as listed in Appendix A, begins to define the specific range requirements for each level of training. The suite outlines and delineates the maneuver/training area, impact areas, live-fire ranges, aviation ranges, and MOUT complexes required to conduct training events as delegated in Marine Corps Orders specifying ITS and promulgating T&R Manuals. Where applicable, each individual range or training area is directly linked to a defined Deputy Commandant for Installations and Logistics (DC I&L) Facility Category Code and range/training area description/definition. In some cases, the range requirements identified attributes that required a new facility category code. These new attributes are identified by (XXXXX) and are pending further classification.

The Suite of Ranges is a nominal make-up of range attributes and is intended to provide the baseline requirement for each level of training. Specific complex requirements, such as number and type of ranges for each complex, is dependent upon a complex or installation's defined mission, units to be supported, capacity, throughput, and Commander's discretion.

### **5.4.1 Maneuver/Training Areas**

Maneuver/Training Areas and Live-Fire and Maneuver Training Area/Ranges are defined by the level in which they support training: Individual, Unit, and MAGTF Level. Specific dimensions and overall area were fashioned utilizing doctrinally defined requirements outlined by USMC ITS and T&R requirements or doctrinally accepted U.S. Army defined training land requirements outlined in Training Circular 25-1 (TC 25-1), Training Land. SDZs were utilized in determining the dimensions and area for the Live-Fire and Maneuver Training Area/Ranges, pursuant to MCO 3570.1B and DA Pamphlet 385-63 (Range Safety).

### **5.4.2 Impact Areas**

The RCD identifies Dudded and Non-Dudded Impact Areas as a baseline requirement at each training level. Impact area descriptions are delineated per the DC I&L Facility Category Codes. The RCD does not define the specific dimensions and area requirements for the impact areas. These attributes are strictly determinant upon types and frequency of fire support and aviation ordnance utilized at each individual range or complex.

### **5.4.3 Live-Fire Ranges**

The RCD identifies a nominal listing of live-fire ranges required to support weapon system firing training operations as specified by the ITS and T&R training requirements. Live-fire range listings will differ through each level of training. Dimension and area calculations were derived from baseline attributes outlined in U.S. Army Training Circular 25-8 (TC 25-8), Training Ranges. Individual range descriptions and baseline characteristics are defined by the appropriate Facility Category Code.

### **5.4.4 Aviation Ranges**

The RCD identifies the required aviation range attributes based upon the six functional areas of Marine Aviation:

- Offensive Air Support (OAS)
  - CAS
  - Deep Air Support (DAS)
- AAW
  - Offensive AAW
  - Air Defense
- Assault Support
- Air Reconnaissance
- EW
- Control of Aircraft and Missiles

Dimensional and area attributes are directly derived from doctrinal ITS and T&R training requirements. Training requirements for Control of Aircraft and Missiles did not directly correlate to specific range requirements.

### **5.4.5 MOUT Training Facilities/Complexes**

RCD defined MOUT complex attributes are listed in four categories: MOUT Assault Course (MAC), MOUT Facility (Small), MOUT Facility (Large), and MAGTF Level MOUT Facility. Description and characteristics of each type of facility are defined by Facility Category Code. Dimension and area attribute calculations are derived from doctrinally established frontages in FM 3.06-11.

## **5.5 DOCUMENT OVERVIEW**

The remainder of this document is presented in Sections SIX through ELEVEN and related appendices. Section SIX (and Appendix B) describes several common (i.e., not peculiar to any specific class of range) range attributes and their associated Thresholds, Objectives, and KPPs. Sections SEVEN through TEN (and Appendices C through F) contain the required range capabilities, Thresholds, Objectives, and KPPs associated with each of the four Marine Corps range classes. Section ELEVEN contains the required range capabilities associated with the JNTC.

## **SECTION SIX: COMMON USMC RANGE REQUIREMENTS AND ATTRIBUTES**

### **6.1 OVERVIEW**

There are six common Marine Corps range requirements and attributes: High-level Required Capabilities, IERs (including Interoperability), Suitability, the Scheduling System, the MET System, and the Instrumentation System. The specific required capabilities associated with these common requirements and attributes are detailed below and summarized in Appendix B.

### **6.2 HIGH-LEVEL REQUIRED CAPABILITIES**

The following High-level Required Capabilities, representing both Thresholds and Objectives, are applicable to all classes of ranges and all levels of training:

- Adequate airspace with absolute volume, clearances, and authorizations to allow the use of long-range platform sensors, tactics, and weapons associated with detection, classification, identification, and neutralization of hostile threats
- The use of Commercial-Off-The-Shelf technology for hardware and software applications
- A threat environment representative of the potential real-world area of operations
- Sufficient (and usable) RF bandwidth for employing onboard sensors, communications, and intelligence collection and distribution systems
- A communications system that includes RC, Exercise Control, and D/L circuits that allow the unimpeded exchange of intra- and inter-range information and data (both secure and non-secure) among all range organizations and on- and off-range participants and designated observers
- An instrumentation system, independent of a fixed geographic location, that provides real-time observation and post-mission reconstruction, replay and debrief of participants' TSPI and monitoring of weapons system status, employment, performance, and "kill" determination
- A robust data collection, processing, and communications capability and capacity for depicting real-time force dispositions and maneuvering, key combat systems data, EC&C, and virtual range activities
- For designated JNTC ranges, compatibility with the JNTC concept, which includes a JNTC-compatible architecture for exchange of low-latency L, V, and/or C data and information with the JNTC enterprise

### **6.3 INFORMATION EXCHANGE REQUIREMENTS AND INTEROPERABILITY**

#### **6.3.1 Information Exchange Requirements**

An IER characterizes the information exchanges to be performed by and with a proposed system of systems. A top-level IER identifies who exchanges what information with

whom, why the information is necessary, and how the information exchange should occur. The top-level training range IERs identify the training range information that is exchanged to support training range-related tasks, where the information exchange may occur between two or more training range information exchange nodes or between training range information exchange nodes and non-training range information exchange nodes. The following information exchange nodes are included in the top-level training range IERs:

- Officer Conducting the Exercise (OCE): the individual or set of individuals responsible for evaluating the performance of range participants for purposes of determining the participants' combat readiness (the OCE may be ashore or afloat)
- Participant: a friendly (Blue force) or OPFOR aircraft, ship, ground vehicle, personnel, or a command and control element and their on-board sensors and systems
- Range Control (RC): the facilities and equipment that provide real-time monitoring and control of on-range events and the range resources that support those events
- Range Scheduling (RS): the facilities and equipment that are used to reserve a specific range period and assign specific range resources to support an on-range event
- Range Tracking (RT): the facilities and equipment (NOT associated with a specific range resource OPFOR weapon system) that provide real-time tracking (TSPI) of all on-range participant activities (the RT may include dedicated training range tracking systems, such as radar, optical, Identification Friend and Foe, and instrumentation or off-range tracking systems, such as a Fleet Area Control and Surveillance Facility radar or an air station Approach Control radar)
- Range EW (REW): the ground-based facilities and equipment that generate RF signals to simulate or replicate an OPFOR EOB
- Range Targets (Targets): the facilities, equipment, and materials against which Blue participants prosecute attacks and employ weapons (Targets, which could be air, ground, surface, or subsurface, also include the imbedded and remote scoring systems associated with specific targets)
- Range Data Collection and Processing System (RDCPS): the local and remote facilities and equipment that collect and correlate real-time information related to participant TSPI, RT, REW, Targets, and Range Simulation (SIM) (see below) activities (the RDCPS also includes the facilities and equipment used to perform real-time assessment of weapons engagements, including the probability of kill, against both L and V targets)
- Range Simulation (SIM): the facilities and equipment used to generate a virtual threat environment and/or virtual targets (SIM could be a stand-alone system or a subsystem within another system, for example, Targets or RDCPS)
- Range Debriefing (RD): the facilities and equipment used by participants and the OCE to view on-range events in real-time and to conduct post-mission review/AAR of on-range events (the RD facilities and equipment may be located at the range or at remote locations, either ashore or afloat).

The top-level training range IERs, which are universal across all levels of training, are presented in Table 6-1. In Table 6-1, a *Critical* IER is an IER where the information exchange must occur or the training in the indicated MCT will be impacted adversely.

**Table 6-1. USMC Training Range Top-level IERs**

<b>MCT</b>	<b>Event/Action</b>	<b>Info Characterization</b>	<b>Sending Node</b>	<b>Receiving Node</b>	<b>Critical (Y / N)</b>	<b>Notes</b>
MCT 5	Request range period	<b>Command &amp; Control</b> User ID, type and number of participants, training event name and #, range, time, ordnance planned, range support required	Participant OCE	RS RC Associated TYCOM	Y	
MCT 5	Range schedule confirmation	<b>Command &amp; Control</b> User ID, range ID, time scheduled, exceptions to requested range support	RS	Participant OCE RC Associated TYCOM	Y	
MCT 5	Range Check-in	<b>Command &amp; Control</b> Participant ID, TSPI, available weapons system info	Participant Targets REW	RC REW Targets RD RDCPS	Y	
MCT 1 MCT 1.1 MCT 1.1.3 MCT 1.2 MCT1.2.1.16 MCT 1.3 MCT 1.3.17 MCT 2.2.2	Participant Maneuver	<b>Situation Awareness</b> Participant ID, TSPI	Participant Targets RT	RDCPS RD RC OCE	Y	

Table 6-1 (continued). USMC Training Range Top-level IERs

MCT	Event/Action	Info Characterization	Sending Node	Receiving Node	Critical (Y / N)	Notes
N/A	Generation of a V target or threat simulation	<b>Situation Awareness</b> Target track data, EW threat signal data	SIM	Participants RDCPS Remote RDCPS RD OCE	N	If JNTC event, would be distributed to JNTC enterprise
MCT 1.1 MCT 1.1.1 MCT 1.1.6 MCT 1.2 MCT 1.2.1.16 MCT 1.3 MCT 1.3.17 MCT 1.3.18	Weapons System Employment	<b>Targeting</b> Detection, targeting, tracking, weapon type, number of weapons, weapon release	Participant SIM REW	RDCPS RD Participant OCE	Y	Weapons could be fired by or against Participant, L or V targets, or REW; includes all available sensor and weapons system data.
All range-related MCTs	Data processing and correlation	<b>Situation Awareness</b> All available range data	RDCPS	Remote RDCPS JNTC Enterprise	Y	
MCT 3.0 MCT 3.0.1 MCT 3.1 MCT 3.2 MCT 3.2.1 MCT 3.2.2 MCT 3.2.3 MCT 3.2.4 MCT 3.2.5 MCT 3.2.6	Engagement outcome	<b>Targeting</b> P <sub>K</sub> and “kill” notification	RDCPS	Participant OCE RD	Real time—Y  Post mission—Y	Applies to simulated weapons employment; requires weapons modeling and simulation

**Table 6-1 (continued). USMC Training Range Top-level IERs**

<b>MCT</b>	<b>Event/Action</b>	<b>Info Characterization</b>	<b>Sending Node</b>	<b>Receiving Node</b>	<b>Critical (Y / N)</b>	<b>Notes</b>
MCT 3.0 MCT 3.0.1 MCT 3.1 MCT 3.2 MCT 3.2.1 MCT 3.2.2 MCT 3.2.3 MCT 3.2.4 MCT 3.2.5 MCT 3.2.6	Weapons Scoring	<b>Targeting</b> Weapons impact, weapon miss distance	Targets	Participant RC OCE RD	Real Time—N  Post Mission—Y	
All range-related MCTs	Event monitoring and control	<b>Situation Awareness</b> All processed range data information	RDCPS	RC OCE RD JNTC Enterprise	Y	Event monitoring and control may be collated at the range (local) or at a remote location.
MCT 1.1 MCT 1.1.1 MCT 3.0.5 MCT 3.2.2 MCT 4.0.1 MCT 4.1.2 MCT 4.1.2.1 MCT 4.1.3 MCT 4.2.1.7 MCT 4.2.4 MCT 4.4 MCT 5.3 MCT 5.3.2	Coordinated range operations	<b>Tracking</b> All processed Training Range data and information	RDCPS	JNTC Enterprise Remote RDCPS	Y—JNTC ranges  N—Non-JNTC ranges	Transfer of data from one range to another to enable coordinated operations between remote range facilities.
All range-related MCTs	Training event debrief/AAR	<b>Situation Awareness</b> All processed range data information	RDCPS	RD OCE JNTC Enterprise	Y	Debrief may be conducted at the host range (local) or at a remote location.

### 6.3.2 Interoperability KPP

The top-level training range IERs are the basis for measuring the achievement of training range Interoperability. The Threshold for training range Interoperability is the achievement of all *Critical* top-level IERs, while the Objective for training range Interoperability is the achievement of all top-level IERs.

## 6.4 SUITABILITY

Table 6-2 presents range suitability characteristics for the entire System of Systems at any range<sup>4</sup>. These characteristics are applicable to all range classes and all levels of training.

**Table 6-2. Training Range Suitability Characteristics**

Characteristic	Threshold	Objective
Operational Availability *	0.82	0.85
Mean Time to Repair	≤ 7.0 hours	6.5 hours
Mean Time Between Failure *	100.0 hours	120 hours
Mean Time Between Mission Critical Failure	125.0 hours	150.0 hours
Built-in-Test Fault Detection Rate	80.0%	90.0%

Note: \* indicates a KPP.

## 6.5 THE SCHEDULING SYSTEM

The Scheduling System should allow potential range users access to a web-enabled database of descriptive information (including individual range resources) for the entire Marine Corps range infrastructure and the ability to schedule required range periods remotely at least 2 weeks in advance (Threshold).

The Objective for the Scheduling System, which should be an interactive system that is interfaced with aircraft, surface combatant, subsurface combatant, and ground element training requirements, is described in the following paragraphs.

### 6.5.1 Pre-event Module

The Pre-event Module should be capable of supporting unit level queries based upon the type of training and the size of the unit to be trained. Based upon the query, the Pre-event Module should be capable of searching a database of the entire Marine Corps range infrastructure to identify and display which ranges/range complexes possess the specific training resources required to support the identified training event. The Pre-event Module should also be capable of indicating which of the qualified ranges have available (i.e., open) range periods.

<sup>4</sup> Training range suitability characteristics have been extracted from the Operational Requirements Document for the Tactical Training Ranges Program, dated 28 May 1995



The Pre-event Module should be capable of identifying competing requests for the same range period/range resources to affected range facility schedulers. Range schedulers would be responsible for adjudicating these conflicts and notifying requesting units of the results of their adjudication. The Pre-event module should be capable of generating automatically a message/email confirmation to the requesting unit to advise of the scheduled period, the training event to be supported, and the list of range resources scheduled. The confirmation notification should identify any required resources that are not available for the scheduled range period.

The Pre-event Module should be flexible and responsive to late cancellations by scheduled users. Upon notification of a cancellation, the Pre-event Module should “broadcast” a range cancellation/availability notification to all interested subscribers in order to allow the greatest opportunity for the newly released range period to be rescheduled, rather than have the related range resources go unused.

### **6.5.2 Real-time Event Module**

The Real-time Event Module should allow the range controller to enter into the Scheduling System (prior to, during, and after the event) all event-related data, where event-related data includes, but is not limited to, differences between requested range resources and actual range resources available at the start of the event; event start and stop times; number and types of participants; airspace, sea space, land area, and targets used; type and number of ordnance expended; and results (i.e., scoring).

### **6.5.3 Post-event Module**

The Post-event Module should be capable of generating automatically a post-event completion message/e-mail to the user unit. The message/e-mail should contain a summary of the data collected by the Pre-event and Real-time Event Modules. The Post-event Module should also be capable of generating automatically required range utilization reports in required formats (for example, the “Report Increment” of the Range Facilities Management Support System 2002).

## **6.6 THE MET SYSTEM**

The MET System should be capable of collecting and reporting present weather conditions, to include barometric pressure, cloud height, visibility, wind speed, wind direction (Threshold), and where applicable, sea state (Objective).<sup>5</sup>

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<sup>5</sup> Although present weather conditions (like cloud height, visibility, precipitation, or wind speed/direction) at a range complex can result today in an event cancellation due to target obscuration, the inability to employ some existing target designation/weapon guidance systems, or the anticipated impact of the weather conditions on environmental compliance requirements, it is reasonable to assume that before the end of the 10-year period covered by this RCD, weapons system capabilities associated with target detection and weapon guidance will obviate the need for on-site MET Systems.

## **6.7 THE INSTRUMENTATION SYSTEM**

### **6.7.1 Tracking**

Tracking provides event participant TSPI. High Fidelity TSPI (Objective), which is characterized by high update rates and positional accuracy, is required by tactical aircraft, airborne drones, and instrumented exercise weapons, such as missiles. Low Fidelity TSPI (Threshold), which is characterized by lower update rates and positional accuracy, is typically useful only for non-tactical aircraft, ground units (air cushion, armored, amphibious, mechanized vehicles, etc.) and personnel.

TSPI tracking systems should operate in a “range-less” environment (Threshold), where the ground-based reception/display segments of the TSPI tracking systems should not be tied to any fixed geographical position/facility. Rather, the ground-based reception/display segments of the TSPI tracking systems should be mobile/transportable in order to allow participant TSPI data to be received and displayed at any desired location, including shipboard (Objective).

In Sections SEVEN through TEN, the required capability for TSPI at any level of training will be indicated by the required maximum number of High Fidelity and Low Fidelity TSPI tracks to be provided.<sup>6</sup>

### **6.7.2 Range Control**

RC refers to the ability of RO personnel to observe on-range event activities in real-time and, when required, provide directions to event participants and/or make the event-related data available to other observers.

In Sections SIX through NINE, the required capability for RC at any level of training will be indicated as YES or NO for two separate display criteria: 2-D (Threshold), and three-dimensional (3-D) (Objective).

### **6.7.3 Exercise Control and Coordination**

EC&C refers to the ability of the Exercise Controlling Authority to observe and control exercise event activities in real-time, provide directions to event participants, input flexibility into exercise scenarios, and/or make event-related data available to other observers in both real-time and post exercise situations.

In Sections SEVEN through TEN, the required capability for EC&C at any level of training will be indicated as YES or NO for three separate criteria: 2-D (Threshold), 3-D (Objective), and whether there is the potential to interface with the JNTC enterprise.

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<sup>6</sup> The number of High Fidelity and Low Fidelity TSPI tracks was derived from training requirements included in applicable training manuals, Fleet Exercise Publications (FXPs), and exercise scenarios associated with MCTs and the EMW doctrine.

#### **6.7.4 Modeling and Simulation**

M&S provides detailed system and equipment performance characteristics (search patterns, pointing angles, weapons “fly-out” profiles, lethality curves, and  $P_K$  for both friendly and OPFOR weapons systems [Threshold]). M&S also provides the ability to simulate a system’s RF characteristics in order to stimulate a weapon system’s receiver, processing, and display systems (Threshold). Finally, M&S allows the range to recreate artificially (i.e., model) an operational environment, thereby allowing event participants to experience the geographical details of the expected area of operations (Objective).

In Sections SEVEN through TEN, the required capability for M&S for any level of training will be indicated as YES or NO for the following types of training scenarios: A-A, A-G, S-A, and S-S (includes ground operations).

#### **6.7.5 Scoring**

Scoring refers to the ability to detect and/or report the success and/or the projected lethality (i.e.,  $P_K$ ) of L or V training weapons employed on the range.

In Sections SEVEN through TEN, the required capability for Scoring at any level of training will be stipulated by Type, Feedback, and RTKN. The Type of Scoring will be categorized as automatic (AUTO) (Objective) or MANUAL (Threshold), where MANUAL Scoring requires human intervention to report the results of the weapons employment. If a requirement exists for Feedback, the required capability will stipulate whether that Feedback should be provided in REAL TIME (Objective), POST MISSION (Threshold), or BOTH. Finally, where a required capability for RTKN exists, the requirement will stipulate whether the RTKN should be reported AUTO (Objective) or by VOICE (Threshold), where a Voice report requires human observer intervention.

#### **6.7.6 Event Debrief/AAR**

Event Debrief/AAR refers to the capability to recreate tracking, M&S, and scoring data from a given event to a degree of granularity that will allow a detailed post-event interactive environment for event participants and observers to review, replay, assess, and critique the participants’ performance.

In Sections SEVEN through TEN, the required capability for Event Debrief/AAR at any level of training will stipulate whether the capability should be available at the host range (LOCAL), at another range or location (REMOTE), or BOTH (Threshold).

Remote Event Debrief/AAR should not require instrumentation system-peculiar equipment or a dedicated debrief facility; rather, the information required for debrief/AAR should be available to participants via wireless or broadband connection in a format compatible for display on personal computer/laptop technology (Objective).

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## **SECTION SEVEN: REQUIRED INDIVIDUAL LEVEL TRAINING RANGE CAPABILITIES**

### **7.1 INDIVIDUAL LEVEL TRAINING OVERVIEW**

Marine Corps Individual Level training reinforces the basic combat infantry skills acquired in MCT and supports personnel and platform training requirements associated with the Marine Corps' ITS at the individual and progressive level of training. The ITS describe the required essential core and core plus skills (or 100-level T&R events) for the lowest level (i.e., basic building blocks) of the MAGTF ACE, GCE, and CSSE.

#### **7.1.1 Aviation Combat Element**

The Individual Level training range supports individual aircrew and fixed- and rotary-wing aircraft that will deploy as part of the MEF. The fixed-wing ACE platforms include fighter, attack, electronic warning/EA, and support aircraft. The rotary-wing ACE platforms include both transport and attack helicopters and Vertical/Short Take-off and Landing (V/STOL) aircraft. The ITS associated with these fixed- and rotary-wing aircraft platforms and individual Marine skills are described in the individual platform T&R manuals. There is also a ground support element within the ACE whose individual range requirements are very similar to that of the CSSE. CSSE individual range requirements should be applied to ACE ground support element requirements.

#### **7.1.2 Ground Combat Element**

The Individual Level training range supports the individual combat vehicle crews (tank, amphibious, and armored), artillery crews (including battlefield rocket launching systems) and the individual and crew-served weapons assigned to operational and support units within a MEF. The ITS associated with these GCE assets are described in the individual "school house" curricula and outlined in each occupational field's T&R manual.

#### **7.1.3 Combat Service Support Element**

The Individual Level training range supports individual vehicle and equipment crews, including trucks, refuelers, and Expeditionary Airfield refueling systems. The ITS associated with these platforms and the individual Marine skills are outlined in each occupational field's T&R manual.

### **7.2 OPERATIONAL CONCEPT**

The operational concept for Individual Level range requirements are assessed based on a comprehensive training scenario derived from the UJTL and directly linked to the MCTL. The MCTL then drives the individual T&R requirements as defined in ITS. The

following operations/events from the Operations List of the UJTL and their associated MCTs form the basis for assessment of the required range attributes:

- Reconnaissance, Surveillance, and Target Acquisition
- Command and Control Warfare
- Information Operations
- Suppression of Enemy Air Defenses
- Joint Interdiction
- Offensive Counter–Air
- Forcible Entry–Expeditionary Assault
- Movement to Contact
- Attack
- Pursuit
- Exploitation
- Rear Area Security
- Defensive Counter–Air
- Area Defense
- Mobile Operations
- Delay
- Withdrawal
- Combat Search and Rescue
- Deployment
- Counterterrorism
- Anti-terrorism

### 7.3 REQUIRED CAPABILITIES

The required capabilities for a Marine Corps Individual Level training range are described in detail below and summarized in Appendix C.

#### 7.3.1 Operational Elements

##### 7.3.1.1 Suite of Ranges

<b>GCE Suite</b>	
<ul style="list-style-type: none"> <li>• Maneuver/Training Area</li> <li>• Impact Area—Dudded</li> <li>• Impact Area—Non-Dudded</li> <li>• Basic 10m-30m Zero Firing Range</li> <li>• Automated Field-Fire (AFF) Range</li> <li>• Rifle Known-Distance (KD) Range</li> <li>• Automated Sniper Field-Fire Range</li> <li>• Pistol KD Range</li> <li>• Automated Multi-Purpose Machine Gun (MPMG) Range</li> <li>• Automated Grenade Launcher Range</li> <li>• 40mm (Grenade) Machine Gun Qualification Range</li> <li>• Automated Anti-Armor Tracking and Live-Fire Range</li> </ul>	<ul style="list-style-type: none"> <li>• Tank/Fighting Vehicle Stationary Gunnery Range</li> <li>• Mortar Range</li> <li>• Automated Multi-Purpose Training Range</li> <li>• Fire and Movement Range</li> <li>• Automated Infantry Squad Battle Course</li> <li>• Live Hand Grenade Range</li> <li>• Non-Standardized Engineer Qualification Range</li> <li>• Light Demolition Range</li> <li>• MOUT Assault Course (MAC)</li> <li>• MOUT Collective Training Facility (Small)</li> <li>• Breacher Range</li> </ul>
<b>ACE Suite</b>	
<ul style="list-style-type: none"> <li>• Impact Area—Dudded</li> <li>• Impact Area—Non-Dudded</li> <li>• Offensive Air Support (OAS) Range</li> <li>• Anti-Air Warfare (AAW) Range</li> <li>• Assault Support Range</li> </ul>	<ul style="list-style-type: none"> <li>• Air Reconnaissance Range</li> <li>• Electronic Warfare/Combat Range</li> <li>• Basic 10m-30m Zero Firing Range</li> <li>• Rifle KD Range</li> <li>• Pistol KD Range</li> </ul>

<b>CSSE Suite</b>	
<ul style="list-style-type: none"> <li>• Maneuver/Training Area</li> <li>• Impact Area—Dudded</li> <li>• Impact area—Non-Dudded</li> <li>• Basic 10m-30m Zero Firing Range</li> <li>• AFF Range</li> <li>• Rifle KD Range</li> </ul>	<ul style="list-style-type: none"> <li>• Pistol KD Range</li> <li>• Automated MPMG Range</li> <li>• 40mm (Grenade) Machine Gun Qualification Range</li> <li>• Non-Standardized Engineer Qualification Range</li> <li>• Light Demolition Range</li> </ul>

### 7.3.1.2 Airspace

<b>GCE Training</b>
A 12-hour day-night period on a range with Airspace that extends from surface to 10,000 feet AGL to support the use of live-fire mortars, artillery, and direct fire weapons. The horizontal limits of the Airspace should extend to 10 nm on either side of the training range Land Area.
<b>ACE Training</b>
<p><u>OAS Range:</u> A 30-minute period on a 25 nm x 25 nm range with Airspace that extends from surface to 30,000 feet AGL. Area should be cleared for use of A-G gunnery, free-fall and guided A-G munitions, laser designating devices, and the expenditure of chaff and flares.</p> <p><u>AAW Range:</u> A 30-minute period on a 20 nm x 50 nm range with Airspace that extends from surface to 50,000 feet AGL. The Airspace must allow supersonic flight.</p> <p><u>Assault Support Range:</u> A 30-minute period on a 20 nm x 50 nm range with Airspace that extends from surface to 25,000 feet AGL. The Airspace must overlie a Land Area with significant topographical features. Area should be cleared for A-G gunnery, laser devices, and the expenditure of chaff and flares.</p> <p><u>Air Reconnaissance Range:</u> A 30-minute period on a 20 nm x 50 nm range with Airspace that extends from surface to 50,000 feet AGL. The Airspace must overlie a Land Area with significant topographical features. The Airspace should allow supersonic flight</p> <p><u>EW Range:</u> A 45-minute period in an area 30 nm x 60 nm, from surface to 30,000 feet AGL. Must allow the use of chaff and flares.</p>
<b>CSSE Training</b>
Same as GCE Training.

### 7.3.1.3 Sea Space

<b>GCE Training</b>
A day-night period of up to 12 hours duration in a 300 nm <sup>2</sup> area that is at least 10 nm wide, and contiguous to the beachfront capable of supporting amphibious vehicle and landing craft training, and extending seaward to the simulated ARG/ESG element location.
<b>ACE Training</b>
A 60-minute day/night period in a designated OPAREA extending from surface to 20,000 feet AGL. <sup>1</sup>
<b>CSSE Training</b>
Same as GCE Training.

Note: <sup>1</sup> For fixed- and rotary-wing day/night shipboard qualification training.

**7.3.1.4 Land Area**

<b>GCE Training</b>
12 hours on a day-night area. <u>Maneuver/Training Area</u> A dedicated area of at least 68 mi <sup>2</sup> (176 km <sup>2</sup> ) or 43,520 acres. <sup>1,2</sup> <u>Suite of Live-Fire Ranges</u> A estimated 16 mi <sup>2</sup> area (41.44 km <sup>2</sup> ) or 10,240 acres, to accommodate the defined list of Individual Level ranges and their associated SDZs. <sup>3</sup>
<b>ACE Training</b>
A 30-minute period on a 20 nm x 20 nm range with significant topographical features. Land Area should be cleared for the use of live or inert and live A-G gunnery, precision and non-precision inert and live A-G munitions (up to 2,000 pounds), and precision and non-precision live A-G munitions (up to 500 pounds). Land area should allow the use of chaff and flares, and cleared for use of laser targeting and designating devices. Portions of the land area should be cleared for use as designated Landing/Drop Zones (LZ/DZ). <u>Suite of Live-Fire Ranges</u> The estimated land area requirement to accommodate the defined list of Unit Level live-fire ranges to include all SDZs is 30 nm <sup>2</sup> (5 nm x 6 nm).
<b>CSSE Training</b>
Same as GCE Training for Maneuver/Training Area. <u>Suite of Live-Fire Ranges</u> The estimated land area requirement to accommodate the defined list of Unit Level live-fire ranges to include all SDZs is 5 mi <sup>2</sup> (12.11 km <sup>2</sup> ) or 2,992 acres.

Notes:

<sup>1</sup> Derived from required area to support Armor Offense/Threat STX and Maneuver/Land Navigation (MCO 3501.23, MCO 3501.30, TC 25-1)

<sup>2</sup> Must also support amphibious training requirements that require a dedicated beachfront.

<sup>3</sup> Land area requirement may be reduced dependent upon Mission, type of units supported, and quantity of ranges needed based upon capacity and throughput.

**7.3.2 System of Systems**

**7.3.2.1 Scheduling System**

<b>GCE Training</b>	<b>ACE Training</b>	<b>CSSE Training</b>
See paragraph 6.5	See paragraph 6.5	See paragraph 6.5

**7.3.2.2 Communications System**

See paragraphs 4.3.2.2 and 5.3.7 for a definition and explanation of the types of communications circuits.

<b>GCE Training</b>	<b>ACE Training</b>	<b>CSSE Training</b>
Two dedicated RC circuit. At least two dedicated Exercise Control circuits.	Same as GCE Training.	Same as GCE Training.



**7.3.2.3 MET System**

<b>GCE Training</b>	<b>ACE Training</b>	<b>CSSE Training</b>
See paragraph 6.6	See paragraph 6.6	See paragraph 6.6

**7.3.2.4 Target System**

<b>GCE Training</b>
Target sites composed of fixed and mobile, hard and soft targets, varying in size and composition, to support Live Fire indirect and direct fire weapon systems, to include small arms and armor/anti-armor. They should provide a “shoot back” capability and automated scoring. There should be static and “pop-up” targets, arranged at both fixed and variable distances, configured to represent varying military operations, units, and capabilities. Targets should be of sufficient number and type to satisfy all basic level ITS requirements for each individual infantry weapon system within the USMC inventory.
<b>ACE Training</b>
At least one target complex with at least two separate weapons target sites that allow the use of Live Fire inert and live ordnance. The targets should be composed of scored raked and strafe ranges and representative CAS targets, and should include Mobile Land Targets that can be engaged on any heading (180 degree engagement profile minimum). Each target site should include a minimum of 4 targets to support strike planning and execution, with a minimum of four Desired Mean Points of Impact (DMPIs) per target.
<b>CSSE Training</b>
Same as GCE Training, except targets should also support mine clearing operations, both deliberate and in-stride, and counter barrier operations.

### 7.3.2.5 Instrumentation System

See paragraphs 4.3.2.5; 5.3.8; and 6.7 for explanation of the elements of the Instrumentation System.

Element	GCE Training	ACE Training	CSSE Training
Tracking (TSPI)			
High Fidelity	0	6 <sup>1</sup>	0
Low Fidelity	0	0	0
RC			
2-D	Yes	Yes	Yes
3-D	No	Yes	No
EC&C			
2-D	Yes	Yes	Yes
3-D	No	Yes	No
JNTC	No	No	No
M&S			
A-A	No	Yes	No
A-G	No	Yes	No
S-A	No	Yes	No
S-S	Yes	No	Yes
Scoring			
Type	Auto or Manual	Auto	Manual or Auto
Feedback	Real Time	Real Time	Real Time
RTKN	Voice or Auto	Voice or Auto	Voice or Auto
Debrief/AAR			
Type	Both	Both	Both

Note:

<sup>1</sup> Includes 2 friendly and 4 OPFOR fixed-wing aircraft for air combat training and coordinated opposed strike training.

### 7.3.2.6 OPFOR System

GCE Training	ACE Training	CSSE Training
A L, V, or C squad-sized ground force, at least a fire-team of which must be L.  Fixed and moving targets, at least some of which must be reactive.	Up to four L fixed-wing, supersonic capable threat aircraft with A-A gun and active A-A missile capability. All threat aircraft must be able to operate from the surface to the upper limit of the range Airspace.	A L, V, or C squad-sized ground force, at least a fire-team of which must be L.  Fixed and moving targets, at least some of which must be reactive.

## **SECTION EIGHT: REQUIRED UNIT LEVEL TRAINING RANGE CAPABILITIES**

### **8.1 UNIT LEVEL TRAINING OVERVIEW**

Marine Corps Unit Level training supports personnel and platform ITS' core and core plus skills and capabilities associated with the basic Marine Corps fighting units. Unit level training also incorporates 200- and 300- level T&R requirements for each element of the MAGTF. Accordingly, the Marine Corps Unit Level training includes the training associated with the individual fighting unit elements of a MAGTF ACE, GCE, and CSSE, as described below.

#### **8.1.1 Aviation Combat Element**

The Unit Level training range supports the basic ACE fighting unit. For the purpose of this RCD, a squadron of similar Type/Model/Series fixed- or rotary-wing aircraft is considered the basic fighting unit within the ACE. Squadron level training supports the ITS and T&R requirements necessary to achieve a core capable squadron, as defined in the applicable platform T&R manuals. There is also a ground support element within the ACE whose unit range requirements are very similar to that of the CSSE. CSSE unit range requirements should be applied to ACE ground support element requirements.

#### **8.1.2 Ground Combat Element**

The Unit Level training range supports the ITS and individual T&R requirements associated with the smallest MAGTF GCE that could be expected to be deployed into a hostile environment. For this RCD, the Unit Level GCE is presumed to include a Marine infantry company, a tank platoon, an amphibious vehicle platoon, a light armored vehicle platoon, an engineer detachment, and an artillery battery.

#### **8.1.3 Combat Service Support Element**

The Unit Level training range supports the ITS and individual T&R requirements associated with the smallest MAGTF CSSE that could be expected to be deployed into a hostile environment. For this RCD, the Unit Level CSSE is presumed to include a communications detachment, a Transportation Support Detachment (TSD), a Landing Support Detachment (LSD), an engineer platoon, a maintenance platoon, a health services detachment, and a Military Police (MP) detachment.

### **8.2 OPERATIONAL CONCEPT**

The operational concept for Unit Level range requirements are assessed based on a comprehensive training scenario derived from the UJTL and directly linked to the

MCTL. The following operations/events from the Operations List of the UJTL and their associated MCTs form the basis for assessment of the required range attributes:

- Reconnaissance, Surveillance, and Target Acquisition
- Command and Control Warfare
- Information Operations
- Suppression of Enemy Air Defenses
- Joint Interdiction
- Offensive Counter-Air
- Forcible Entry: Expeditionary Assault
- Movement to Contact
- Attack
- Pursuit
- Exploitation
- Rear Area Security
- Defensive Counter-Air
- Area Defense
- Mobile Operations
- Delay
- Withdrawal
- Combat Search and Rescue
- Deployment
- Counterterrorism
- Anti-terrorism

### 8.3 REQUIRED CAPABILITIES

The required capabilities for the Marine Corps Unit Level training range is described in detail below and summarized in Appendix D.

#### 8.3.1 Operational Elements

##### 8.3.1.1 Suite of Ranges

<b>GCE Suite</b>	
• Maneuver/Training Area	• 40mm (Grenade) Machine Gun Qualification Range
• Unit (Co) Level Instrumented Live-Fire and Maneuver Training Area/Range	• Automated Anti-Armor Tracking and Live-Fire Range
• Impact Area—Dudded	• Field Artillery Direct Fire Range
• Impact Area—Non-Dudded	• Tank/Fighting Vehicle Stationary Gunnery Range
• Non-Standard Small Arms Range	• Mortar Range
• Basic 10m-25m Small Arms Range	• Field Artillery Direct Fire Range
• Automated Field-Fire (AFF) Range	• Automated Multi-Purpose Training Range
• Rifle Known-Distance (KD) Range	• Automated Tank/Fighting Vehicle Multi-Purpose Range Complex
• Automated Sniper Field-Fire Range	• Fire and Movement Range
• Pistol Known-Distance (KD) Range	• Squad Defense Range
• Automated Combat Pistol/MP Firearms Qualification Course	• Automated Squad Battle Course
• Automated Multi-Purpose Machine Gun (MPMG) Range	• Automated Platoon Battle Course
<b>ACE Suite</b>	
• Impact Area—Dudded	• Air Reconnaissance Range
• Impact Area—Non-Dudded	• Electronic Warfare/Combat Range
• Offensive Air Support (OAS) Range	• Basic 10m-30m Zero Firing Range

<ul style="list-style-type: none"> <li>• Anti-Air Warfare (AAW) Range</li> <li>• Assault Support Range</li> </ul>	<ul style="list-style-type: none"> <li>• Rifle KD Range</li> <li>• Pistol KD Range</li> </ul>
<b>CSSE Suite</b>	
<ul style="list-style-type: none"> <li>• Impact Area—Dudded</li> <li>• Impact Area—Non-Dudded</li> <li>• Maneuver/Training Area</li> <li>• Basic 10m-30m Zero Firing Range</li> <li>• AFF Range</li> <li>• Rifle KD Range</li> </ul>	<ul style="list-style-type: none"> <li>• Pistol KD Range</li> <li>• Automated MPMG Range</li> <li>• 40mm (Grenade) Machine Gun Qualification Range</li> <li>• Non-Standardized Engineer Qualification Range</li> <li>• Light Demolition Range</li> </ul>

### 8.3.1.2 Airspace

<b>GCE Training</b>
A 24-hour day-night period on a range with Airspace that extends from surface to 10,000 feet AGL. <sup>1</sup> The horizontal limits of the Airspace should extend horizontally to 10 nm on either side of the applicable training range Land Area.
<b>ACE Training</b>
<p><u>OAS Range</u> A 30-minute period on a 25 nm x 50 nm range with Airspace that extends from the surface to 40,000 feet AGL. Area should be cleared for use of A-G gunnery, free-fall and guided A-G munitions, laser designating devices, and the expenditure of chaff and flares.</p> <p><u>AAW Range</u> A 30-minute period on a 40 nm x 60 nm range with Airspace that extends from the surface to 50,000 feet AGL. The range must support supersonic operations. Some portion of the Airspace should overlay land area with significant topography.<sup>2</sup></p> <p><u>Assault Support Range</u> A 30-minute period on a 20 nm x 50 nm range with Airspace that extends from surface to 50,000 feet AGL. Area should be cleared for A-G gunnery, laser devices, and the expenditure of chaff and flares. The Airspace must overlie a Land Area with significant topographical features.</p> <p><u>Air Reconnaissance Range</u> A 30-minute period on a 20 nm x 50 nm range with Airspace that extends from surface to 50,000 feet AGL. The Airspace should allow supersonic flight. The Airspace must overlie a Land Area with significant topographical features.</p> <p><u>EW Range</u> A 45-minute period in an area 30 nm x 60 nm, from surface to 30,000 feet AGL. Must allow the use of chaff and flares.</p>
<b>CSSE Training</b>
Same as GCE Training.

Notes:

<sup>1</sup> Allows for shoulder-fired SAM training.

<sup>2</sup> It is important to replicate to the greatest degree practical the topography of the planned area of operations. This required topographical fidelity could be achieved through the physical geographic location of the range or through a high-fidelity V environment generated and “up-linked” from a range subsystem or generated autonomously by on-board aircraft systems.

**8.3.1.3 Sea Space**

<b>GCE Training</b>
A day-night period of up to 12 hours duration in a 300 nm <sup>2</sup> area that is at least 10 nm wide, and contiguous to the beachfront capable of supporting amphibious vehicle and landing craft training, and extending seaward to the simulated ARG/ESG element location. <sup>1</sup>
<b>ACE Training</b>
Same as GCE Training.
<b>CSSE Training</b>
Same as GCE Training.

Note:

<sup>1</sup> Supports amphibious and amphibious-support training elements.

**8.3.1.4 Land Area**

<b>GCE Training</b>
A 24-hour period for Maneuver, Live-Fire and Maneuver, and MOUT training.
<u>Maneuver</u>
A dedicated area of at least 144 mi <sup>2</sup> (373 square kilometers) or 92,160 acres. The Land Area should include a dedicated beachfront for amphibious operations training. <sup>1,2</sup>
<u>Live-Fire and Maneuver</u>
The Threshold and Objective requirements are at least 260 mi <sup>2</sup> (672 km <sup>2</sup> ) or 166,054 acres. The Land Area should include a dedicated beachfront for amphibious operations training. At least some portion (if not all) of the Land Area should be cleared for use of live indirect and direct fire weapons. <sup>2,3</sup>
<u>MOUT</u>
A dedicated MOUT facility, encompassing at least 7 mi <sup>2</sup> , that combines a central urban area of at least 0.01 mi <sup>2</sup> (1 block x 1 block), and an outlying suburban/residential area of at least .63 mi <sup>2</sup> (that extends at least .35 mi beyond the central urban area), and an outlying facilities or villages of at least .8 square miles (that extend at least .2 mi beyond the outlying suburban area). The MOUT facility should also include a Live-Fire training area of at least 3 mi <sup>2</sup> that includes a SDZ for ground and aviation direct and indirect weapons systems. The MOUT should include major avenues of approach connecting the suburbs and outlying villages with the central urban area. Outlying and suburban areas should simulate the local non-combatant populace and infrastructure. The live-fire area of the MOUT should consist of a moderately-developed urban area configured to support a coordinated live-fire MOUT assault that employs individual, crew-served, and indirect-fire infantry weapons and precision use of indirect fire from airborne CAS and ground based artillery. <sup>4</sup>
<u>Suite of Live-Fire Ranges</u>
The estimated land area requirement to accommodate the defined list of Unit Level Live-Fire ranges to include all SDZs is 26 mi <sup>2</sup> (67.34 square kilometers) or 16,640 acres.
<b>ACE Training</b>
A 30-minute range period on a dedicated Land Area with dimensions of 20 nm x 20 nm. The Land Area should be cleared for the use of live or inert A-G gunnery, inert precision or non-precision A-G munitions up to 2,000 pounds, and live precision or non-precision munitions (including cluster munitions) up to 1,000 pounds. The Land Area should be cleared for use of laser targeting and designating devices. Land Area should have significant topographical features and multiple designated landing/drop zone areas.
<u>Suite of Live-Fire Ranges</u>
The estimated land area requirement to accommodate the defined list of Unit Level Live-Fire ranges to include all SDZs is 175 nm <sup>2</sup> (14 nm x 12.5 nm).

**CSSE Training**

Same as GCE Training for Maneuver and MOUT.

**Suite of Live-Fire Ranges**

The estimated land area requirement to accommodate the defined list of Unit Level Live-Fire ranges to include all SDZs is 5 mi<sup>2</sup> (12.11 square kilometers) or 2,992 acres.

Notes:

<sup>1</sup> Derived from 6 km x 24 km maneuver box requirement to support non live-fire Mechanized Infantry Company maneuver training.

<sup>2</sup> Land area requirement may be reduced dependent upon Mission, type of units supported, and quantity of ranged needed based upon capacity and throughput.

<sup>3</sup> Derived from nominal 16 km x 24 km maneuver box requirement to support Mechanized Infantry Company live-fire and maneuver training.

<sup>4</sup> Per FM 3-06.11, one city block = 175 m company frontage for MOUT.

**8.3.2 System of Systems****8.3.2.1 Scheduling System**

<b>GCE Training</b>	<b>ACE Training</b>	<b>CSSE Training</b>
See paragraph 6.5	See paragraph 6.5	See paragraph 6.5

**8.3.2.2 Communications System**

See paragraphs 4.3.2.2 and 5.3.7 for a definition and explanation of the types of communications circuits.

<b>GCE Training</b>	<b>ACE Training</b>	<b>CSSE Training</b>
Two dedicated RC circuits, at least one of which must support secure communications. At least three dedicated EC&C circuits, at least one of which must support secure communications. EC&C circuits must support communications with all airborne and ground participants.	Same as GCE Training.	Same as GCE Training.

**8.3.2.3 MET System**

<b>GCE Training</b>	<b>ACE Training</b>	<b>CSSE Training</b>
See paragraph 6.6	See paragraph 6.6	See paragraph 6.6

### 8.3.2.4 Target System

<p><b>GCE Training</b></p> <p>Land-based fortified defenses, distributed throughout the range complex. At least 2 target sites composed of fixed and mobile, hard and soft targets in varying size and composition, which will support indirect and direct fire weapon systems, to include small arms Live-Fire. There should be static and pop-up targets, configured to represent varying military operations, units, and capabilities. Structural and urban targets should require event participants to discriminate between valid and invalid targets in order to practice minimizing collateral damage. Urban targets must also support ground fire-and-maneuver operations. Targets should be of sufficient number and type to satisfy ITS requirements for individual, crew- served, and indirect-fire infantry weapons; 120mm and 25mm weapon systems; demolitions and explosives; and all wheeled/tracked vehicle mounted systems associated with the GCE units listed in paragraph 7.1.2.</p>
<p><b>ACE Training</b></p> <p><u>OAS</u> At least one range complex with at least two separate live/inert weapons target sites composed of raked and strafe ranges, structural targets, revetted targets, and mobile targets. Some of the structural targets should replicate congested urban areas, requiring event participants to discriminate between valid and invalid targets in order to practice minimizing collateral damage. Tactical target complexes should provide a minimum of four targets and four DMPIs per target, as well as present target ID and discrimination challenges to the aircrew.<sup>1</sup> Tactical targets should possess visual, radar and spectral signatures representative of threat systems.<sup>2</sup> At least one target site must allow the use of inert weapons up to 2,000 pounds and live weapons (including cluster munitions) up to 1,000 pounds. At least some of the targets should allow the use of laser designators.</p> <p><u>AAW</u> Gunnery Banners or Darts. Unmanned subsonic and supersonic drones that can operate from surface to 50,000 feet AGL. These drones should be capable of being augmented to replicate the radar and spectral signature of anticipated threat aircraft and anti-ship/A-G missiles.</p> <p><u>Air Reconnaissance</u> Same as OAS Targets.</p> <p><u>EW Range</u> Tactical target complexes should present target ID and discrimination challenges to the aircrew.<sup>1</sup> Tactical targets should possess visual, radar and spectral signatures representative of threat systems.<sup>2</sup></p>
<p><b>CSSE Training</b></p> <p>A range complex with at least 2 target sites composed of fixed and mobile, hard and soft targets in varying size and composition, which will support indirect and direct fire weapon systems, to include small arms live fire. There should be static and pop-up targets, configured to represent varying military operations, units, and capabilities.</p>

Notes:

<sup>1</sup> Does not apply to raked and strafe ranges.

<sup>2</sup> Building structures, revetted, and moving targets must replicate to the greatest degree practical the physical characteristics and spectral signatures of the type of targets expected to be encountered in the projected area of operations.



### 8.3.2.5 Instrumentation System

The required capabilities in the table below are applicable to Maneuver, Fire and Maneuver, and MOUT training. See paragraph 5.3.8 and 6.7 for explanation of the elements of the Instrumentation System.

Element	GCE Training	ACE Training	CSSE Training
Tracking (TSPI)			
High Fidelity	0	8 <sup>2</sup>	0
Low Fidelity	6 <sup>1</sup>	2 <sup>3</sup>	4 <sup>4</sup>
RC			
2-D	Yes	Yes	Yes
3-D	No	Yes	No
EC&C			
2-D	Yes	Yes	Yes
3-D	No	Yes	No
JNTC	No	No	No
M&S			
A-A	No	Yes	No
A-G	No	Yes	No
S-A	Yes	Yes	Yes
S-S	Yes	No	Yes
Scoring			
Type	Auto	Auto	Auto
Feedback	Both	Both	Both
RTKN	Voice or Auto	Voice or Auto	Voice or Auto
Debrief/AAR			
Type	Both	Both	Both

Notes:

<sup>1</sup> Provides for up to 6 platoons during coordinated live-fire and maneuver training.

<sup>2</sup> Provides for up to 4 friendly and 4 OPFOR threat aircraft.

<sup>3</sup> Provides for up to two support (i.e., Tanker/Airborne Early Warning) aircraft.

<sup>4</sup> Provides for up to 2 convoys and 2 OPFOR threats

### 8.3.2.6 OPFOR System

<b>GCE Training</b>
A L, V, or C company-sized ground force, at least a platoon of which must be L. A L, V, or C platoon-sized armored and/or mechanized vehicle force, at least a squad of which must be L. Fixed and moving targets, at least some of which must be reactive. EC Threat Level 2.
<b>ACE Training</b>
Up to two L rotary-wing threat aircraft with A-A missile capability. Up to four L fixed-wing, supersonic capable threat aircraft with A-A gun and active A-A missile capability. All fixed-wing threat aircraft must be able to operate from the surface to the upper limit of the Airspace. Fixed, moving, and time critical targets, at least some of which must be reactive. EC Threat Level 2.
<b>CSSE Training</b>
A L, V, or C company-sized ground force, at least a platoon of which must be L. Fixed and moving targets, at least some of which must be reactive. EC Threat Level 2.

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## **SECTION NINE: REQUIRED MAGTF MEU LEVEL TRAINING RANGE CAPABILITIES**

### **9.1 MAGTF MEU LEVEL TRAINING OVERVIEW**

Marine Corps MAGTF MEU Level training supports personnel and platforms of a MEU-sized MAGTF or its individual elements. MAGTF MEU Level training also supports both 300- and 400-level T&R requirements for each element of the MEU. Accordingly, MAGTF MEU Level training supports the training associated with the ACE, GCE, and CSSE units described below.

#### **9.1.1 Aviation Combat Element**

MAGTF MEU Level training range supports the T&R requirements associated with the complete aviation component of the MEU. A typical MEU ACE would include up to six fixed-wing attack aircraft, 20-24 attack and support helicopters, and an Air Support Control element.<sup>7</sup>

#### **9.1.2 Ground Combat Element**

MAGTF MEU Level training range supports the T&R requirements associated with the complete ground component of the MEU. A typical MEU GCE would include an infantry battalion, a tank platoon, an artillery battery, a light armored vehicle platoon, an amphibious vehicle platoon, an armored vehicle platoon, and a combat engineer platoon.

#### **9.1.3 Combat Service Support Element**

MAGTF MEU Level training range supports the T&R requirements associated with the complete combat service support components of a MEU. A typical MEU CSSE would include a TSD/LSD, an engineer detachment, a maintenance detachment, an MP detachment, a communications detachment, and a health services detachment.

### **9.2 OPERATIONAL CONCEPT**

The operational concept for MAGTF MEU Level range requirements are assessed based on a comprehensive training scenario derived from the UJTL and directly linked to the MCTL. The following operations/events from the Operations List of the UJTL and their associated MCTs form the basis for assessment of the required range attributes:

- Reconnaissance, Surveillance, and Target Acquisition
- Command and Control Warfare
- Information Operations
- Suppression of Enemy Air Defenses
- Joint Interdiction
- Offensive Counter-Air

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<sup>7</sup> MARFORLANT JTR, G3/5 Memo Ser 3000 JTR/fl dated 08 November 02

- Forcible Entry: Expeditionary Assault
- Movement to Contact
- Attack
- Pursuit
- Exploitation
- Rear Area Security
- Defensive Counter-Air
- Area Defense
- Mobile Operations
- Delay
- Withdrawal
- Combat Search and Rescue
- Deployment
- Counterterrorism
- Anti-terrorism

### 9.3 REQUIRED CAPABILITIES

The required capabilities for a Marine Corps MAGTF MEU Level training range is described in detail below and summarized in Appendix E.

#### 9.3.1 Operational Elements

##### 9.3.1.1 Suite of Ranges

<b>MAGTF MEU Level Suite of Ranges</b>	
• MAGTF Level Maneuver/Training Area	• OAS Range
• MAGTF Level Instrumented Live-Fire and Maneuver Training Area/Range	• AAW Range
• Impact Area—Dudded	• Assault Support Range
• Impact Area—Non-Dudded	• Air Reconnaissance Range
• Field Artillery Indirect Fire Range	• EW Range
• Non-Standardized Engineer Qualification Range	• MOUT Collective Training Facility (Large)
• Light Demolition Range	• MAGTF Level MOUT Collective Training Facility

Note:

<sup>1</sup> Suite of ranges can be augmented based upon Mission, type of units supported, and training capacity and throughput.

### 9.3.1.2 Airspace

<b>MAGTF MEU Level Training Range</b>
<p>At least a 24-hour day-night period on a 50 nm x 80 nm range with Airspace that extends from surface to 50,000 feet AGL.<sup>1</sup></p> <p>The Airspace must allow supersonic operations. At least some portion of the Airspace should overlay Land Area with significant topography and significant Landing/Drop Zones (LZ/DZ). Where the Airspace overlays the training range Land Area, the horizontal limits of the Airspace should extend at least 10 nm beyond the horizontal limits of the Land Area.<sup>2, 3, 4</sup></p>

Notes:

<sup>1</sup> The required length of the time period in the Airspace range will increase to 5 days (120 hours) to support large-scale operations like the Special Operations Capable Exercise, ARG Exercise, etc.

<sup>2</sup> It is important to replicate to the greatest degree practical the topography of the planned area of operations. This required topographical fidelity could be achieved through the physical geographic location of the range or through a high-fidelity V environment generated and “up-linked” from a range subsystem or generated autonomously by on-board aircraft systems.

<sup>3</sup> Deconfliction between artillery and air operations must be effected through Range Control and the Direct Air Support Center (DASC) or Fire Support Coordination Center (FSCC).

<sup>4</sup> All Airspace should be scheduled in 30-minute blocks.

### 9.3.1.3 Sea Space

<b>MAGTF MEU Level Training Range</b>
<p>At least a 24-hour day-night period in a 7500 nm<sup>2</sup> area including an area at least 15 nm wide, and contiguous to the beachfront capable of supporting amphibious vehicle and landing craft training, and extending seaward to the ARG/ESG element location.<sup>1, 2</sup></p>

Notes:

<sup>1</sup> Supports ocean-based training elements.

<sup>2</sup> The required time period in the Sea Space will increase to 5-7 days to support large-scale operations like the Special Operations Capable Exercise, ESGEX, ARG Exercise, etc. The cumulative requirement for large scale MEU operations is a 5 to 7 day period (both day and night time periods), that includes a cumulative total of 36,000 nm<sup>2</sup> littoral sea space, including an area at least 15 nm wide, and contiguous to the beachfront capable of supporting amphibious vehicle and landing craft training, and extending seaward to the simulated ARG/ESG element location.

### 9.3.1.4 Land Area

<b>MAGTF MEU Level Training Range</b>
<p>At least a 24-hour day-night period to support Maneuver or Live-Fire and Maneuver and MOUT training.<sup>1,6</sup></p> <p><u>Maneuver</u> The Threshold and Objective requirements should include at least 150 square miles (96,000 acres) that includes a dedicated beachfront for amphibious operations training.<sup>2,6</sup> –OR–</p> <p><u>Live-Fire and Maneuver</u> The Threshold requirement is at least 739 mi<sup>2</sup> (1,914 km<sup>2</sup>) or 472,960 acres. The Objective requirement is 985 mi<sup>2</sup> (2,552 km<sup>2</sup>) or 630,613 acres. Both should include a dedicated beachfront for amphibious operations training. At least some portion (if not all) of the Land Area should be cleared for use of live NSFS, A-G, NSW, indirect, and direct fire weapons for both service (objective) and training practice (threshold) ammunition.<sup>3,6</sup></p> <p><u>MOUT</u> The Land Area should include a MOUT facility, encompassing at least 15 mi<sup>2</sup>, that combines a large central urban area of at least .1 mi<sup>2</sup> (3 blocks x 3 blocks), an outlying suburban/residential area of at least 6.3 mi<sup>2</sup> (that extends at least 1.1 mi beyond the central urban area), and an outlying facilities or villages of at least 8 mi<sup>2</sup> (that extend at least .485 mi beyond the outlying suburban area). The MOUT facility should also include a Live-Fire training area of at least 3 mi<sup>2</sup> that includes a SDZ for ground and aviation direct and indirect weapons systems.<sup>4,5</sup></p> <p>The MOUT should include major avenues of approach connecting the suburbs and outlying villages with the central urban area. Outlying areas should include a non-operational airfield with tower and hangars and a port/industrial complex that includes warehouses, power plants, and other industrial structures. Suburban area structures should simulate the local non-combatant populace and infrastructure. The live-fire area of the MOUT (which should be incorporated within the central urban area, suburban area, or outlying area) should consist of a moderately-developed urban area configured to support a coordinated live-fire MOUT assault that employs individual, crew-served, and indirect-fire infantry weapons and precision use of indirect fire from airborne CAS and ground based artillery.</p>

Notes:

<sup>1</sup> The required length of the time period on the Land Area will increase to 5 days (120 hours) to support large-scale operations like the Special Operations Capable Exercise, ARG Exercise, etc.

<sup>2</sup> Minimum Land Area requirements are derived from a nominal 5-mi x 30-mi (8 km x 48 km) maneuver area to support a contiguous MEU-sized maneuver operation (Reference U.S. Army TC 25-1).

<sup>3</sup> Minimum Land Area requirements are derived from a nominal 18-mi x 41-mi (29 km x 66 km) maneuver area to support a contiguous MEU-sized Live-Fire and maneuver operation using training ammunition and associated SDZs. Maximum requirements derived from a nominal 18-mi x 55-mi (29 km x 88 km) maneuver area to support a contiguous MEU-sized Live-Fire and maneuver operations using service ammunition and associated SDZs (Reference U.S. Army TC 25-1 and DA PAM 385-63).

<sup>4</sup> Per FM 3-06.11, one city block = 175 m company frontage for MOUT. A 3 Block x 3 Block area = 525 m x 525 m.

<sup>5</sup> The Live-Fire area includes a 300 m x 300 m urban area surrounded by a 7,000 m radius SDZ.

<sup>6</sup> Land area requirement may be reduced or increased dependent upon Mission, type of units supported, and quantity of ranges needed based upon capacity and throughput.

## 9.3.2 System of Systems

### 9.3.2.1 Scheduling System

MAGTF MEU Level Training Range
See paragraph 6.5

### 9.3.2.2 Communications System

See paragraphs 4.3.2.2 and 5.3.7 for a definition and explanation of the types of communications circuits.

MAGTF MEU Level Training Range
Five RC circuits, at least three of which must support secure A-G, ship-to-shore, and point-to-point communications. At least five Exercise Communications circuits to support communication with ground, airborne, service support, surface participants, and exercise evaluators/controllers. At least three of the circuits should support secure communications.

### 9.3.2.3 MET System

MAGTF MEU Level Training Range
See paragraph 6.6

### 9.3.2.4 Target System

MAGTF MEU Level Training Range
<p>Exposed beach obstacles and fortified beach defenses and NSFS targets. All targets should be cleared for engagement with Live-Fire inert weapons and at least some of the targets should be cleared for engagement with Live-Fire live ordnance, including NSFS weapons.</p> <p>There should be land-based fortified defenses distributed throughout the range complex.</p> <p>There should be target sites composed of fixed and mobile, hard and soft targets in varying size and composition that are representative of varying military operations, units, and capabilities. The target sets should support Live-Fire air- and surface-launched indirect and direct fire weapon systems, to include small arms live fire. At least some targets should be pop-up and reactive in nature and provide scoring feedback. All targets should possess representative visual, radar, and spectral signatures.</p> <p>Ground targets should be of sufficient number and type to satisfy ITS requirements for: individual, crew served, and indirect-fire infantry weapons; 120mm and 25mm weapon systems; demolitions and explosives; and all wheeled/tracked vehicle mounted systems associated with the MEU Level MAGTF units listed in paragraphs 8.1.1 through 8.1.3.</p> <p>There should be at least six separate target sites to accommodate Live-Fire inert and live A-G weapons, with at least four targets per site, composed of representative threat targets to include vehicles, structural targets, revetted targets, and moving targets. There should be a minimum of four DMPIs per target.</p> <p>Structural and urban targets should require event participants to discriminate between valid and invalid targets in order to practice minimizing collateral damage. Urban targets must also support ground fire-and-maneuver operations.</p> <p>At least two target sites must allow the use of heavy precision and non-precision weapons. These targets must allow the use of Live-Fire inert weapons up to 2,000 pounds, Live-Fire live weapons (including cluster munitions) up to 1,000 pounds, and laser targeting devices.</p>

### 9.3.2.5 Instrumentation System

The required capabilities in the table below are applicable to Maneuver, Fire and Maneuver, and MOUT training. See paragraphs 5.3.8 and 6.7 for explanation of the elements of the Instrumentation System.

Attribute	MAGTF MEU Level Training Range
Tracking (TSPI)	
High Fidelity	26 <sup>1</sup>
Low Fidelity	24 <sup>2</sup>
RC	
2-D	Yes
3-D	Yes
EC&C	
2-D	Yes
3-D	Yes
JNTC	Yes
M&S	
A-A	Yes
A-G	Yes
S-A	Yes
S-S	Yes
Scoring	
Type	Manual or Auto
Feedback	Both
RTKN	Voice or Auto
Debrief/AAR	
Type	Both

Notes:

<sup>1</sup> Will support up to 22 friendly air assets (up to 12 Assault Support Aircraft and 10 Fixed-wing aircraft) and 4 OPFOR air assets.

<sup>2</sup> Assumes a platoon (of ground forces or vehicles) is the smallest unit for which TSPI is required.

### 9.3.2.6 OPFOR System

MAGTF MEU Level Operations
A L, V, or C battalion-sized ground force, at least a company of which must be L.
A L, V, or C, company-sized armored and/or mechanized vehicle force, at least a platoon of which must be L.
Up to 4 fixed- or rotary-wing threat aircraft, at least 2 of which must be L. All threat aircraft must have A-A missile capability. Fixed-wing threat aircraft must have A-A gun and active A-A missile capability, be capable of supersonic flight, and able to operate to the upper limit of the Airspace.
Fixed, moving, and time critical targets, at least some of which must be reactive.
EC Threat Level 3



## **SECTION TEN: REQUIRED MAGTF MEB LEVEL TRAINING RANGE CAPABILITIES**

### **10.1 MAGTF MEB LEVEL TRAINING OVERVIEW**

MAGTF MEB Level training supports not only the personnel and platform core capabilities associated with the individual elements of a MEB, but also the combined T&R requirements of the fully-integrated MEB. Accordingly, the MAGTF MEB Level training supports the MEB ACE, GCE, and CSSE units described below.

#### **10.1.1 Aviation Combat Element**

The MAGTF MEB Level training range supports the T&R requirements associated with the individual fixed- and rotary-wing platforms, portions of or complete fixed- and rotary-wing squadrons, and the complete aviation component of a MEB (i.e., a Marine Air Group [MAG]). The MAG fixed-wing elements include fighter, attack, electronic warning/electronic attack, and support aircraft. The MAG rotary-wing elements include transport and attack aircraft and VSTOL platforms.

#### **10.1.2 Ground Combat Element**

The MAGTF MEB Level training range supports the training requirements associated with the individual and overall ground warfighting components of a MEB GCE. A typical MEB GCE is composed of a Regimental Combat Team (RCT)/Regimental Landing Team (RLT). The RCT/RLT will include three Marine infantry battalions, a tank company, an amphibious vehicle company, an armored vehicle company, a combat engineer company, and an artillery battalion.

#### **10.1.3 Combat Service Support Element**

The MAGTF MEB Level training range supports the T&R requirements associated with the individual and complete combat service support components of a MEB CSSE. A typical MEB CSSE is composed of a Brigade Service Support Group that includes a communications platoon, a TSD/LSD company, an engineer company, a maintenance company, a health services company, and a MP company.

### **10.2 OPERATIONAL CONCEPT**

The operational concept for MAGTF MEB Level range requirements are assessed based on a comprehensive training scenario derived from the UJTL and directly linked to the MCTL. The following operations/events from the Operations List of the UJTL and their associated MCTs form the basis for assessment of the required range attributes:

- Reconnaissance, Surveillance, and Target Acquisition
- Command and Control Warfare
- Information Operations
- Suppression of Enemy Air Defenses

- Joint Interdiction
- Offensive Counter-Air
- Forcible Entry: Expeditionary Assault
- Movement to Contact
- Attack
- Pursuit
- Exploitation
- Relief in Place
- Passage of Lines
- Rear Area Security
- Defensive Counter-Air
- Area Defense
- Mobile Operations
- Delay
- Withdrawal
- Combat Search and Rescue
- Deployment
- Counterterrorism
- Anti-terrorism

### 10.3 REQUIRED CAPABILITIES

The required capabilities for a Marine Corps MAGTF MEB Level Training range is described in detail below and summarized in Appendix F.

#### 10.3.1 Operational Elements

##### 10.3.1.1 Suite of Ranges

<b>MAGTF MEB Level Suite of Ranges</b>	
• MAGTF Level Maneuver/Training Area	• OAS Range
• MAGTF Level Instrumented Live-Fire and Maneuver Training Area/Range	• AAW Range
• Impact Area—Dudded	• Assault Support Range
• Impact Area—Non-Dudded	• Air Reconnaissance Range
• Field Artillery Indirect Fire Range	• EW Range
• Non-Standardized Engineer Qualification Range	• MOUT Collective Training Facility (Large)
• Light Demolition Range	• MAGTF Level MOUT Collective Training Facility

Note:

<sup>1</sup> Suite of ranges can be augmented based upon Mission, type of units supported, and training capacity and throughput.

**10.3.1.2 Airspace****MAGTF MEB Level Training Range**

A 24-hour day-night period on a 50 nm x 80 nm range with Airspace that extends from surface to 50,000 feet AGL. At least some portion of the Airspace must allow supersonic operations. At least some portion of the Airspace should also overlay land area with significant topography. Where the Airspace overlays the training range Land Area, the horizontal limits of the Airspace should extend at least 10 nm beyond the horizontal limits of the Land Area.<sup>1, 2, 3, 4</sup>

**Notes:**

<sup>1</sup> The Airspace should be scheduled in 30-minute blocks.

<sup>2</sup> The required length of the time period in the range Airspace may increase to 10 days (240 hours) to support large-scale combined arms exercises and operations.

<sup>3</sup> It is important to replicate to the greatest degree practical the topography of the planned area of operations. This required topographical fidelity could be achieved through the physical geographic location of the range or through a high-fidelity V environment generated and “up-linked” from a range subsystem or generated autonomously by on-board aircraft systems.

<sup>4</sup> Deconfliction between artillery and air operations must be effected through the DASC or FSCC.

**10.3.1.3 Sea Space****MAGTF MEB Level Training Range**

At least a 24-hour day-night period in a 10,000 nm<sup>2</sup> area including an area at least 15 nm wide, and contiguous to the beachfront capable of supporting amphibious vehicle and landing craft training, and extending seaward to the ARG/ESG element location.<sup>1, 2</sup>

**Notes:**

<sup>1</sup> Supports ocean-based training elements.

<sup>2</sup> The required time period in the Sea Space will increase to 7-10 days to support large-scale operations like the Joint Task Force Exercise. The cumulative requirement for large scale MEB operations is a 7 to 10 day period (both day and night time periods), that includes a cumulative total of 36,000 nm<sup>2</sup> littoral sea space, including an area at least 15 nm wide, and contiguous to the beachfront capable of supporting amphibious vehicle and landing craft training, and extending seaward to the simulated ARG/ESG element location.

**10.3.1.4 Land Area****MAGTF MEB Level Training Range**

At least a 24-hour day-night period in an area to support Maneuver or Live-Fire and Maneuver and MOUT training.<sup>1</sup>

Maneuver

The Threshold and Objective requirement is at least 300 mi<sup>2</sup> (192,000 acres) and include a beachfront for amphibious operations training.<sup>2</sup>

–OR–

Live-Fire and Maneuver

The Threshold requirement is at least 892 mi<sup>2</sup> (2,310 km<sup>2</sup>) or 570,813 acres. The Objective requirement is 1,189 mi<sup>2</sup> (3,080 km<sup>2</sup>) or 761,085 acres. Both should include a beachfront for amphibious operations training. Some portion (if not all) of the Land Area should be cleared for use of Live-Fire NSFS, A-G, NSW, indirect, and direct fire weapons with both service (objective) and training practice (threshold) ammunition.<sup>3</sup>

MOUT

There should be a dedicated 150 mi<sup>2</sup> MOUT facility that combines a large central urban area of at least 1 mi<sup>2</sup> (9 Blocks x 9 Blocks), an outlying suburban/residential area of at least 63 mi<sup>2</sup> (that extends at least 3.5 mi beyond the central urban area), and an outlying facilities or villages area of at least 80 mi<sup>2</sup> (that extends at least 2 mi beyond the suburban/residential area). The outlying areas should include a non-operational airfield (with tower and hangers) and a port/industrial complex that includes warehouses, power plants, and other industrial structures. Suburban area structures should represent the local non-combatant populace and infrastructure. The MOUT should include major avenues of approach connecting the suburbs and outlying villages with the central urban area.<sup>4</sup>

The MOUT complex should also include a ground and aviation live-fire training area of at least 3 mi<sup>2</sup>. This area should consist of a moderately developed urban area that will accommodate a coordinated combined arms Live-Fire MOUT assault. The live-fire training area should accommodate the employment of individual, crew-served, and indirect-fire infantry weapons, as well as the use of precision indirect fire from airborne CAS and ground-based artillery.<sup>5</sup>

Notes:

<sup>1</sup> The required length of the time period in the Land Area may increase to 10 days (240 hours) to support large-scale combined arms exercises and operations.

<sup>2</sup> Minimum Land Area requirements are derived from a nominal 10-mi x 30-mi (16 km x 48 km) maneuver area to support a contiguous MEB-sized non-firing maneuver operation (Reference U.S. Army TC 25-1).

<sup>3</sup> Minimum Land Area requirements are derived from a nominal 22-mi x 41-mi (35 km x 66 km) maneuver area to support a contiguous MEB-sized live-fire and maneuver operation using training ammunition and associated SDZs. Maximum requirement derived from a 22-mi x 55-mi (35 km x 88 km) maneuver area to support a contiguous MEB-sized Live-Fire and maneuver operation using service ammunition and associated SDZs. (References U.S. Army TC 25-1 and DA PAM 385-63).

<sup>4</sup> Per FM 3-06.11, the MOUT frontage for a single infantry company is 1 City Block.

<sup>5</sup> The Live-Fire area includes a 300 m by 300 m urban area surrounded by a 7,000 m radius SDZ.

<sup>6</sup> Land area requirement may be reduced or increased dependent upon Mission, type of units supported, and quantity of ranges needed based upon capacity and throughput

## 10.3.2 System of Systems

### 10.3.2.1 Scheduling System

<b>MAGTF MEB Level Training Range</b>
See paragraph 6.5

### 10.3.2.2 Communications System

See paragraph 4.3.2.2 and 5.3.7 for a definition and explanation of the types of communications circuits.

<b>MAGTF MEB Level Training Range</b>
Five RC circuits, at least three of which must support secure A-G, ship-to-shore, and point-to-point communications. At least five Exercise Communications circuits to support communication with ground, airborne, service support, surface participants, and exercise evaluators/controllers. At least three of the circuits should support secure communications.

### 10.3.2.3 MET System

<b>MAGTF MEB Level Training Range</b>
See paragraph 6.6

### 10.3.2.4 Target System

<b>MAFTG MEB Level Training Range</b>
<p>Exposed beach obstacles and fortified beach defenses and NSFS targets. All targets should be cleared for engagement with live-fire inert weapons and at least some of the targets should be cleared for engagement with live-fire live NSFS weapons.<sup>1</sup></p> <p>There should be land-based fortified defenses distributed throughout the range complex.</p> <p>There should be target sites composed of fixed and mobile, hard and soft automated targets in varying size and composition that are representative of varying military operations, units, and capabilities. The target sets should support air- and surface-launched indirect and direct fire weapon systems, including small-arms live fire. At least some of the targets should be pop-up and reactive in nature. All targets should possess representative visual, radar, and spectral signatures.</p> <p>Ground targets should be of sufficient number and type to satisfy ITS requirements for: individual, crew-served, and indirect-fire infantry weapons; 120mm and 25mm weapon systems; demolitions and explosives; and all wheeled/tracked vehicle mounted systems associated with the MEB Level MAGTF units listed in paragraphs 9.1.1 through 9.1.3.</p> <p>There should be at least eight separate live-fire inert and live A-G weapons target sites, with at least four targets per site, composed of representative threat targets to include vehicles, structural targets, revetted targets, and moving targets. There should be at least four DMPs per target.</p> <p>Structural and urban targets should require event participants to discriminate between valid and invalid targets in order to practice minimizing collateral damage. Urban targets must also support ground fire-and-maneuver operations.</p> <p>At least 4 target sites must support heavy precision and non-precision live-fire weapons. These targets must allow the use of inert weapons up to 2,000 pounds, live weapons (including cluster munitions) up to 1,000 pounds, and laser targeting systems.</p>

Note: <sup>1</sup> Supports ocean-based training elements.

### 10.3.2.5 Instrumentation System

See paragraphs 5.3.8 and 6.7 for explanation of the elements of the Instrumentation System.

Attribute	MAGTF MEB Level Operations
Tracking (TSPI)	
High Fidelity	72 <sup>1</sup>
Low Fidelity	100 <sup>2</sup>
RC	
2-D	Yes
3-D	Yes
EC&C	
2-D	Yes
3-D	Yes
JNTC	Yes
M&S	
A-A	Yes
A-G	Yes
S-A	Yes
S-S	Yes
Scoring	
Type	Manual or Auto
Feedback	Both
RTKN	Voice or Auto
Debrief/AAR	
Type	Both

Notes:

<sup>1</sup> Will support up to 56 friendly air assets (24 Assault Support Aircraft and 24 fixed-wing aircraft) and 16 OPFOR aircraft.

<sup>2</sup> Assumes a platoon (of ground forces or vehicles) is the smallest unit for which TSPI is required.

### 10.3.2.6 OPFOR System

MAGTF MEB Level Operations
A L, V, or C brigade-sized ground force, at least a battalion of which must be L. A L, V, or C, battalion-sized armored and/or mechanized vehicle force, at least a company of which must be L. Up to 8 fixed- or rotary-wing threat aircraft, at least 4 of which must be L. All threat aircraft must have A-A missile capability. Fixed-wing threat aircraft must have A-A gun and active A-A missile capability, be capable of supersonic flight, and able to operate to the upper limits of the Airspace. Fixed, moving, and time critical targets, at least some of which are reactive. EC Threat Level 4

## **SECTION ELEVEN: JOINT NATIONAL TRAINING CAPABILITY**

### **11.1 OVERVIEW**

Joint training is training that integrates more than one Service into a military force operating under a single combatant commander. In 2002, the DoD initiated a Training Transformation (T2) program to develop and implement concepts and infrastructure as essential elements in preparing U.S. forces to conduct joint effects-based operations of the future. The JNTC focuses on collective training. It helps to prepare forces by providing units and command staffs with an integrated live, virtual, and constructive training environment with appropriate joint context that allows accurate, timely, and relevant training in support of specific operational needs. It can be used to train forces against a general threat, to conduct mission rehearsal against a specific threat, or to experiment with new doctrine, tactics, techniques, procedures, Joint Operations Concepts and equipment.

The test and training transformation concept is designed around improving four principal areas: realistic combat training, OPFOR, ground truth, and feedback. JNTC, which is being implemented to provide improvements in these four areas, will provide an integrated L, V, and C training environment that includes appropriate joint context for global training and mission rehearsal in support of specific operational needs. The JNTC, which will integrate a network of resources to include live test and training ranges, simulations, and simulators, will allow DoD to assess their effects-based operations.

JNTC will create and sustain an environment in which units and individuals get joint operations training at the strategic, operational, and tactical levels. Using a global network of joint training facilities and facilitators, JNTC will combine existing military exercise elements with live forces to create a more realistic and, therefore, more valuable training experience.

### **11.2 JNTC TERMINOLOGY**

#### **11.2.1 Training Program Accreditation**

To maximize training audience exposure and help ensure consistency of a realistic joint training environment, the support and involvement of combatant command, Service, and component nominated and selected training programs will be required. JWFC will work collaboratively with combatant commands, Services, and components to identify and accredit programs that can plan and execute joint training.

Accreditation is a process to determine that a combatant command, Service, or component training program or organization has the capability to conduct training on joint tasks. The process will serve as the vehicle to provide oversight and evaluation of existing joint context capabilities and the ability of training programs to provide a realistic joint training environment.

### **11.2.2 Site and System Certification**

As part of the JNTC concept, sites and systems will be required to create a realistic joint environment for training/mission rehearsal of joint tasks. These sites and systems will require certification of their capability to support their joint training role. The purpose of certification is to ensure that all the technical elements required to create a realistic environment to train joint tasks are sufficient, available, operational, and interoperable.

Certification deals with sites and systems, and is event independent, but is related to joint task requirements. Certification standards will be derived from specified joint tasks and current and emerging Department of Defense (DoD) technical guidelines, policy and JNTC standards.

### **11.2.3 The Test & Training Enabling Architecture**

JNTC will use TENA as the foundation for JNTC certified test and training range instrumentation. TENA is an existing software architecture that is being improved to better satisfy the Foundation Initiative 2010 requirement for a test and training range instrumentation software architecture that will enable software interoperability and reuse at DoD test and training ranges. TENA will provide the software architecture and applications to enable interoperability among range systems, facilities, simulations, and Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance systems. The end-state TENA will allow event-related real-time and post-event information to be shared between both TENA-compliant and non-TENA-compliant range infrastructures. There will be three key components of the end-state TENA architecture:

- TENA Middleware will provide the high performance, real-time, low-latency communications infrastructure
- TENA Repository will contain all the information relative to TENA that is not specific to a given logical range (see paragraph 3.2.4, below)
- TENA Logical Range Data Archive will store and provide for the retrieval of all of the information associated with a specific logical range event

### **11.2.4 Logical Range**

A logical range is a suite of TENA resources, sharing a common object model, that work together for a given range event. A logical range for any JNTC event may include geographically separated ranges or range complexes, simulators, command centers, data collection and distribution centers, etc.

## **11.3 REQUIRED JNTC RANGE CAPABILITIES**

The Services maintain training ranges and operating areas necessary to satisfy core service training requirements. This frequently results in the development and fielding of unique instrumentation for the operating platforms, and a wide variety of infrastructure necessary to create the training environment, capture “ground truth,” assesses activity and



performance, and provide feedback to the training audience in a timely manner. Examples include position information collection systems, weapons scoring, threat emitters, opposition force equipment, communications, and exercise surveillance and support systems. Providing and modernizing such training functionality and capabilities are the responsibilities of the Services. These established capabilities form the baseline of a modern range infrastructure. It is this baseline that forms the foundation of the Joint National Training Capability, from which Joint National Training Capability investments will selectively expand and connect service training ranges and instrumentation systems to create joint capabilities. An example would be adding the systems for fixed-wing aircraft tracking and weapon-engagement scoring to the infrastructure at an Army range to enable accredited, joint training events. Occasionally, modifications will be required to service training-support systems to incorporate joint functionality.

The overall intent is a future interoperability end state where service and joint integrated live, virtual, and constructive (LVC) training systems are routinely inter-connected to support joint training and mission rehearsal events. It includes a global infrastructure capability, which enables distributed joint training across DoD sites, simulation centers, training areas and locations, and ranges.

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## **APPENDIX A: MARINE CORPS SUITE OF RANGES**

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### MARINE CORPS SUITE OF RANGES

Satisfying the Objectives listed below will allow achievement of a combat readiness level of C-1. Satisfying the Thresholds listed below will allow the achievement of a combat readiness level of C-2.

**Table A-1. Marine Corps Suite of Ranges**

		Individual Level	Unit Level	MAGTF (MEU) Level	MAGTF (MEB) Level
<b>Maneuver/Training Area</b>	<b>Maneuver/Training Area (XXXXX)</b>	X	X		
	<b>MAGTF Level Maneuver/Training Area (XXXXX)</b>			X	X
	<b>Unit Level Instrumented Live-Fire and Maneuver Training Area/Range (XXXXX)</b>		X		
	<b>MAGTF Level Instrumented Live-Fire and Maneuver Training Area/Range (XXXXX)</b>			X	X
<b>Impact Areas</b>	<b>Impact Area—Dudded (17430)</b>	X	X	X	X
	<b>Impact Area—on-Dudded (17431)</b>	X	X	X	X
<b>Live-Fire Ranges</b>	<b>Non-Standard Small Arms Range (17502)</b>		X		
	<b>Basic 10 M—25 M Zero Firing Range (17510)</b>	X	X		
	<b>Automated Field-Fire (AFF) Range (17520)</b>	X	X		
	<b>Rifle Known-Distance (KD) Range (17550)</b>	X	X		
	<b>Automated Sniper Field-Fire Range (17561)</b>	X	X		
	<b>Pistol Known-Distance (KD) Range (17570)</b>	X	X		

**Table A-1 (continued). Marine Corps Suite of Ranges**

Live-Fire Ranges		Individual Level	Unit Level	MAGTF (MEU) Level	MAGTF (MEB) Level	
	Automated Combat Pistol/MP Firearms Qualification Course (17572)			X	X	
	Automated Multi-Purpose Machine Gun (MPMG) Range (17582)	X	X			
	40MM (Grenade) Machine Gun Qualification Range (17620)	X	X			
	Automated Anti-Armor Tracking and Live-Fire Range (17641)	X	X			
	Field Artillery Direct Fire Range (17650)			X		
	Tank/Fighting Vehicle Stationary Gunnery Range (17660)	X	X			
	Mortar Range (17670)	X	X			
	Filed Artillery Indirect Fire Range (17671)			X	X	X
	Automated Multi-Purpose Training Range (17711)	X	X			
	Automated Tank/Fighting Vehicle Multi-Purpose Range Complex (17722)			X		
	Fire and Movement Range (17730)	X	X			
	Squad Defense Range (17740)			X		
Automated Infantry Squad Battle Course (17751)	X	X				

**Table A-1 (continued). Marine Corps Suite of Ranges**

		<b>Individual Level</b>	<b>Unit Level</b>	<b>MAGTF (MEU) Level</b>	<b>MAGTF (MEB) Level</b>
<b>Live-Fire Ranges</b>	<b>Automated Infantry Platoon Battle Course (17753)</b>		X		
	<b>Live Hand Grenade Range (17810)</b>	X	X		
	<b>Non-Standardized Engineer Qualification Range (17820)</b>	X	X	X	X
	<b>Light Demolition Range (17830)</b>	X	X	X	X
<b>Aviation Ranges</b>	<b>Offensive Air Support (OAS) Range (XXXXX)</b>	X	X	X	X
	<b>Anti-Air Warfare (AAW) Range (XXXXX)</b>	X	X	X	X
	<b>Assault Support Range (XXXXX)</b>	X	X	X	X
	<b>Air Reconnaissance Range (XXXXX)</b>		X		
	<b>Electronic Warfare (EW) Range (XXXXX)</b>	X	X		
<b>MOUT Facilities</b>	<b>MOUT Assault Course (MAC) (17760)</b>	X	X		
	<b>MOUT Collective Training Facility (Small) (17962)</b>	X	X		
	<b>MOUT Collective Training Facility (Large) (17963)</b>			X	X
	<b>MAGTF Level MOUT Collective Training Facility (XXXXX)</b>			X	X

The dimensions and land areas listed below are for the nominal makeup of live-fire ranges as listed in the TC 25-8 and utilized in the calculation of the threshold land area requirement. These dimensions do not account for capacity or throughput considerations and are general in nature. Also, these dimensions do not necessarily fully account for the unmitigated SDZs of the weapons associated with these ranges.

**Table A-2. Live-Fire Range Characteristics**

<b>Live-Fire Range</b>	<b>Dimension (m)</b>	<b>Area (km<sup>2</sup>)</b>
Non-Standard Small Arms Range	200 x 5,000	1
Basic 10m-25m Zero Firing Range	200 x 2,000	.4
Automated Field-Fire (AFF) Range	520 x 5,000	2.6
Rifle Known-Distance (KD) Range	500 x 2,000	1
Automated Sniper Field Fire Range	600 x 5,000	3
Pistol Known-Distance (KD) Range	120 x 1,000	.12
Automated combat Pistol/MP Firearms Qualification Course	120 x 1,000	.12
Automated Multi-Purpose Machine Gun (MPMG) Range	1,200 x 5,200	6.24
Automated Grenade Launcher Range	500 x 2,500	1.25
40mm (Grenade) Machine Gun Qualification Range	500 x 2,500	1.25
Automated Anti-Armor Tracking and Live-Fire Range	1,000 x 5,000	5
Field Artillery Direct Fire Range	1,000 x 5,000	5
Tank/Fighting Vehicle Stationary Gunnery Range	1,000 x 4,000	4
Mortar Range	2,000 x 6,000	12
Field Artillery Indirect Fire Range	12,500 x 25,000	312.5*
Automated Multi-Purpose Training Range	1,000 x 4,000	4
Automated Heavy Tank/Fighting Vehicle Multi-Purpose Range Complex	1,500 x 6,000	9
Fire and Movement Range	500 x 1,000	.5
Squad Defense Range	100 x 1,000	.1
Automated Infantry Squad Battle Course	1,000 x 2,000	2
Automated Infantry Platoon Battle Course	1,500 x 5,000	7.5
Live Hand Grenade Range	80 x 30	.0024
Non-Standardized Engineer Qualification Range	500 x 500	.25
Light Demolition Range	500 x 500	.25
MOUT Assault Course (MAC)	300 x 1,500	.45

\*Estimate based upon rectangular shape



**APPENDIX B: COMMON MARINE CORPS RANGE REQUIREMENTS AND  
ATTRIBUTES—THRESHOLDS, OBJECTIVES, AND KPP**

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### COMMON RANGE REQUIREMENTS AND ATTRIBUTES

Satisfying the Objectives listed below will allow achievement of a combat readiness level of C-1. Satisfying the Thresholds listed below will allow the achievement of a combat readiness level of C-2.

**Table B-1. Common Range Requirements and Attributes**

Attribute	Threshold	Objective
IERs	See Table 6-1	See Table 6-1
Suitability	See Table 6-2	See Table 6-2
Scheduling System	A web-enabled db that can be used by participants to schedule range times and resources.	A web-enabled db that is interfaced with the ITSS and T&R manuals
MET System	See paragraph 6.6	See paragraph 6.6
<b>Instrumentation System</b>		
Tracking	Low fidelity TSPI.  Ground-based display systems that are not “tied” to fixed facilities or dependent upon peculiar equipment suites.	High fidelity TSPI.  Mobile, COTS-based display systems.
Range Control	2-D displays for range operations	3-D displays for range operations
EC&C	2-D displays for exercise controllers	3-D displays for exercise controllers
M&S	The ability to simulate air, surface, and ground RF, IR, and spectral signatures and characteristics that can stimulate friendly and OPFOR receiver, processing, and display systems.	The ability to generate a virtual environment that emulates the intended area of operations.
Scoring	Scoring: Manual Feedback: Post-mission RTKN: Voice	Scoring: Auto Feedback: Real-time RTKN: Auto
Event Debrief/AAR	Both local and remote	Available via wireless or broadband interconnectivity for display on COTS equipment at any location, ashore or afloat.

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**APPENDIX C: INDIVIDUAL LEVEL RANGE REQUIREMENTS—  
THRESHOLDS, OBJECTIVES, AND KPP**

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## INDIVIDUAL LEVEL RANGE THRESHOLDS, OBJECTIVES, AND KPP

Satisfying the Objectives listed below will allow achievement of a combat readiness level of C-1. Satisfying the Thresholds listed below will allow the achievement of a combat readiness level of C-2.

**Table C-1. Individual Level Range Thresholds, Objectives, and KPP**

Attribute	Threshold	Objective
<b>Operational Elements</b>		
Airspace	<u>ACE</u> A-G: 20 nm x 20 nm range extending from surface to 25,000 feet	See 7.3.1.1
Sea Space	See 7.3.1.2	See 7.3.1.2
Land Area	<u>ACE</u> Land area with dimensions of 10 nm x 10 nm.	See 7.3.1.3
<b>System of Systems</b>		
Communications	<u>All Elements</u> At least one dedicated RC circuit and one dedicated Exercise Control circuit.	See 7.3.2.2
Target	<u>ACE</u> At least one target complex with at least one separate weapons target site that allows the use of live-fire inert and live ordnance.	See 7.3.2.4
Instrumentation	See 7.3.2.5	See 7.3.2.5
OPFOR	<u>GCE and CSSE Training</u> Fixed and moving targets, at least some of which must be reactive.  <u>ACE</u> Up to two L fixed-wing, supersonic capable threat aircraft	See 7.3.2.6

**KPPs:**

1. All Operational Elements required capabilities described in paragraphs 7.3.1.1 through 7.3.1.4, except as modified above.
2. All Target required capabilities described in paragraph 7.3.2.4.
3. All Time, Space, and Position Information (TSI) and Scoring required capabilities described in paragraph 7.3.2.5, except as modified above.
4. All Electronic Combat (EC) required capabilities described in paragraph 7.3.2.6.

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**APPENDIX D: UNIT LEVEL RANGE REQUIREMENTS—THRESHOLDS,  
OBJECTIVES, AND KPP**

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### UNIT LEVEL RANGE THRESHOLDS, OBJECTIVES, AND KPP

Satisfying the Objectives listed below will allow achievement of a combat readiness level of C-1. Satisfying the Thresholds listed below will allow the achievement of a combat readiness level of C-2.

**Table D-1. Unit Level Range Thresholds, Objectives, and KPP**

Attribute	Threshold	Objective
Operational Elements		
Airspace	<u>ACE</u> A-A: 25 nm x 25 nm range extending up to 45,000 feet AGL.  A-G: 20 nm x 50 nm range extending up to 35,000 feet AGL.	See 8.3.1.1
Sea Space	See 7.3.1.2	See 8.3.1.2
Land Area	<u>ACE</u> Land area with dimensions of 10 nm x 10 nm	See 8.3.1.3
System of Systems		
Communications	<u>All Elements</u> One dedicated RC circuit, and two dedicated EC&C circuits.	See 8.3.2.2
Target	<u>GCE and CSSE</u> At least one target site  <u>ACE</u> A-G: One weapon target site	See 8.3.2.4
Instrumentation	<u>GCE</u> (TSPI) Low Fidelity: 3  <u>CSSE</u> (TSPI) Low Fidelity: 2	See 8.3.2.5
OPFOR	<u>GCE and CSSE</u> A L, V, or C platoon-sized ground force.	See 8.3.2.6

**KPPs:**

1. All Operational Elements required capabilities described in paragraphs 8.3.1.1 through 8.3.1.4, except as modified above.
2. All Target required capabilities described in paragraph 8.3.2.4.
3. All Time, Space, and Position Information (TSI) and Scoring required capabilities described in paragraph 8.3.2.5, except as modified above.
4. All Electronic Combat (EC) required capabilities described in paragraph 8.3.2.6.

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**APPENDIX E: MAGTF MEU LEVEL RANGE REQUIREMENTS—  
THRESHOLDS, OBJECTIVES, AND KPP**

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## MAGTF MEU LEVEL RANGE THRESHOLDS, OBJECTIVES, AND KPP

Satisfying the Objectives listed below will allow achievement of a combat readiness level of C-1. Satisfying the Thresholds listed below will allow the achievement of a combat readiness level of C-2.

**Table E-1. MAGTF MEU Level Range Thresholds, Objectives, and KPP**

Attribute	Threshold	Objective
Operational Elements		
Airspace	A 50 nm x 50 nm range with airspace that extends from surface to 45,000 feet AGL.	See 9.3.1.1
Sea Space	See 9.3.1.2	See 9.3.1.2
Land Area	See 9.3.1.3	See 9.3.1.3
System of Systems		
Communications	Three (3) RC circuits and five (5) EC&C circuits.	See 9.3.2.2
Target	At least three separate A-G target sites  At least one target site must allow the use of heavy precision and non-precision weapons.	See 9.3.2.4
Instrumentation	See 9.3.2.5	See 9.3.2.5
OPFOR	See 9.3.2.5	See 9.3.2.6

**KPPs:**

1. All Operational Elements required capabilities described in paragraphs 9.3.1.1 through 9.3.1.4, except as modified above.
2. All Target required capabilities described in paragraph 9.3.2.4.
3. All Time, Space, and Position Information (TSI) and Scoring required capabilities described in paragraph 9.3.2.5, except as modified above.
4. All Electronic Combat (EC) required capabilities described in paragraph 9.3.2.6

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**APPENDIX F: MAGTF MEB LEVEL TRAINING REQUIREMENTS—  
THRESHOLDS, OBJECTIVES, AND KPPS**

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## MAGTF MEB RANGE THRESHOLDS, OBJECTIVES, AND KPP

Satisfying the Objectives listed below will allow achievement of a combat readiness level of C-1. Satisfying the Thresholds listed below will allow the achievement of a combat readiness level of C-2.

**Table F-1. MAGTF MEB Range Thresholds, Objectives, and KPP**

Attribute	Threshold	Objective
<b>Operational Elements</b>		
Airspace	A 50 nm x 50 nm range with airspace that extends from surface to 45,000 feet AGL.	See 10.3.1.1
Sea Space	See 10.3.1.2	See 10.3.1.2
Land Area	See 10.3.1.3	See 10.3.1.3
<b>System of Systems</b>		
Communications	See 10.3.2.2	See 10.3.2.2
Target	At least four separate A-G target sites  At least 3 target sites must support heavy precision and non-precision weapons. Two targets must allow the use of inert weapons up to 2,000 pounds.	See 10.3.2.4
Instrumentation	<u>Tracking (TSPI)</u> High Fidelity: 56	See 10.3.2.5
OPFOR	See 10.3.2.6	See 10.3.2.6

**KPPs:**

1. All Operational Elements required capabilities described in paragraphs 10.3.1.1 through 10.3.1.4, except as modified above.
2. All Target required capabilities described in paragraph 10.3.2.4.
3. All Time, Space, and Position Information (TSI) and Scoring required capabilities described in paragraph 10.3.2.5, except as modified above.
4. All Electronic Combat (EC) required capabilities described in paragraph 10.3.2.6.

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## **APPENDIX G: REFERENCES AND BIBLIOGRAPHY**

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## REFERENCES AND BIBLIOGRAPHY

In October 2002, the Secretary Of Defense directed a review and update of the DoD acquisition process, which resulted in the replacement of the Chairman, Joint Chiefs of Staff Instruction (CJCSI) 3170.01B, *Requirements Generation System* with CJCSI 3170.01C, *Joint Capabilities and Integration System*. This Marine Corps RCD uses the Capstone Requirements Document format described in CJCSI 3170.01C for guidance in content and format. Other references and documents used in the development of this RCD include:

- a) Commandant of the Marine Corps, *Marine Corps Order P3500.26, Conditions for Joint and Marine Corps Tasks*, dated 01 October 2002.
- b) Department of the Navy (CNO N789), *Live Tactical Training Range Instrumentation Roadmap (LTTIR)(Draft)*, dated October 2001.
- c) Department of the Navy (CNO N889), *Tactical Training Range Roadmap*, dated July 1995.
- d) Department of the Navy, *Navy Tactical Task List 3.0 (NTTL) (Draft)*, dated 27 July 2001.
- e) Department of the Navy (CNO N433), *Navy Range Management System (NRMS) Functional Areas (Draft)*, undated.
- f) Department of the Navy (CNO N441), *Air-to-Ground Range Needs Assessment (Draft)*, September 2000.
- g) Commander, Joint Forces Command, *TENA Overview Course*, undated.
- h) Department of the Navy (CNO N88), *Operational Requirements Document for Tactical Training Ranges Program (TTRP)*, dated 28 May 1995.
- i) Department of the Army, *U.S. Army Training Circular 25-1, Training Land*, dated 25 June 2001.
- j) Department of the Army, *U.S. Army Training Circular 25-8, Training Ranges*, dated 05 April 2004

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## **APPENDIX H: RECOMMENDED OTHER TRAINING INFRASTRUCTURE**

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**RECOMMENDED OTHER TRAINING INFRASTRUCTURE****Table H-1. Recommended Other Training Infrastructure**

		<b>Individual Level</b>	<b>Unit Level</b>	<b>MAGTF (MEU) Level</b>	<b>MAGTF (MEB) Level</b>
<b>Recommended Other Training Range Infrastructure</b>	<b>Gas Chamber</b>	X	X		
	<b>Land Navigation Course (17412)</b>	X	X		
	<b>Personnel Equipment Drop Zone (17440)</b>		X	X	X
	<b>Mine Warfare Area (17905)</b>	X			
	<b>Wheeled Vehicle Drivers Course (17906)</b>	X	X		
	<b>Tracked Vehicle Drivers Course (17907)</b>	X			
	<b>Amphibious Vehicle Training Area (17908)</b>	X			
	<b>Air Transport Mockup (17911)</b>	X			
	<b>Rappelling Training Area (17917)</b>	X	X		
	<b>Road/Airfield Construction Training Site (17918)</b>	X			
	<b>Floating Bridge Site (17922)</b>		X		
	<b>Water Supply Training Area (17924)</b>		X		
	<b>Medium Heavy Equipment Training Area (17931)</b>		X		
	<b>Decontamination Training Site (17932)</b>	X	X		
	<b>POL Training Site (17933)</b>		X		
<b>Fire Fighting and Rescue Training Areas (17951)</b>	X	X			

**Table H-1 (continued). Recommended Other Training Infrastructure**

Recommended Other Training Range Infrastructure		Individual Level	Unit Level	MAGTF (MEU) Level	MAGTF (MEB) Level
	Infiltration Course (17981)	X	X		
	Confidence Course (17991)	X			
	Obstacle Course (17992)	X			
	Command and Control/Exercise Support Facility (XXXXX)	X			
	Range Operations Building (17310)		X	X	X
	Bayonet Assault Course (17901)	X	X	X	X
	Range Support Building (17311)	X			
Covered Training Area (17330)	X	X	X	X	