



**DEPARTMENT OF THE NAVY**  
HEADQUARTERS UNITED STATES MARINE CORPS  
3000 MARINE CORPS PENTAGON  
WASHINGTON DC 20350-3000

MCO 3550.14  
TECOM (RTPD)  
23 June 2021

MARINE CORPS ORDER 3550.14

From: Commandant of the Marine Corps  
To: Distribution List

Subj: POLICIES AND PROCEDURES FOR SYNTHETIC GROUND TRAINING SYSTEMS

Ref: See Enclosure (1)

Encl: (1) References  
(2) Policies and Procedures

1. Situation

a. Synthetic Training integrates Live, Virtual, and Constructive (LVC) training environments and solutions enabling multi-domain training with a heightened degree of realism. Reference (a) defines live training as "real people operating real systems." Virtual training consists of "real people operating simulated systems." Constructive training consists of "real people providing input to models and simulations." Synthetic Ground Training Systems (GTS) are employed throughout the Fleet Marine Forces (FMF) at Home Station Training (HST), within Entry Level Training (ELT), and within Service Level Training Events (SLTE) conducted throughout the Marine Corps Training Environment (MCTE).

(1) The MCTE is comprised of a holistic enterprise of training capabilities and supporting enablers across all domains and warfighting functions.

(2) Components of the MCTE include live fire ranges, training areas, immersive training environments, instructors, live and virtual role players, simulators, simulations, and networked Command and Control systems / applications.

(3) Reference (b) serves as the plan to achieve the modernized MCTE, which will enable the rehearsal of emerging operational concepts while integrating the LVC training environments. The MCTE must integrate not just systems, but those people and organizations that support, train, and employ these capabilities.

b. Reference (c) aims to create "a Joint Force that possesses decisive advantages for any likely conflict, while remaining proficient across the entire spectrum of conflict."

c. Skill proficiency is achieved and sustained while leveraging various training systems and capabilities during training at formal schools, during sustainment training at home station, while conducting collective training within SLTE, and within other training events or exercises.

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

d. While working toward increased proficiency, reference (d) introduces guidance to shape a Capstone Concept of Joint Operations calling for a "Joint Force designed and able to out-think, out-maneuver, and out-fight any adversary under conditions of disruptive change."

e. Reference (e) identifies education and training as one of five priority focus areas, and states that "...the force lacks the necessary modern simulators to sustain training readiness." To address this concern, the Commandant directs "a deliberate plan to invest, divest, and reset." Furthermore, reference (e) suggests that our training system expenditures must result in "greater readiness and... a return to the Service for the investment."

f. Reference (f) highlights the required transformation to meet the demands of modern and anticipated operational environments.

2. Mission. Define roles and responsibilities of all Synthetic GTS stakeholders throughout the MCTE, outline investment / divestment decision criteria related to current training systems, and develop a method to evaluate the anticipated value of future Synthetic GTS prior to an acquisition decision to meet the Commandant's intent and address training challenges identified within reference (e).

### 3. Execution

#### a. Commander's Intent and Concept of Operations

##### (1) Commander's Intent

(a) To meet the expressed intent and objectives set forth within references (e) and (f) and achieve a modernized MCTE, we must be deliberate in our approach to shaping training system requirements as they relate to capability development, acquisition, and sustainment throughout a program life cycle.

(b) Training stakeholders must justify training-related expenditures with defensible data to inform resource decisions. In support of these efforts, we will routinely collect and report qualitative and quantitative performance data to better capture the utility of a given training system and shape investment / divestment criteria.

(c) The Marine Corps will continually seek to improve operational readiness and increase lethality through quality learning experiences conducted throughout the MCTE while optimizing our investments within given resource constraints.

##### (2) Concept of Operations

(a) Commanding General, Training and Education Command (CG TECOM) is the Service lead and sponsor for all TECOM-sponsored Synthetic GTS.

(b) TECOM, Range and Training Programs Division (RTPD) serves as the Resource and Requirements Sponsor for all TECOM-sponsored Synthetic GTS.

(c) TECOM, Marine Air Ground Task Force Training Command (MAGTFTC) supports enterprise-level trends analysis and data collection from all units conducting SLTE.

(d) Marine Corps Systems Command (MARCORSYSCOM), Program Manager, Training Systems (PM TRASYS) serves as the designated acquisition program manager for all TECOM-sponsored Synthetic GTS.

(e) Deputy Commandant, Installations and Logistics (DC I&L) provides support facilities, infrastructure, and logistical requirements for all TECOM-sponsored Synthetic GTS employed across the Marine Corps Installations.

b. Coordinating Instructions

(1) Synthetic GTS needs are borne of the user community. For a validated training need to become an enduring requirement, these requirements must be incorporated within the appropriate Training and Readiness (T&R) Manual as a component of progressive training in support of a specific T&R event.

(2) TECOM will maintain a prioritized list of validated training capability gaps, assessing whether they can be addressed via non-materiel solutions, or through materiel solutions.

(3) Related to training systems, MARCORSYSCOM, PM TRASYS will engage in solution development by conducting a Front End Analysis (FEA) early in the Requirements Transition Process (RTP).

(4) DC I&L will be consulted at the appropriate time and phase of capability development to ensure training support concepts, to include facilities support planning, are properly coordinated and addressed with a system fielding plan.

(5) Stakeholder Roles and Responsibilities are further defined within Chapter 1 of this Order.

4. Administration and Logistics

a. CG TECOM will modify this Order, as required, to ensure its currency and relevance. This Order is focused specifically on TECOM-sponsored Synthetic GTS employed throughout the Marine Corps and is intended to address the Commandant's guidance while working toward all stated objectives.

b. Requests for deviation from any of the provisions of this Order must be submitted via the appropriate Chain of Command to CG TECOM.

c. Records Management. Records created as a result of this directive shall be managed according to National Archives and Records Administration (NARA)-approved dispositions per SECNAV M-5210.1 CH-1 to ensure proper maintenance, use, accessibility and preservation, regardless of format or medium. Records disposition schedules are located on the Department of the Navy/Assistant for Administration (DON/AA), Directives and Records Management Division (DRMD) portal page at: <https://portal.secnav.navy.mil/orgs/DUSNM/DONAA/DRM/Records-and-Information-Management/Approved%20Record%20Schedules/Forms/AllItems.aspx>. Refer to MCO 5210.11F for Marine Corps records management policy and procedures.

d. Privacy Act. Any misuse or unauthorized disclosure of Personally Identifiable Information (PII) may result in both civil and criminal penalties. The Department of the Navy (DON) recognizes that the privacy of an individual is a personal and fundamental right that shall be respected and protected. The DON's need to collect, use, maintain, or disseminate PII about individuals for purposes of discharging its statutory responsibilities shall be balanced against the individuals' right to be protected against unwarranted invasion of privacy. All collection, use, maintenance, or dissemination of PII shall be in accordance with the Privacy Act of 1974, as amended (5 U.S.C. 552a) and implemented per SECNAVINST 5211.5F.

e. Recommendations. Recommendations concerning the content of this Order are welcomed and may be directed to Training and Education Command, Range and Training Programs Division via the appropriate Chain of Command.

5. Command and Signal

- a. Command. This Order is applicable to the Marine Corps Total Force.
- b. Signal. This Order is effective the date signed.

  
LEWIS A. CRAPAROTTA  
Commanding General  
Training and Education Command  
By Direction

DISTRIBUTION: PCN 10203368200

REFERENCES

- (a) Joint Live Virtual and Constructive (JLVC) Federation Integration Guide
- (b) Marine Corps Training Environment Modernization Plan
- (c) National Defense Strategy (2018)
- (d) National Military Strategy (2018)
- (e) 38th Commandant's Planning Guidance
- (f) U.S. Marine Corps Force Design 2030
- (g) SECNAV Notice 5210
- (h) SECNAV M-5210.1 CH-1
- (i) MCO 5210.11F
- (j) 5 U.S.C. 552a
- (k) SECNAVINST 5211.5F
- (l) MCO 3900.20
- (m) MCO 5311.1E
- (n) CDCBul 5400
- (o) OPNAVINST 1500.76C
- (p) Marine Corps Rapid Capabilities Office Handbook
- (q) Marine Corps Integrated Test and Evaluation Handbook
- (r) DoDI 5000.61, October 15, 2018
- (s) MCO 3550.10
- (t) TECOM Campaign Plan
- (u) MCO 1553.2C
- (v) NAVMC 1553.1A

**TABLE OF CONTENTS**

<b><u>IDENTIFICATION</u></b>	<b><u>TITLE</u></b>	<b><u>PAGE</u></b>
<b>Chapter 1</b>	<b>Roles and Responsibilities</b>	
1.	Purpose.....	1-1
2.	Commanding General, Training and Education Command.....	1-1
3.	Deputy Commandant, Combat Development and Integration.....	1-2
4.	Deputy Commandant, Plans, Policies, and Operations.....	1-3
5.	Deputy Commandant, Aviation.....	1-3
6.	Deputy Commandant, Information.....	1-3
7.	Deputy Commandant, Installations and Logistics.....	1-3
8.	Deputy Commandant, Programs and Resources.....	1-3
9.	Commanders, Marine Forces.....	1-3
10.	Commander, Marine Corps Systems Command.....	1-4
<b>Chapter 2</b>	<b>Formulating Requirements</b>	
1.	Capabilities Based Assessment.....	2-1
2.	Requirements Transition Process .....	2-1
3.	Determining Service-Level Training Requirements.....	2-2
4.	Front End Analysis.....	2-2
<b>Chapter 3</b>	<b>Ensuring Training Effectiveness</b>	
1.	Background.....	3-1
2.	Military Utility Assessment.....	3-1
3.	Field User Evaluation.....	3-1
4.	Training Effectiveness Evaluation.....	3-2
<b>Chapter 4</b>	<b>Training System Accreditation</b>	
1.	Verification, Validation, and Accreditation.....	4-1
2.	Verification.....	4-1
3.	Validation.....	4-1
4.	Accreditation.....	4-2
<b>Chapter 5</b>	<b>Sustainment and Modernization</b>	
1.	Divest To Invest Strategy.....	5-1
2.	Informing a Utility Score.....	5-1
<b>Chapter 6</b>	<b>Training and Support</b>	
1.	Introduction.....	6-1
2.	Instructional Systems Design.....	6-1
3.	Training Execution.....	6-1
4.	Systems Support.....	6-1

<b>Chapter 7</b>	<b>Assessment and Evaluation</b>	
1.	Introduction.....	7-1
2.	Quantitative Performance Assessment.....	7-2
3.	Comprehensive Training Assessment.....	7-3
<b>Chapter 8</b>	<b>Scheduling and Reporting</b>	
1.	Objective.....	8-1
2.	Background.....	8-1
3.	Approach.....	8-1
<b>Appendix A</b>	<b>Glossary of Acronyms And Abbreviations.....</b>	<b>A-1</b>
<b>Appendix B</b>	<b>Applicable Synthetic Ground Training Systems.....</b>	<b>B-1</b>

## Chapter 1

### Roles and Responsibilities

1. Purpose. The purpose of this chapter is to clarify roles and responsibilities spanning multiple stakeholder organizations. Coordination amongst interdependent organizations is essential to maximize the benefits of Synthetic GTS, targeting increased skill proficiency and improved operational readiness.

2. Commanding General, Training and Education Command (CG TECOM)

a. Serves as the proponent for all matters pertaining to the oversight, coordination, and execution of all live and synthetic training conducted throughout the MCTE.

b. Serves as the Executive Agent for all matters pertaining to live and synthetic training capabilities and concepts employed within the MCTE.

c. Develops and implements policy in support of the effective execution of LVC training conducted throughout the MCTE.

d. Plans and conducts a recurring Working Group (WG) amongst stakeholders to gain synergy, communicate Synthetic GTS status, and collect user feedback.

e. Provides Subject Matter Experts (SME) to participate in Capability Portfolio Management WGs and governance boards.

f. Determines and validates training standards, requirements, and objectives to be supported by Synthetic GTS.

g. Manages Instructional Systems Design (ISD) and Training Execution functions of all TECOM-sponsored Synthetic GTS.

(1) Establishes and maintains current, relevant curriculum to support quality training across all TECOM-sponsored Synthetic GTS employed within ELT, HST, and SLTE.

(2) Implements formative and collective performance assessment across all Synthetic GTS to inform program evaluation.

(3) Manages Training Execution across all Synthetic GTS at all major installations via a cadre of operator / instructors. Specific operator / instructor requirements will vary across the Synthetic GTS as some systems are user-intuitive, while others require contextual information or instruction in advance.

(4) Resources the regional Training Support Centers to best support the FMF by aligning TECOM training resources to progressive training design at each major installation.

h. Follows the RTP to initiate the coordinated development of capabilities requirements documents with the materiel developer to ensure system Key Performance Parameters, Key System Attributes, and Additional Performance Attributes are accurate, achievable, verifiable, and based upon a concept of employment with quantifiable measures of effectiveness.

i. Provides sponsorship for all Planning, Programming, Budgeting, Execution, and Audit (PPBEA) efforts.

j. Maintains accountability of TECOM-sponsored Synthetic GTS employed throughout the Marine Corps.

k. Coordinates with DC I&L for the provision of infrastructure, facilities, and logistics support to Synthetic GTS located aboard Marine Corps Installations.

(1) Advocates for facilities requirements to support Synthetic GTS within the Facilities Sustainment, Restoration, and Modernization and Military Construction processes.

(2) Resources the installations to achieve sufficient GTS scheduling capacity supporting TECOM utilization data collection efforts in accordance with this Order.

l. Coordinates the acquisition of new training capabilities and life cycle sustainment of existing training capabilities with MARCORSSYSCOM.

m. Serves as the Accreditation Authority for all TECOM-sponsored Synthetic GTS.

n. Manages synthetic training needs from the FMF for inclusion in a Training and Education Gap List. The Training and Education Gap List will be maintained as a sub-set of the Marine Corps Gap List.

o. Considers the unique requirements of the Reserve Component when addressing training gaps and capability development.

p. Serves as the Training Community Lead on the Marine Corps Modeling and Simulation Integrated Process Team in pursuit of MCTE interoperability standards.

q. Coordinates training requirements with sister services to improve LVC interoperability when employed as a joint force.

r. Ensures the accurate and timely tracking of expenditures in order to validate the effectiveness of resourcing.

### 3. Deputy Commandant, Combat Development and Integration (DC CD&I)

a. Identifies validated training capability gaps to CG TECOM in accordance with reference (s) and this Order.

b. Serves as the requirements authority to achieve MCTE interoperability.

c. Leads the RTP process in support of synthetic training capability requirements documents.

d. Conducts the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities with Cost Awareness (DOTMLPF-C) Working Group to forward initiatives related to synthetic training capabilities.

4. Deputy Commandant, Plans, Policies, and Operations (DC PP&O)

a. Identifies validated training capability gaps to CG TECOM in accordance with reference (s) and this Order.

b. Supports the development of capability requirements to achieve MCTE interoperability.

5. Deputy Commandant, Aviation (DC Avn)

a. Identifies validated training capability gaps to CG TECOM in accordance with reference (s) and this Order.

b. Supports the development of capability requirements to achieve MCTE interoperability.

6. Deputy Commandant, Information (DC I)

a. Identifies validated Operations in the Information Environment training capability gaps to CG TECOM in accordance with reference (s) and this Order.

b. Through the Network Governance Board, supports MCTE capability requirements to achieve interoperability with the Marine Corps Information Environment Enterprise (MCIEE).

c. Ensures MCTE network access requirements are addressed as a component of the MCIEE.

7. Deputy Commandant, Installations and Logistics (DC I&L)

a. Identifies validated training capability gaps to CG TECOM in accordance with reference (s) and this Order.

b. Supports the development of capability requirements to achieve MCTE interoperability.

c. Provides infrastructure support to Synthetic GTS inclusive of facilities and logistical support aboard Marine Corps installations.

d. Supports Synthetic GTS scheduling within the Range Facility Management Support System (RFMSS) at each major installation.

8. Deputy Commandant, Programs and Resources (DC P&R). Supports TECOM throughout the PPBEA process in support of MCTE modernization.

9. Commanders, Marine Forces

a. Identify validated training capability gaps to CG TECOM in accordance with reference (s) and this Order.

b. Support the development of capability requirements to achieve MCTE interoperability.

c. Drive MCTE modernization through the identification of training and education gaps within HST.

d. Utilize RFMSS for Synthetic GTS scheduling at each major installation.

e. Ensure expenses and contributions to readiness levels resulting from Synthetic GTS training are accurately captured within the Marine Corps Training Information Management System (MCTIMS) in order to ensure effective resourcing analysis and allocation.

10. Commander, Marine Corps Systems Command (MARCORSYSCOM)

a. Determine the appropriate manpower and training analysis to be conducted based upon standard or nonstandard training elements to meet specific training requirements. Synthetic GTS referenced within this Order are considered nonstandard training systems. Definitions of standard and nonstandard training systems are stated below.

(1) Standard Training System. A training solution developed and / or acquired for use with a specific system (e.g., weapons platform, vehicle), family of systems, or item of equipment (including subassemblies and components). Standard Training Systems may be stand-alone, embedded, or appended.

(2) Nonstandard Training System. A training solution developed and / or acquired independent of, and not directly associated with, a specific weapon system or other item of equipment. Nonstandard training systems may support general military training, system-specific, and non-system specific training requirements.

b. Exercise management authority and accountability for assigned Marine Corps acquisition programs.

(1) Designate Program Manager Training Systems (PM TRASYS) as the MARCORSYSCOM program manager with responsibility for accomplishing program objectives, manpower and training analyses, acquisition, contract support, and total life cycle management of nonstandard training systems, to include training aids, devices, simulators, and simulations.

(a) PM TRASYS is responsible for establishing the configuration management of the functional, allocated, product and Acquisition Program Baselines for nonstandard training systems and maintaining them throughout the acquisition and system life cycle.

(b) PM TRASYS retains the authority and responsibility for approving any design changes, to include hardware and software, that affects the system's ability to meet specification requirements or change its configuration baseline.

(2) Other MARCORSYSCOM Program Managers have the responsibility for manpower and training analyses, acquisition, and life cycle management of standard training system solutions to support their respective programs.

c. Support all identified aspects of the FEA, the conduct of the Military Utility Assessment (MUA), the conduct of the Field User Evaluation (FUE), and the conduct of the Training Effectiveness Evaluation (TEE), in coordination with TECOM, as required, throughout each program life cycle.

## Chapter 2

### Formulating Requirements

#### 1. Capabilities Based Assessment (CBA)

a. The Marine Corps CBA process, defined within reference (l), is a deliberate and integrated enterprise process through which the Total Force conducts capabilities analysis, gap analysis, solutions analysis, and risk analysis.

b. TECOM Resource Sponsors and functional area SMEs will proactively engage in the CBA process to ensure potential materiel training system requirements are identified and addressed in a timely manner well in advance of fielding.

(1) This engagement will require consistent Command representation as well as SME participation to maintain visibility on all identified capabilities, gaps, solutions, and risks to identify potential impacts to TECOM and / or service-level training requirements.

(2) A Training System Requirements Analysis (TSRA) will be completed to determine if a materiel training system is required. If so, a simplified Training Device Decision Coordinating Paper (TDDCP) will be developed to identify alternative solutions, projected acquisition costs, and anticipated sustainment costs.

c. TECOM will continue to serve as the Training and Education pillar representative within the Total Force Structure Process, defined within reference (m), via the DOTMLPF-C WG.

d. Designated TECOM representatives will monitor new initiatives presented via the Urgent Needs Process (UNP) and the Deliberate Universal Needs Statement (DUNS) process.

(1) The UNP synchronizes accelerated requirements, resourcing, and acquisition processes to distribute mission-critical warfighting capabilities more rapidly than the deliberate processes permit.

(2) As such, anticipated Synthetic GTS require the same scrutiny as that of an operational capability to inform TECOM resource decisions. To this end, PM TRASYS will conduct a TSRA / TDDCP (as required) to identify training system alternatives, acquisition costs, and anticipated sustainment costs.

#### 2. Requirements Transition Process

a. The RTP is defined within reference (n).

b. Led by the Capabilities Development Directorate, DC CD&I, RTP is focused on requirements development and transition via Joint Capabilities Integration and Development System documentation and Business Capabilities Acquisition Cycle documentation to ensure valid and approved requirements are transitioned between DC CD&I and MARCORSSYSCOM or Program Executive Office Land Systems (PEO LS).

c. RTP 1.0 consists of the formal request for SME support from MARCORSYSCOM to assist the capability developer in drafting a requirements capability document. For a training device, PM TRASYS will conduct an FEA. TECOM will actively participate (For Action) in the process when drafting a Capabilities Development Document (CDD). The CDD will be based upon the results of the FEA.

d. RTP 2.0 includes formal staffing of the requirements document. RTP 2.0 will also drive the need for a draft Accreditation Plan, initiated by TECOM, while a draft FEA Report will be submitted by MARCORSYSCOM. RTP 2.5, which consists of a formal document review by the affected acquisition command following the staffing process, will also trigger the need for the Final Accreditation Plan.

e. RTP 3.0 is the formal transition of the validated capability document from the capability developer to the respective acquisition command.

### 3. Determining Service-Level Training Requirements

a. When a new initiative is identified via the CBA Process or DOTMLPF-C WG, TECOM will gain the appropriate insight, awareness, and visibility needed to inform initial decisions.

b. When appropriate, as determined by the Resource and Requirements Sponsor and the Program Manager, an FEA will be planned and initiated to determine / validate the following:

- (1) Impacted T&R communities;
- (2) Anticipated Mission Essential Tasks and T&R events;
- (3) Proposed new T&R events, as required.

### 4. Front End Analysis

a. The FEA is defined as a structured process used to examine Manpower, Personnel, and Training (MPT) requirements and identify alternative approaches to training tasks. Reference (o) outlines policy for MPT requirements for Navy and integrated Navy and Marine Corps programs.

b. MPT requirements related to all Marine Corps acquisition programs are addressed within Chapter 8 of reference (m).

c. The MPT Plan aims to "identify manpower, personnel, and training requirements including: concepts, strategies, constraints, risks, data, resources, and guides manpower, personnel, and budget submissions." Specific to Synthetic GTS, the training system is the operational capability; therefore, these actions must take place early in the capability development process via an FEA.

d. The FEA process identifies associated tasks, determines required knowledge and skills, assesses potential instructional learning technologies, required training system attributes and provides cost and schedule comparisons for feasible alternatives. Acquisition decisions must be made based on a rigorous FEA process that provides early insight into these MPT-related items. FEA results will inform T&R standards and the accreditation plan.

## Chapter 3

### Ensuring Training Effectiveness

1. Background. To ensure a Synthetic GTS will support training requirements, a series of tests will be conducted prior to full fielding. In doing so, TECOM will ensure the training system meets a minimum training standard, under various conditions, in accordance with applicable T&R tasks in advance of fielding. These tests consist of the Military Utility Assessment (MUA), the Field User Evaluation (FUE), and the Training Effectiveness Evaluation (TEE).

#### 2. Military Utility Assessment

a. The Marine Corps will conduct a MUA on training system prototypes.

b. Detailed execution will be the result of the MUA Plan, which will be shaped at the onset of the FEA.

c. The conduct of the MUA will be a coordinated effort between the Resource and Requirements Sponsor and the Program Manager.

d. Per reference (p), the MUA provides a determination of how well a capability or system in question responds to a stated military need, to include a determination of its potential effectiveness and suitability in performing the mission. Military utility is measured against the operational concept, operational effectiveness, safety, security, and cost / worth.

e. Related to training systems, the MUA will focus on demonstrating value toward training effectiveness. Training effectiveness is unique to each system. Determining appropriate training effectiveness metrics will be identified within the FEA.

f. A MUA is conducted when a new training modality is being considered, such as an augmented reality head-mounted display.

g. The MUA is conducted as early as possible in the development process to help determine the technological readiness level of the proposed solution.

h. The MUA is conducted with representatives of the intended training audience in a structured environment, likely at the user's home-station.

i. Military utility estimates form a rational basis for making investment decisions.

#### 3. Field User Evaluation

a. Upon successful completion of system verification testing and a system verification review, a FUE will be performed. The conduct of the FUE will be a coordinated effort between the Resource and Requirements Sponsor and the Program Manager.

b. Per reference (q), a FUE is a "developmental test conducted using representative operators... and typically conducted to help define system requirements."

c. Usability testing may be incorporated within the FUE to "evaluate the system's ability to accurately and efficiently aid the operator in performing required tasks."

d. The structure and execution of the FUE will focus upon the criteria specified in the training system Accreditation Plan developed in concert with the FEA.

e. All FUEs will include a FUE Plan prior to execution and a FUE Report upon conclusion.

f. The FUE Report will be used as input into the training system accreditation decision process.

#### 4. Training Effectiveness Evaluation

a. Reference (o) defines the TEE as an analysis of training capability and potential value of a training system in enabling students to execute identified T&R tasks to standard.

b. The TEE, shaped by a TEE Plan, consists of various components addressing training effectiveness.

(1) A TEE Plan is a plan for evaluating the effectiveness of a training system in meeting its criteria for specific training objectives.

(2) The TEE Plan addresses host activity and location of training site(s), identification of lead and supporting organizations and personnel, students and support personnel, and the "ready for training date," which is synonymous with the Initial Operating Capability date within the Marine Corps.

(3) The TEE Plan addresses the evaluation strategy, system description, evaluation goals, associated T&R tasks and impacted communities, applicable training scenarios (as part of a TSP), data collection procedures, schedule, and additional resources needed to conduct the TEE.

c. The initial TEE is typically performed within six months of initial fielding and more than one TEE will likely take place within a program life cycle to ensure the value of the training system. The conduct of the TEE will be a coordinated effort between the Resource and Requirements Sponsor and the Program Manager.

## Chapter 4

### Training System Accreditation

#### 1. Verification, Validation, and Accreditation (VV&A)

a. Synthetic GTS Accreditation will leverage the verification and validation steps from the systems engineering process.

b. The VV&A process, as defined within reference (r), is specific to Modeling and Simulation systems and primarily focused on system attributes.

c. The purpose of the VV&A is to ensure the development of correct and valid simulations; to include the model within the simulator, and determine if the simulation is sufficient to meet a need. Related to Synthetic GTS, VV&A aims to ensure the training system will meet its intended purpose.

d. The VV&A process is initiated by the development of an Accreditation Plan by the Resource Sponsor.

e. System Verification and Validation must be conducted to evaluate the correctness of the underlying simulations.

f. The MUA and FUE play important roles within VV&A by determining if the training system is a valid system to meet the training system requirements identified in the FEA - a key contributor to an accreditation decision.

#### 2. Verification

a. Verification is the formal test / review process that determines if the system accurately represents the developer's conceptual description and specifications.

b. Successful Verification means that the system functions as stated and aims to answer the question: Did we build the training system correctly? Verification is the responsibility of the Program Manager.

#### 3. Validation

a. Validation is the formal test / review process that determines the degree to which a training system provides an accurate representation of the real world from the perspective of the intended use.

b. Validation measures how closely the training system looks and acts like the real thing (e.g., operationally representative) in the context of the training objectives.

c. Validation aims to answer the question: Did we build the right training system?

d. Validation is the responsibility of the Program Manager.

4. Accreditation

a. Accreditation is the official certification that a training system is acceptable for use for a specified purpose. Accreditation aims to answer the question: Should the training system be used to support training?

b. Accreditation begins with an Accreditation Plan.

(1) This plan is informed by FEA results, establishes the inputs (e.g., T&R events and FUE Report), criteria, and measures that must be provided to inform the accreditation decision.

(2) This should include expected outcomes and the types of recommendations derived from the supporting test events.

c. Accreditation is the responsibility of the Resource Sponsor.

d. Successful accreditation suggests a training system is or has been adequately designed to meet a specified purpose, fulfilling a training gap.

e. The accreditation authority is CG TECOM.

## Chapter 5

### Sustainment and Modernization

#### 1. Divest to Invest Strategy

a. If a training system does not add value, has become outdated, or has lost its relevance and / or technological edge, the Resource Sponsor must assess the system's anticipated future utility to determine the need to modernize the system, or divest of the system for re-investment of associated resources elsewhere.

b. Re-investment may apply to system modernization or capability refresh internal or external to the respective program.

c. TECOM and the user community must routinely seek to determine training system utility related to existing capabilities and operational demands.

(1) The stakeholder community must assess the anticipated skill proficiency gains realized as a result of utilizing the training system, while the resource sponsor determines if those gains are justifiable from a cost perspective. If not, the Resource Sponsor and Program Manager must take action.

(2) Resource Sponsors must remain aware of the impact of their program(s) and be prepared to make resource recommendations to DC P&R based upon potential performance shortfalls.

d. Investment / Divestment decisions require stakeholder engagement to include the FMF to gain a qualitative insight on training system utility, DC I&L to inform facilities support and logistical implications, and DC P&R to document the reallocation of resources and the justification of that decision.

#### 2. Informing a Utility Score

a. The metrics identified below are intended to serve as an example that broadly applies to all training systems supporting investment / sustainment decisions related to fielded capabilities. TECOM will utilize these metrics to inform resource decisions related to TECOM-sponsored Synthetic GTS.

- (1) Expected Utilization
- (2) Total Capacity
- (3) Actual Utilization
- (4) Expected Utilization Achieved
- (5) Student Performance
- (6) Cost

b. Expected Utilization: Expected Utilization is determined by system, unit type, and location.

(1) How many students are expected to utilize the system?

(2) This is more than demand; expected utilization determines what unit types should utilize the training system, what T&R events are supported, and their associated sustainment interval.

(3) Expected Utilization serves as a predictor of demand by number of supported units, by system, and by site.

c. Total Capacity: Total Capacity is determined by system capabilities and system quantity for each location.

(1) How many students does the system support by location?

(2) Synthetic GTS will leverage Range and Training Area estimates reflected within reference (s), which establishes a Marine Corps standard of 242 training days available per year.

(a) This number is determined by subtracting all weekends, federal holidays, and additional days for inclement weather and maintenance.

(b) Capacity for one training system is determined by considering 242 eight-hour training days per year.

(c) Anomalies may exist, but surge requirements are included in this estimate over the course of one year.

(d) If the Total Capacity is less than the Expected Utilization, this is an indicator that additional systems are needed; however, Expected Utilization Achieved should also be considered.

d. Actual Utilization: Actual Utilization is reported using the same metrics as Expected Utilization and Total Capacity.

(1) How many students used the system at each site?

(2) This variable is unlikely to be greater than Total Capacity, and in many cases may be considerably less. Competing unit demands often affect Actual Utilization.

(3) Of those units and supported T&R events described within Expected Utilization, this metric aims to determine how many Marines actually conducted training.

e. Expected Utilization Achieved: Expected Utilization Achieved is determined by dividing Actual Utilization by Expected Utilization, reflected as a percentage.

(1) This variable will be consolidated weekly, monthly, quarterly, and annually per fiscal year. In the near-term, utilization will be recorded and reported via RFMSS data and contract support. In a future state, utilization of all training systems will be ideally recorded within MCTIMS to tie resources to readiness.

(2) This measure helps answer the question: Are we on target, below target, or above target per system, per location?

f. Student Performance: Student Performance is determined by applying a quantitative performance assessment method to provide a quantitative score related to student performance.

(1) Skill proficiency will be assessed and recorded during HST to inform program evaluation. Formative and summative assessment will be part of each course delivered across Synthetic GTS employed within HST.

(2) The aim of recording student performance attributes within HST is to:

(a) Inform individual remediation requirements, and;

(b) Aggregate the data to compare and contrast unit performance within SLTE.

(3) Positive and negative trends will inform changes to existing curricula and ultimately inform resource decisions.

g. Cost: Cost is determined by total operations and sustainment costs of each training system.

(1) If multiple training systems are funded by the same funding source, they must be assessed independently to determine true cost.

(2) Cost Savings and Cost Avoidance must also be considered when addressing Total Cost. What is the total annual operations and sustainment cost of a training system across all locations?

(a) Cost Savings can be generally defined as budgeted expenditures that are unrealized and can, therefore, be used elsewhere as a result of a change to a plan or optimization. With respect to training systems, Cost Savings can be achieved if a training device has a known impact on the training timeline (e.g., the device has reduced the time required to achieve the required proficiency from 10 days to five days).

(b) Cost Avoidance provides a means to measure the effect of reducing future expenses on total costs. In this context, Cost Avoidance refers to expenses that can be avoided through the use of a training system vice conducting live training. For example, fuel expended while learning to drive a vehicle, fuel expended driving a tactical vehicle to a range, ammunition savings, reduced wear and tear on tactical equipment, and reduced consumables are examples of costs that could be avoided while leveraging a training system. These costs avoided will be factored into the utility score.

## Chapter 6

### Training and Support

1. Introduction. TECOM maintains an inherent responsibility to ensure training capabilities employed throughout the FMF are current, relevant, and support increased skill proficiency leading toward operational readiness. To achieve this objective, TECOM will manage a comprehensive Synthetic GTS training program inclusive of instructional materials and operators / instructors to conduct training execution.

2. Instructional Systems Design. ISD efforts in support of TECOM-sponsored Synthetic GTS will be managed by TECOM. The requiring activity will nominate a Contracting Officer's Representative to the contracting activity. The nominee shall be qualified by training and experience commensurate with the responsibilities to be delegated. The organization that is funding ISD support from its operating budget is typically the requiring activity.

3. Training Execution. Training provided to the intended training audience in support of increased skill proficiency toward assigned T&R tasks will be resourced and developed by the resource sponsor.

a. Training will include formative and summative assessment to record individual student performance. This will inform immediate, individual remediation requirements and inform program evaluation in the aggregate.

b. Although these systems are resourced by TECOM, RTPD, which is not a Formal Learning Center, training execution will be guided by references (u) and (v).

c. Associated curricula will be visited routinely based upon assessment and evaluation data indicative of positive and negative trends.

d. Each Course Content Review Board (CCRB) will be led by TECOM and include stakeholder representation from TECOM, MARCORSYSCOM, DC I&L, applicable formal schools, FMF representatives, and other designated stakeholders, as required.

e. Training execution will generally be managed by TECOM via contract support.

#### 4. Systems Support

a. Systems Support is inclusive of infrastructure, facilities, and logistical support provided by the installations. Systems Support requirements will be coordinated by TECOM, DC I&L, and MARCORSYSCOM prior to system fielding.

b. Changes to Synthetic GTS Support concepts will be planned and coordinated by TECOM, DC I&L, and MARCORSYSCOM for each change impacting training execution. Systems Support concepts will be routinely addressed via appropriate channels to ensure FMF awareness and contribution to the decision making process.

## Chapter 7

### Assessment and Evaluation

1. Introduction. The following methods outline TECOM's approach to conducting assessment and evaluation.

a. To inform Return on Investment (ROI), the Marine Corps must conduct assessment of student performance and evaluation of training systems and programs.

b. In the context of this Order, assessment refers to student performance (e.g., How well did the student or training audience perform?), while evaluation refers to the training instruction, system, or program (e.g., How well did the system support the training objectives? What was the impact as a result of the training?).

c. Return on Expectations (ROE) is often described as the ultimate indicator of value because it is designed and implemented in close collaboration with those SMEs who will define what success looks like within their organization or community. These attributes can be seen as critical performance indicators or behaviors. Critical behaviors, when performed, produce results that are important to the organization or community, which, in turn determine the ROE for training and education programs.

d. Training and Education Assessment is focused on student performance, and conducted in the form of a formative or summative assessment.

(1) A formative assessment may be compared to a quiz, while a summative assessment could be compared to a final exam.

(2) In the context of Marine Corps training, an example of a formative assessment may be a rehearsal at home station, while a summative assessment is ideally a culminating event, such as a live-fire event at a SLTE, or within a Marine Corps Combat Readiness Evaluation.

e. Quantitative performance assessment at different intervals benefits the readiness of the unit. It also provides a means to measure performance at different stages of a "work-up" period or phases of unit composition based upon manpower strength.

(1) Remediation is a must at all levels, and can be informed through quantitative performance assessment.

(2) The underlying purpose of assessment is to gauge individual and unit performance rather than highlight imperfections.

f. Evaluation, on the other hand, is for the training institution, from small unit leader, to training system Resource Sponsor, to formal schools and service-level training installations to determine the impact of the training curriculum or event.

(1) Is the training capability having the desired impact (e.g., supporting increased skill proficiency and improved operational readiness)?

(2) Training program evaluation is most often based upon the Kirkpatrick model, which includes four levels of evaluation. These are: 1)

student reaction; 2) knowledge, skills, and attitudes; 3) student behaviors; and, 4) results, or impact.

(3) Formal Schools conduct evaluation at multiple levels of the Kirkpatrick model through the conduct of the CCRB, Institutional Effectiveness Processes, T&R Conferences, and addressing feedback from associated Operational Advisory Group(s). However, evaluation of HST capabilities presents a significant opportunity for service-wide improvement toward informing resource decisions based upon objective data.

g. The Service maintains an inherent responsibility across the enterprise to seek improvement, add realism, and strive toward better training capabilities and experiences. TECOM will collect data to address the perspective of the student, the operator / instructor, and unit leadership to fully understand the user's perspective.

h. Reference (t) provides TECOM guidance on the collection, synthesis, and reporting of data that will inform training and education programs and support service-level decisions while providing a ROI / ROE determination.

i. The collected and analyzed data, resulting from implementing the assessment and evaluation plan, establishes the basis for continuous improvement.

## 2. Quantitative Performance Assessment

a. When using a training system to support training, it should make us better; increasing skill proficiency and, therefore, operational readiness. Within a given T&R Manual, training systems, listed as a training resource, must be identified to support complete or partial task completion.

b. To determine the benefits of a training system, the Marine Corps requires a quantitative means to do so.

(1) At present, assessing student performance and evaluating training system effectiveness are both largely based on qualitative feedback.

(2) While qualitative feedback is valuable, this subjective feedback, alone, does not provide the data necessary to prioritize and fund training capabilities, nor does it allow the Resource Sponsor to identify where improvements should be made. In cases where quantitative evaluation is not possible, leaders will continue to use qualitative feedback to evaluate program effectiveness, by exception.

(3) The ROE approach outlined within reference (t) outlines the combined use of both qualitative and quantitative measures to provide a holistic and balanced evaluation of program benefits and effectiveness.

c. By implementing a model to quantitatively assess student / unit performance, TECOM and unit commanders receive quantifiable evidence of unit improvement to complement subjective feedback. Quantitative Performance Assessment benefits unit commanders by providing comparable results of unit training to optimize remediation and drive improvements toward operational readiness across the training continuum.

d. Consolidating student performance scores over time would indicate a correlation between student performance and the training objectives of the

supporting training system. A positive correlation would suggest the instruction is having the desired outcome, while a negative correlation, or no improvement, between utilization of a training system and student performance would suggest a need to determine the root cause, likely prompting the need to conduct an additional TEE.

### 3. Comprehensive Training Assessment

a. Assessment of a single training event may be approached from multiple perspectives based upon the desired outcomes.

(1) For a routine, squad-level live-fire event, assessment can be conducted on the performance of the individual Marines, the fire team leaders, the squad leader, the platoon commander, supporting arms, or all of the above.

(2) The training provider or unit leadership must determine if they are assessing skill proficiency of the primary training audience, the small unit leader, or the effects of the action.

(3) Each T&R task has a technical aspect - are the minimum performance standards being met? This is important to fundamental skill development. Nobody is an expert the first time they perform a task, but can become proficient through repetition.

(4) Each T&R task has a tactical aspect - Are we performing the task correctly?

(5) Lastly, a T&R event resulting in observable effects can simply look at those desired effects to determine if the actions worked or not. Did the rounds hit the target?

b. To conduct assessment in a comprehensive manner, all of these aspects must be considered to inform the following:

(1) Program evaluation seeking improvement upon existing training;

(2) To address systemic trends;

(3) To make a minor change in a course curriculum, or;

(4) To conduct an analysis to make significant changes to an event or training program.

c. Consideration must be given to multiple factors when identifying a trend based upon assessment and evaluation.

(1) A trend, whether positive or negative, does not present itself unless the data is recorded and analyzed.

(2) A trend is something repeated by a significant number of Marines and / or units and based upon data in the aggregate.

(3) Functional SMEs must support policymakers, and vice versa, to determine the criteria against which trends are identified, and only then can training effectiveness be measured.

## Chapter 8

### Scheduling and Utilization

1. Objective. RFMSS will be utilized to schedule the use of Synthetic GTS and record utilization data required to inform resource decisions in accordance with reference (s). In a future state, MCTIMS would be the ideal system to record system utilization as a training resource and tie resources to readiness.

2. Background. In support of the Commandant's intent, a significant effort is currently underway to align property management and accountability of all TECOM-sponsored Synthetic GTS to TECOM.

a. In doing so, CG TECOM, and the Resource and Requirements Sponsor, will achieve visibility of Synthetic GTS to inform resource decisions throughout a system's life cycle.

b. These actions provide TECOM with quantifiable data from which to conduct objective decision making aimed at sustainment and modernization of current capabilities.

3. Approach. TECOM will implement a standardized GTS nomenclature to uniquely identify an individual system and location for Synthetic GTS utilized across all installations.

a. The nomenclature will be standardized as follows: "System Name-Number-Location." For example, the Facility Name field for the Supporting Arms Virtual Trainer (SAVT) located at Las Pulgas, Camp Pendleton will read "SAVT-001-PULGAS" in RFMSS.

b. From RFMSS data, the TECOM resource sponsor will obtain the following:

- (1) Specific System (e.g., SAVT-001-PULGAS)
- (2) Unit
- (3) Date Time Group Scheduled
- (4) Event Name (e.g., Call for Fire, FiST Team Operations, Patrolling, etc.)
- (5) Actual Utilization
- (6) Marines Trained

(7) Instances of co-use, cancellations within 24 hours of the scheduled training event, and no-shows

c. TECOM will resource additional RFMSS scheduling capacity across the installations to adequately support this requirement.

d. Utilization prioritization will continue to be managed by the senior tenant command/activity at the installation or by the installation, itself.

e. Exceptions to RFMSS Scheduling:

(1) Any GTS residing within a Formal Learning Center (FLC) solely used by the FLC to support a Program of Instruction

(2) Any GTS used solely by one unit (e.g., Gunnery Turret Trainer used solely by AA Bn or LAR Bn)

(3) Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) System. MTWS does not require RFMSS scheduling as it is not directly employed by the end user. MTWS is employed by Exercise Design, Support, and Control personnel.

(4) NOTE: All GTS users meeting this exclusion criteria will be required to report system utilization via separate correspondence.

Appendix A

Glossary of Acronyms and Abbreviations

AA BN	Assault Amphibian Battalion
CACCTUS	Combined Arms Command and Control Training Upgrade System
CBA	Capabilities Based Assessment
CCRB	Course Content Review Board
CCS	Combat Convoy Simulator
CG TECOM	Commanding General, Training and Education Command
DC CD&I	Deputy Commandant, Combat Development and Integration
DC I&L	Deputy Commandant, Installations and Logistics
DC P&R	Deputy Commandant, Programs and Resources
DON	Department of the Navy
DOTMLPF-C	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities with Cost Awareness
DVTE	Distributed Virtual Training Environment
ELT	Entry Level Training
FEA	Front End Analysis
FiST	Fire Support Team
FLC	Formal Learning Center
FMF	Fleet Marine Forces
FUE	Field User Evaluation
GTS	Ground Training Systems
HEAT	HMMWV Egress Assistance Trainer
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HST	Home Station Training
ISD	Instructional Systems Design
ISMT	Indoor Simulated Marksmanship Trainer
JET	JLTV Egress Trainer
JLTV	Joint Light Tactical Vehicle
JLVC	Joint Live Virtual and Constructive
LAR BN	Light Armored Reconnaissance Battalion
LVC	Live, Virtual, and Constructive
MAET	Modular Amphibious Egress Trainer
MAGTF	Marine Air Ground Task Force
MAGTFTC	Marine Air Ground Task Force Training Command
MARCORSYSCOM	Marine Corps Systems Command
MCDT	Marine Corps Driver Trainer
MCIEE	Marine Corps Information Environment Enterprise
MCTE	Marine Corps Training Environment
MCTIMS	Marine Corps Training Information Management System
MET	MRAP Egress Trainer
MPT	Manpower, Personnel, and Training
MRAP	Mine-Resistant Ambush Protected
MTWS	MAGTF Tactical Warfare Simulation
MUA	Military Utility Assessment
ODS	Operator Driver Simulator
PII	Personally Identifiable Information
PM TRASYS	Program Manager, Training Systems
PPBE	Planning, Programming, Budgeting, and Execution
RFMSS	Range Facility Management Support System

ROE	Return on Expectations
ROI	Return on Investment
RTP	Requirements Transition Process
RTPD	Range and Training Programs Division
SAVT	Supporting Arms Virtual Trainer
SLTE	Service Level Training Event
SME	Subject Matter Experts
SVET	Submerged Vehicle Egress Trainer
SWET	Shallow Water Egress Trainer
T&R	Training and Readiness
TDDCP	Training Device Decision Coordinating Paper
TEE	Training Effectiveness Evaluation
TSRA	Training System Requirements Analysis
UNP	Urgent Needs Process
VV&A	Verification, Validation, and Accreditation
WG	Working Group

Appendix B

Applicable Synthetic Ground Training Systems

- Combined Arms Command and Control Training Upgrade System (CACCTUS)
- Distributed Virtual Training Environment (DVTE)
- Supporting Arms Virtual Trainer (SAVT)
- Indoor Simulated Marksmanship Trainer (ISMT)
- MAGTF Tactical Warfare Simulation (MTWS)
- Marine Corps Driver Trainer (MCDT)<sup>1</sup>
- Operator Driver Simulator (ODS)<sup>1</sup>
- Combat Convoy Simulator (CCS)
- Modular Amphibious Egress Trainer (MAET)<sup>2</sup>
- Submerged Vehicle Egress Trainer (SVET)<sup>2</sup>
- Shallow Water Egress Trainer (SWET)<sup>2</sup>
- High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer (HEAT)<sup>3</sup>
- Joint Light Tactical Vehicle (JLTV) Egress Trainer (JET)<sup>3</sup>
- Mine-Resistant Ambush Protected (MRAP) Egress Trainer (MET)<sup>3</sup>

NOTES:

<sup>1</sup> MCDT is currently replacing the ODS.

<sup>2</sup> MAET, SVET, and SWET encompass all TECOM-sponsored Underwater Egress Training capabilities.

<sup>3</sup> HEAT, JET, and MET encompass all TECOM-sponsored Dry Rollover Egress Training capabilities.