JOINT TEST AND EVALUATION METHODOLOGY (JTEM)

PROGRAM MANAGER'S HANDBOOK FOR TESTING IN A JOINT ENVIRONMENT

Approved By:
Maximo Lorenzo
Joint Test Director
JTEM JT&E

Maximo Lorenzo

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OFFICE OF THE SECRETARY OF DEFENSE
1700 DEFENSE PENTAGON
WASHINGTON, DC 20301-1700

OPERATIONAL TEST
AND EVALUATION

OSD-JT&E

SUBJECT: The Capability Test Methodology (CTM) for Testing in a Joint Environment

The Department of Defense is transforming the way it uses and acquires new systems and capabilities. New weapon systems, force structure, and doctrine are increasingly "born joint." Effective test and evaluation is becoming more difficult across the entire acquisition process as individual platforms become part of complex, networked system of systems that should interoperate and depend upon each other in a battlespace made up of air, land, and maritime forces.

Recognizing these challenges, the Deputy Secretary of Defense approved a Testing in a Joint Environment Roadmap that addresses test infrastructure and standards, methods and processes, and policy and assigned the Director, Operational Test and Evaluation (DOT&E), the responsibility of overseeing its implementation. Subsequently, DOT&E chartered the Joint Test and Evaluation Methodology (JTEM) Joint Test and Evaluation to develop and test a methodology to support conducting the test and evaluation of an acquisition system or system of systems in a distributed joint environment using live, virtual, and constructive elements.

In response to this charter, the JTEM JT&E has developed the Capability Test Methodology (CTM), which is encapsulated in the following three handbooks: *Program Manager's Handbook for Testing in a Joint Environment, Action Officer's Handbook for Testing in a Joint Environment,* and *Analyst's Handbook for Testing in a Joint Environment.* These three CTM handbooks are designed to provide best practices to augment existing Service methods and processes for testing in this new environment. The recommended processes can be scaled as needed to accommodate different sizes and types of acquisitions. The CTM is a comprehensive approach, but also offers individual processes that can be integrated with existing Service methods.

These processes will be updated with lessons learned from the components. Feedback should be addressed to the Director, Operational Test and Evaluation, 1700 Defense Pentagon, Room 1D548, Washington, DC, 20301-1700.

M.D. Crisp
Deputy Director, Air Warfare
Operational Test and Evaluation

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EXECUTIVE SUMMARY

Warfare has evolved such that nearly all conflicts are conducted in a joint environment. Department of Defense Instruction (DoDI) 5000.02 requires that the joint environment be replicated as part of realistic testing of the Department of Defense's (DoD) acquisition programs. Because bringing together live units to accomplish this, as currently done, in traditional testing is very difficult, a new approach using live, virtual, and constructive elements over a distributed network is needed.

The *Testing in a Joint Environment Roadmap* (TIJE Roadmap), approved by the Deputy Secretary of Defense (DepSecDef) on November 12, 2004, identified changes to policy, procedures, and test infrastructure necessary to ensure the Services can conduct test and evaluation (T&E) in joint mission environments (JME) in a way that will improve the effectiveness of systems, systems of systems (SoS), or capabilities in their intended joint operational environments.

The Joint Test and Evaluation Methodology (JTEM) Joint Test and Evaluation (JT&E) is one initiative that resulted from the TIJE Roadmap. JTEM was chartered in 2006 to develop methods and processes for testing in a JME. The Capability Test Methodology (CTM) and its associated products represent the outcome of this effort towards developing improved methods and processes for assessing the contribution of a system or SoS before it is fielded. The intended outcome is an improvement in the T&E processes of systems or SoS.[1]

The CTM is comprised of three publications:

- *Program Manager's Handbook for Testing in a Joint Environment* (PM's Handbook)
- *Action Officer's Handbook for Testing in a Joint Environment* (AO's Handbook)
- *Analyst's Handbook for Testing in a Joint Environment* (Analyst's Handbook)

This PM's Handbook is an overview of what is involved with implementing the CTM for testing in a JME. It provides an introductory-level description of the CTM for testing in a JME and the associated measures framework, and discusses other DoD initiatives that support testing in a joint environment. It also serves as a follow-up to the three-hour Continuous Learning Module, *Testing in a Joint Environment* (CLE 029), hosted on-line by the Defense Acquisition University at: https://learn.dau.mil/html/login/login.jsp. The other two handbooks, published separately, are detailed instruction books intended as user guides for implementing the CTM.

The PM's Handbook contains four chapters. Chapter 1 is an overview of testing in a JME and explains some of the key factors that augment the traditional T&E practices. It offers the reader some of the expected advantages from adopting any or all of the associated methods and processes of the CTM.

Chapter 2 is an overview of the CTM and its model-based foundation. The CTM is organized in a view that aligns the principal steps of the CTM with phases of a system's development life

[1] The CTM is scalable and easily tailored for the level of detail necessary to support acquisition programs of various scopes and sizes. In most cases in this handbook, discussion will apply equally to testing of a single system, larger systems or system of systems (SoS), family of systems, federations, capability solutions, etc. For brevity, this summary will refer to all of these as systems or SoS.

cycle as described in the Defense Acquisition System. For execution, the CTM is implemented by threads, each designed to collect the processes relevant to the different participating communities within an acquisition program's T&E team. The threads are described in a series of CTM user guides compiled in the AO's Handbook.

Chapter 3 provides more detail on the measures framework for testing in a JME. Assessing a system's contribution as part of an SoS to achieving the intended mission outcomes generally requires a broader set of measures than traditionally used. The measures framework builds upon the commonly used system parameters and mission task metrics and introduces mission measures of effectiveness (Mission MOE) and critical capability issues (CCI). These measures can help assess how well the system under test contributes to the broader joint mission.

Chapter 4 is a description of the test environment assembled in the CTM processes to help reproduce the system's intended JME. It introduces the Joint Operational Context for Test (JOC-T) which describes the elements that, when addressed, will result in a suitable test environment for assessing whether or not a system provides the intended capability or the desired joint mission effectiveness (JMe).

The PM's Handbook also contains an annex explaining some of the initiatives the user should be familiar with when applying certain processes of the CTM. Although this will be a refresher for most acquisition professionals, it is also intended to benefit warfighters who may be unfamiliar with these or who have recently returned to acquisition or T&E communities, and are therefore not familiar with recent changes associated with the Defense Acquisition System.

A complete description of the CTM can be found in the AO's Handbook, which includes all of the detailed guidance, templates, and checklists required to support members of a Program Test Integrated Product Team (IPT) in their execution of the program acquisition life cycle, and to enable tailored CTM product implementations based on a program's objectives and phase within the acquisition life cycle.

The third book, the Analyst's Handbook, is a compilation of analytical processes supporting the development of the measures, collection of the data, and the analyses and syntheses necessary to produce an evaluation of a system's JMe.

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OVERVIEW

"Systems that provide capabilities for joint missions shall be tested in the expected joint operational environment."

~ DoDI 5000.02, E.6 [December 8, 2008]

1.1 INTRODUCTION

Acquisition program managers (PM) were directed to demonstrate the systems and capabilities they develop by performing testing in a joint mission environment (JME). This handbook was written to help PMs and their development teams understand and address the Department of Defense's (DoD) vision of testing in a JME in the coming years, and to present a compendium of recommended best practices that can facilitate testing in a JME.

This handbook and the accompanying *Action Officer's Handbook for Testing in a Joint Environment* (AO's Handbook) and *Analyst's Handbook for Testing in a Joint Environment* (Analyst's Handbook) comprise the Capability Test Methodology (CTM) and are provided as a means to improve the process of developing and implementing testing in a JME.

1.2 BACKGROUND

The *Testing in a Joint Environment Roadmap, Strategic Planning Guidance, Fiscal Years 2006-2011, Final Report*[2] (hereafter referred to as TIJE Roadmap), approved by the Deputy Secretary of Defense identifies changes to policy, procedures, and test infrastructure to enable test and evaluation (T&E) in JMEs. Large-scale testing in JMEs is generally not possible at any single test facility because of limitations in facility infrastructure or force availability. Instead, combinations of live, virtual, constructive (LVC) systems linked through networks into a single distributed environment can form an LVC JME for testing a system of systems (SoS).

The Deputy Director, Air Warfare (DD,AW), Operational Test and Evaluation (OT&E), Office of the Secretary of Defense (OSD) chartered the Joint Test and Evaluation Methodology (JTEM) Joint Test and Evaluation (JT&E) on February 15, 2006,[3] to develop, test, and evaluate a methodology for defining and using an LVC joint test environment to evaluate the performance and joint mission effectiveness (JMe) of systems and SoS. The JTEM JT&E charter designated Director, Operational Test and Evaluation (DOT&E) as the lead agency and executive agent for this effort, and identified the US Army, Navy, Air Force, Marine Corps, and the Unified Commands as participating Services/commands.

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[2] *Testing in a Joint Environment Roadmap, Strategic Planning Guidance, Fiscal Years 2006-2011, Final Report*, November 12, 2004.

[3] Office of the Secretary of Defense, Charter, Joint Test and Evaluation Methodology, Joint Test and Evaluation, February 15, 2006, signed January 24, 2006.

In response to this charter, the JTEM JT&E developed the CTM for testing in a JME. The CTM is designed to facilitate evaluating a test article's contribution to JMe from the perspective of the capability that it was designed to deliver in response to a stated joint capability requirement. To support the wide range of testing, the CTM is equally applicable to testing of an individual acquisition system, to larger SoS, or to non-materiel solutions, and can be used for other testing applications such as joint experimentation.

CTM does not replace the existing procedures and practices of the various test organizations within the DoD, but rather augments those practices. It provides a number of tools that can help a user define complex test environments, determine measurement requirements, design test events, and establish evaluation products in support of capability testing. The CTM is scalable, the user can select the most beneficial and applicable processes for use. The CTM processes and products described in these guides are suitable for the full scope of acquisition T&E, including developmental test and evaluation (DT&E), OT&E, and follow-on test and evaluation (FOT&E).

The CTM is a logical process that leads PMs and test managers through the planning process to tailor and optimize a test to demonstrate joint capabilities and to assess system performance. Some of the advantages it offers to acquisition PMs and their test teams include:

- Provides an easily-tailored approach that can be used to demonstrate the performance of capability solutions, including the T&E of Service or joint systems or SoS. The CTM augments (but does not replace) existing DoD and Service test processes.
- Provides requirements traceability across multiple DoD processes, namely Analytic Agenda, Joint Capabilities Integration and Development System (JCIDS), DoD architecture framework (DoDAF), and the Defense Acquisition System.
- Facilitates performing complex, realistic testing with limited resources via the use, and reuse, of a live, virtual, constructive distributed environment (LVC-DE).
- Provides a consistent approach to describing, building, and using an appropriate representation of a particular JME across the acquisition life cycle.
- Helps to assess interdependencies among systems.
- Reduces cycle time for development and testing.
- Increases speed of data collection, reduction, analysis, and evaluation.
- Facilitates integrating DT&E and OT&E.
- Supports Defense Science Board (DSB) recommendation[4] to provide an operational evaluation framework to be used as part of the Test and Evaluation Master Plan (TEMP) at Milestone B.

It is important to note testing in a JME will not necessarily add a separate test or phase of testing, but applies instead to demonstrating capability solutions as in system and SoS development across the entire acquisition life cycle and for the full scope of testing, including DT&E and OT&E.

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[4] Office of the Under Secretary of Defense for Acquisition Technology and Logistics, *Report of the Defense Science Board Task Force on Developmental Test and Evaluation*, May 2008.

As shown in Figure 1-1, the actual representation of the JME may involve a mix of live assets, virtual simulations, and constructive models depending upon the supported activity at any given point in the life cycle.

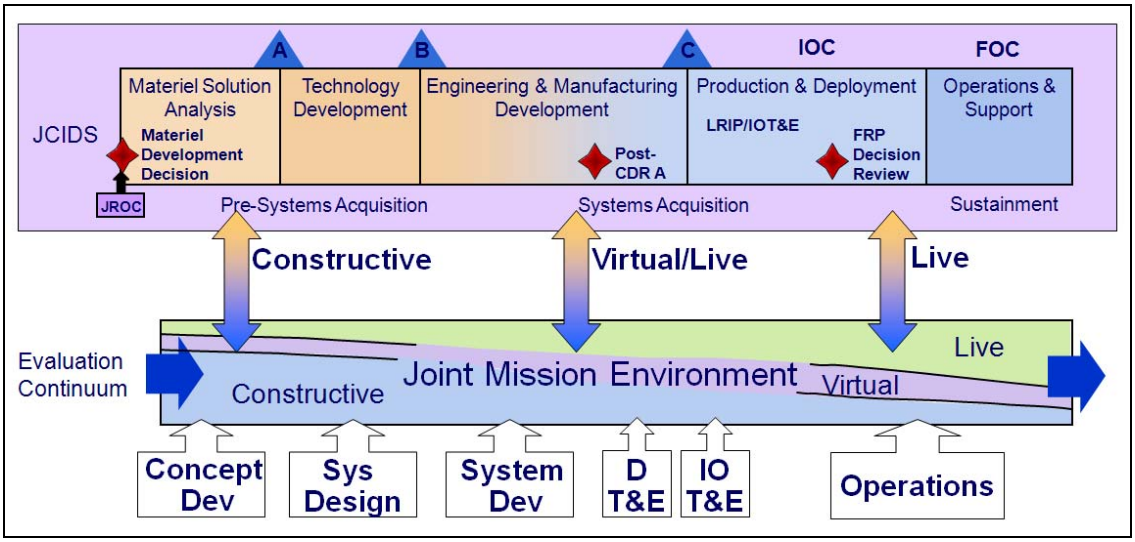

Figure 1-1. Testing Across the Acquisition Life Cycle

For example, constructive and virtual simulations might be used during capability gap analysis and Analysis of Alternatives (AoA). These would be helpful in determining capability shortfalls and the system/SoS attributes needed to address those shortfalls. Similarly, constructive simulations might be used for early (prior to initial design reviews) refinement of systems or SoS. During DT&E, developers can use constructive or virtual simulations to assess system performance and how it supports joint mission capabilities. In early Operational Assessments, operational testers can use constructive and virtual system representations to assess trends in JMe. In Initial OT&E (IOT&E), a production-representative live system can interact with other supporting systems using an appropriate mix of live systems and simulations to evaluate overall system effectiveness and suitability.

1.3 A MEASURES FRAMEWORK FOR EVALUATING TASK AND MISSION EFFECTIVENESS

Although "effectiveness"[5] has always included the mission dimension, the CTM provides an analytical framework for synthesizing system, task and mission measurements to derive JMe. These three measurement levels can be used independently or together depending on the tester's focus and requirements. The CTM recommends applying the full measures framework to allow a comprehensive insight into the capability-level effects of individual system performance.

1.3.1 Traditional Test Measures and Test Issues

Traditionally, acquisition focused on delivering a single system. Accordingly, the focus of testing has been on demonstrating a system's effectiveness, suitability, and survivability in response to Service-specific requirements, with little emphasis on the system's contribution to a larger joint capability or to the joint missions in which the system might be eventually employed. Because of this, measures to support this scope of testing focused primarily on system attributes such as range, speed, or lethality, or on the specific mission the system was designed to perform.

For example, during DT&E, critical technical parameters (CTP) are "measurable system characteristics that when achieved, allows the attainment of a desired operational performance capability."[6] CTPs specify attributes unique to the system only, with no explicit requirement that the system must operate in the context of a JME or contribute to an overall joint capability.

Critical operational issues (COI) are the operational effectiveness and suitability issues that must be examined in OT&E to evaluate/assess the system's capability to perform its mission.[7] In OT&E, a COI must be answered in order to properly evaluate operational effectiveness (for example, Will the system detect the threat in a combat environment at adequate range to allow successful engagement?) and operational suitability (for example, Will the system be safe to operate in a combat environment?). COIs generally relate to system performance and mission task accomplishment but may not provide enough information to help make a determination of a system's contribution to JMe.

1.3.2 Measures for Testing in a Joint Mission Environment (JME)

The CTM provides a flexible measures framework. It allows system performance measurement in a more robust operational environment, also providing measures of the contribution that a system makes to overall JMe. For the purpose of testing in a JME, these measurements include:

- The required performance of a particular *system*.
- How well that performance contributes to a particular *task*.
- Ultimately, how the system contributes to the *overall joint mission* in the JME.

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[5] Operational Effectiveness is defined as "…the overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, tactics, survivability, vulnerability, and threat." – *Defense Acquisition Guidebook*, December 20, 2004.
[6] *Defense Acquisition Guidebook*, December 20, 2004.
[7] Ibid.

Defining metrics to assess performance across all levels can be a challenging problem, especially in the case of a system's contribution to a given joint mission. To help simplify this problem, the CTM defines three levels of measures that can be represented in a JME:

- System or SoS Level – Test measures at this level measure system and SoS performance and can include CTPs, key performance parameters (KPP), key system attributes (KSA), and joint force characteristics. In a joint context, system and SoS measures are applied using the same practices used in traditional, Service-specific contexts.
- Task Level – A task is an action or set of actions that enables a mission or function to be accomplished; it contributes to the accomplishment of the overall mission. Test measures at this level are task measures of performance (Task MOP), which assess whether or not a task can be accomplished.
- JMe Level – Measures at this level assess whether or not the system provides the necessary capability to accomplish the overall mission. These measures are called mission measures of effectiveness (Mission MOE). Mission MOEs are tied to mission-desired effects. The mission-desired effect should meet the combatant commander's intent and achieve the mission end state or objective. Mission-desired effects are identified and derived from authoritative sources, such as the Analytic Agenda. Annex A provides more detail about Analytic Agenda.

1.3.3 Developing Measures for Testing in a Joint Mission Environment (JME)

- DT&E Measures – In a traditional, Service-specific environment, DT&E measures focus on system-level and lower-level technical performance measures. When testing in a JME, system-level measures still focus on system and technical performance characteristics, but those measures are collected within an LVC-DE that is designed to represent the overall JME in a realistic manner. This persistent LVC-DE can then be employed for subsequent phases of testing.
- OT&E Measures – In a traditional environment, operational measures are derived from COIs, that are crafted to evaluate the system's capability to perform its designated operational mission. As in DT&E, the test environment should realistically represent the JME.
- To support evaluating a system's contribution to the overall joint mission, the CTM defines a third group of measures that support a broader perspective than that of the system's task performance alone. These test issues, called critical capability issues (CCI), offer a way to assess and evaluate the capability of a system or SoS to perform a set of tasks under a set of standards and conditions in order to achieve desired mission effects. CCIs are designed to addresses all levels of measures required for supporting testing in a JME and all the major areas included as part of a joint capability. Chapter 3 provides more detail about CCIs.

1.4 VALUE ADDED

The realistic T&E of systems and capabilities in a realistic JME can provide a better understanding of a system's capabilities and limitations, and of how it will interact with other systems when used to execute joint tasks and missions. This understanding can assist planners and field commanders with the proper employment of the system in combat. There are added

benefits to employing the CTM methods and processes for capability and system testing in a JME. Some of these are:

1.4.1 Joint Mission Effectiveness (JMe) Analysis

Testing in a realistic JME can deliver an improved understanding of a capability solution's performance and its contribution of JMe. In systems T&E, the resulting characterization of a system's capabilities and limitations can improve Service and combatant commander planning and, ultimately, result in fielding proven joint capabilities.

A system's test performance in a JME is a valuable indicator of its potential contribution towards capability enhancement. Metrics used in traditional Service-centric testing approaches may be insufficient to demonstrate performance in a more complex JME. For example, system-level performance metrics may be insufficient to demonstrate a system's contribution to the system's overall task performance, or to the broader joint mission to which the system may be required to contribute in the required JME. Useful measures should be defined at the joint mission and task levels, and specific metrics should be developed that can help to assess a system's contribution to JMe. The CTM provides a measures framework designed to facilitate developing measures at the necessary levels.

1.4.2 Complex Testing with Limited Resources

Testing in a JME using a realistic live, virtual, or constructive test environment that can be physically distributed helps provide the ability to perform complex, realistic testing with limited resources. This results in earlier identification of problems, allowing shorter developmental life cycles, reducing re-work, and providing better data for milestone decisions.

The considerations for conducting tests in a JME are more complex than those for traditional test environments. In ideal situations, testing in a JME features adequate numbers of personnel from each Service to simulate complex interactions among systems, equipment, and doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) aspects and warfighters that comprise the JME. Creating such environments is difficult using traditional testing approaches and may be best accomplished with the help of virtual and constructive test capabilities. In addition, if the system under test (SUT) is part of a larger SoS, not all of the supporting systems may be available to support testing. For example, some systems may still be in the early stages of development, and some systems may be legacy systems that have limited availability due to operational requirements.

The CTM can facilitate building a suitable and persistent test environment that employs a distributed array of LVC components for T&E over the full scope of sponsor's requirements or, in the case of acquisition T&E, for the entire system acquisition life cycle. The processes needed to create such an environment are still evolving. For example, until a dedicated T&E networking infrastructure is available to create the JME adequate for testing, there will be only a limited capability to create an LVC test environment. This need for a networking infrastructure capability is being addressed by Acquisition, Technology and Logistics (AT&L) with the Joint Mission Environment Test Capability (JMETC) initiative.

Organizational issues also are more complex in a capability-based JME. Traditionally, Services have developed and tested systems in response to their own Service-specific needs. There has been little need to take into account the activities of other Services, who might have very

different requirements, processes, cultures, and resources. In the capability-based paradigm, system acquisitions are based on theater-level needs. In such a case, the role currently performed by the PM would necessarily expand to encompass a broader, joint perspective to include responsibility for budgeting, planning, and executing tests in a JME to demonstrate the requirements specified in the capability development document (CDD).

1.5 A SOLUTION: THE CAPABILITY TEST METHODOLOGY (CTM)

The CTM is addressed in three handbooks:

- *Program Manager's Handbook for Testing in a Joint Environment* (PM's Handbook)
- *Action Officer's Handbook for Testing in a Joint Environment* (AO's Handbook)
- *Analyst's Handbook for Testing in a Joint Environment* (Analyst's Handbook)

The PM's Handbook (this document) is a high-level view of testing in a JME for PMs or test sponsors to use to incorporate testing in a JME. It introduces concepts supporting this initiative, and describes the CTM in introductory-level detail. In order to execute the methods and processes of the CTM, the user should refer to the AO's Handbook and Analyst's Handbook.

The AO's Handbook is one of the two "how to" publications in this set. It contains a fully detailed description of the CTM and includes a series of user guides and relevant supporting information.

The CTM is executed in a series of three threads, each designed to collect the processes relevant to the different participating communities within an acquisition program's T&E team. These threads are described in the CTM user guides, with each guide addressing one or more processes. The guides offer the user step-by-step directions for implementing those processes. They provide information on inputs, outputs, and products associated with each process. They also include detailed checklists for an action officer to use in executing the processes.

The AO's Handbook explains how testing in a JME can help with:

- Earlier identification of problems – Testing in a JME assists with earlier identification of problems and issues associated with operational requirements. Once identified, these can be addressed early on, reducing the need for rework later in the acquisition process and helping to deliver a needed capability on schedule and within budget. This in turn helps to keep the acquisition more relevant to the warfighter.
- Better decision-making data for milestone decisions – Thorough testing in a JME makes it possible to evaluate the performance of individual systems in realistic operational conditions. This includes additional information relating to overall task performance and JMe, providing data on the system's contribution to each. Observing all of these aspects in a realistic joint testing environment can help decision-makers in evaluating the overall utility of a system or SoS.
- Providing field-proven joint capabilities – The ultimate benefit of testing in a JME is the confidence that systems will work as they were intended in today's battlespace. It ensures that systems do not just perform to specifications, but that they can execute the end-to-end joint missions required by the warfighter. In this way, combatant commanders are provided

with high-confidence, field-proven capabilities that allow them to successfully execute their mission.

The Analyst's Handbook is the other "how to" publication associated with the CTM. It is for test agency analysts and PMs who are participating in joint-level testing. In particular, the Analyst's Handbook concentrates on the tasks and objectives of those analysts who will participate in planning for and analysis of joint testing and evaluation. It provides analysts with information, guidance, tools, and resources that they can use to implement an evaluation strategy and measures framework to support evaluating the technical performance, task performance, and JMe of an SoS in a JME, while providing traceability throughout the T&E life cycle. It is intended to be used within the framework of the CTM methods and processes.

The Analyst's Handbook has a holistic focus on the end-to-end experimental planning life cycle from an analysis perspective. Much of the material is process-oriented, with discussions and checklists designed to step the analyst through the guided procedures. Following the processes contained therein should help the analysis team ensure that all aspects of the tests and experiments are integrated synergistically to provide insights, findings, and recommendations relevant to the COIs and CCIs that apply to the system(s) and SoS under test. The Analyst's Handbook is a collaborative effort between JTEM, the US Army Training and Doctrine Command Analysis Center in Monterey (TRAC-MTRY), and the Naval Postgraduate School (NPS).

1.6 SUMMARY

Testing in a JME is different in a number of ways from T&E as it has been accomplished in the past. It is not simply multi-Service testing or a novel way to tie together simulation labs. Instead, this new paradigm requires defining and evaluating directly a system's contribution to the combatant commander's mission needs, from a joint perspective that reflects the employment of joint forces in today's wars.

This broader view calls for a more complex set of measures to help determine a system's contribution to JMe, and for a distributed mix of live and simulated forces to enable testing throughout the system's development life cycle in mission environments that would otherwise be too costly or difficult to assemble for testing alone. The advantages of this initiative include making possible testing in a realistic JME, producing better data earlier in the development process, and, ultimately, improving the DoD's ability to field proven joint capabilities.

The CTM and the associated concepts described in this handbook provide the methods and processes to assess the contribution of a system or SoS before it is fielded.

2

THE CAPABILITY TEST METHODOLOGY FOR TESTING IN A JOINT MISSION ENVIRONMENT

2.1 INTRODUCTION

JTEM was chartered to develop and enhance methods and processes for defining and using a distributed LVC joint test environment to evaluate system performance and JMe. This resulting collection of best practices comprises the CTM.

CTM version 3.0 was developed to support testing a system or SoS that provides capabilities for joint missions in the expected joint operational environment, as required in DoD Instruction (DoDI) 5000.02, *Operation of the Defense Acquisition System* (December 8, 2008). Its purpose is to guide PMs, systems engineers, and T&E personnel to implement testing in a JME for their DoD programs.

The CTM implementation guidance, summarized in the following sections and detailed in the AO's Handbook, consists of an introduction to testing in a JME, a series of CTM user guides, and supporting references. CTM guides are designed to explain PM and T&E organizational processes with checklists, instructions, and examples. The CTM guides are relevant to integrated testing at various stages in the acquisition life cycle, beginning with the earlier stages of T&E planning before program initiation at Milestone B.

The CTM processes and products described in these guides are designed to be suitable for the full scope of system testing, including DT&E and OT&E. They are intended to be used as a basis for tailored CTM implementations, based on a particular program's specific objectives and its phase in the acquisition cycle. The CTM process threads and guides in the AO's Handbook were written from the perspective of a notional SoS acquisition program in the midst of planning and executing a test event for an SoS prior to the Milestone C decision.

The CTM is designed to be used in conjunction with JCIDS and its associated DoDAF products. The guides identify relevant JCIDS and DoDAF inputs for CTM products. Future CTM versions and associated handbooks will continue this alignment with evolving JCIDS and DoDAF policies.

2.2 THE CAPABILITY TEST METHODOLOGY (CTM)

The CTM is comprised of six steps (Figure 2-1), organized to illustrate what occurs in an actual joint test cycle. This simplified figure describes the activities that occur during the test cycles related to developing and fielding a new system or capability. The CTM should be implemented by the various participants and contributors that make up the program's T&E team in a major acquisition program. Although the entire CTM process falls within the PM's scope, the various participants in the PM's T&E team would implement those CTM processes relevant to them.

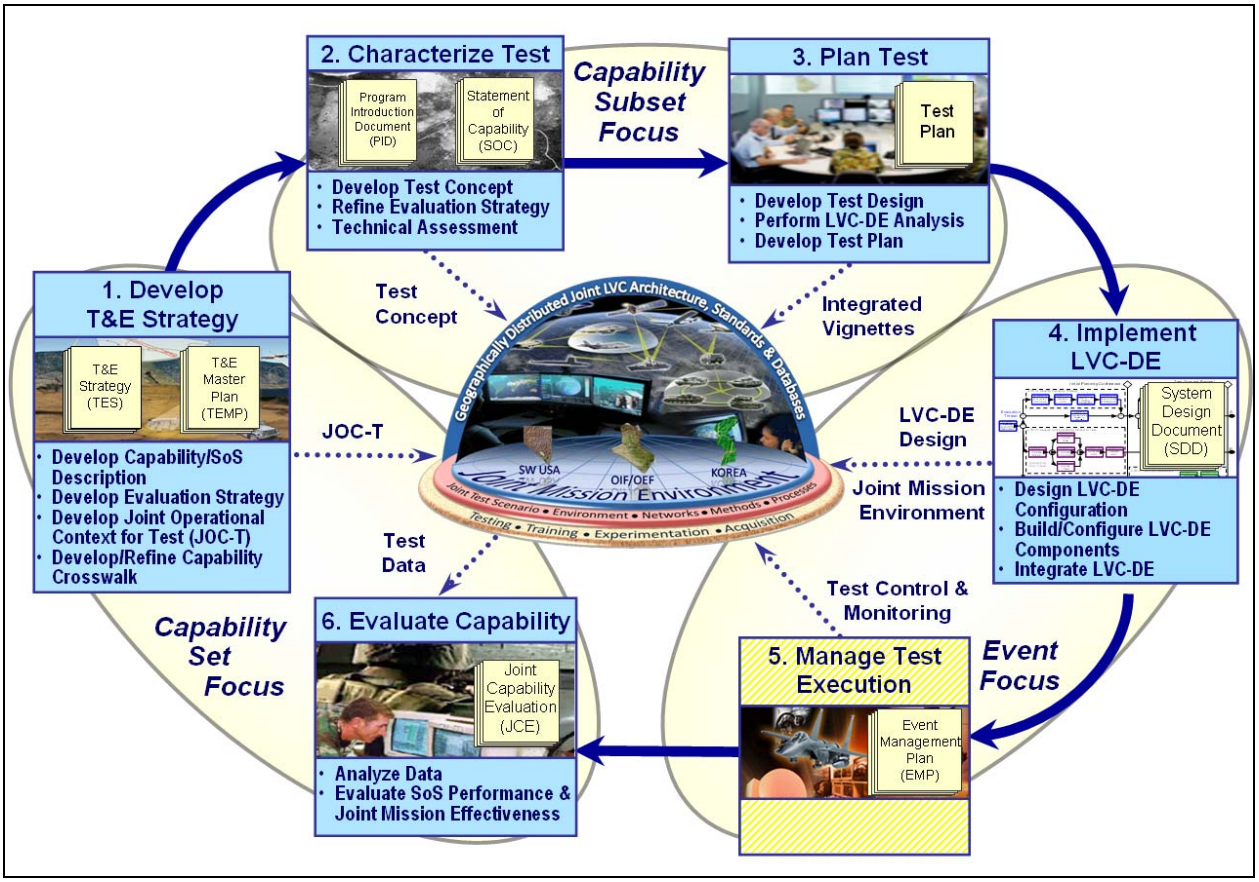

Figure 2-1. Capability Test Methodology Steps

While the CTM may appear sequential, these steps and underlying processes are iterative. The CTM is organized by steps, but implemented by three broad threads using a model-driven approach. Within these three threads, some processes are performed in parallel and the results of these processes are fed into the iterative work of other processes. CTM Step 5 and its processes in the model are shown in grey (striped yellow in the step graphic). These processes have less detail than others due to the Service/resource-specific nature of the processes/products. The CTM thread implementation concept is explained in detail in Section 2.5.

2.2.1 CTM Step 1 (CTM 1), Develop Test and Evaluation (T&E) Strategy

The first step in the CTM yields two key products: an evaluation strategy and its associated Joint Operational Context for Test (JOC-T) description. The T&E strategy establishes the approach to verify that the system or capability will actually fulfill the requirements for which it was developed, and the JOC-T describes the environment in which the system or capability will perform its mission.

A generalized T&E strategy is first published at Milestone (MS) A as the Test and Evaluation Strategy (TES). The evaluation strategy in the TES is further refined and melded into the TEMP

published with program initiation at MS B. The JOC-T is also continually refined throughout the program life cycle and serves as the basis for building the test environment for each event.

2.2.2 CTM Step 2 (CTM 2), Characterize Test

The Characterize Test step in the planning process refines the concepts incorporated in the initial T&E strategy. During this step, the PM and the designated test organization develop test concepts, identify test capabilities, determine resource requirements, and develop the test schedule. There are three main activities in this step:

- Develop the Overall Test Concept – Includes establishing an overall test goal and test objectives, and developing the test approach. This involves refining the elements of the previously developed Evaluation Strategy and should be scoped according to the newly defined test goals and objectives.
- Refine the Evaluation Strategy – The PM reviews the strategy defined previously in order to incorporate changes since the initial strategy was developed, and to reflect new constraints (resource, schedule, and budget). The team then expands upon the test goal and objectives to craft the general test issues in the form of CCIs and COIs to establish a framework for defining what test data should be collected, and at what level of detail and from what perspective these measures should be defined in order to answer the test issues.
- Technical Assessment – The lead test support activity analyzes the explicit and implicit requirements identified in the T&E Strategy and produces a technical recommendation for implementing an LVC-DE suitable for meeting the test objectives. The technical recommendation uses the Program Introduction Document (PID) and enterprise inputs, including previous LVC-DE estimates and an enterprise JME foundation model (JFM) to create an initial operational design for the test. The operational design identifies LVC-DE operational systems/SoS and interactions that should be represented in the JME. The technical alternatives are analyzed and the best ones are selected to satisfy initial test technical and programmatic requirements. These requirements are key drivers in the development of the Statement of Capability (SOC) cost and schedule estimates because they initially identify candidate facilities and organizations for the test.

2.2.3 CTM Step 3 (CTM 3), Plan Test

In this step, test concepts developed in CTM 2 are further refined into a test plan. Test planning processes include:

- Develop Test Design – Includes two preliminary products: the Data Analysis Plan (DAP) and the Integrated Data Requirements List (IDRL). The DAP uses the test concept, evaluation strategy, and the test scenario that were produced in the preceding steps to develop the specifics of a capability-level test design. As the analysts continue to refine the DAP for the test, they update the IDRL and finalize data collection requirements. The DAP should focus on the methods and processes necessary for analyzing test data, and producing quantitative and qualitative test findings and conclusions. The data collection requirements will form a basis for the Data Collection Plan (DCP).

- Perform LVC-DE Analysis – The process of studying the test planning products to generate a complete operational description and the initial functional description of the required LVC-DE.
- Develop Test Plan – Synthesizes operational, technical, management, and support functional areas of the test planning phase into an overall coordinated test plan. Elements of the test plan include the DAP, vignettes, test design trial matrix, LVC-DE functional design, and test support plan. Administration and management (test organization, test control, and test readiness), test schedule, and cost estimate descriptions are further refined, coordinated, and incorporated into the test plan.

2.2.4 CTM Step 4 (CTM 4), Implement LVC-DE

This step involves the execution of structured, system engineering processes for designing, implementing, and integrating the LVC-DE using constructive and virtual representations and live systems in various combinations. This step, like CTM 5, is event-focused. There are three broad activities included within this step:

- Design LVC-DE Configuration – This process uses system engineering best practices to develop the LVC-DE design. This design synthesis develops logical and physical design specifications capable of supporting the required JME test functions within the limits of the functional parameters prescribed in the functional design. This design process also includes the planning, conducting, and reporting of a test infrastructure characterization and the verification of networks and middleware.
- Build/Configure LVC-DE Components – Each distributed node or facility will build and configure their respective component of the LVC-DE using the verified and validated physical design. This activity develops LVC interfaces and instantiates the necessary platforms and interactions that will represent the JME.
- Integrate LVC-DE – During this process, the built and configured components (hardware, software, databases, and networks) that comprise the JME are assembled into a system/SoS and tested to make sure they communicate and operate as intended. The final step is a verification, validation, and accreditation (VV&A) effort prior to LVC-DE use.

2.2.5 CTM Step 5 (CTM 5), Manage Test Execution

CTM 5 involves those activities directly related to planning and executing a test event. In this step, each test organization will develop suitable event management plans and will execute the test events in accordance with their own procedures for control and monitoring. The result is test data suitable for capability assessment and evaluation.

- Test customers will develop their own plans for data management and analysis. These plans may be in the form of a traditional Data Management and Analysis Plan (DMAP) or separate Data Management Plans (DMP) and DAPs. At the capability level, these documents form an overall, integrated plan that addresses the evaluation thread from individual system effectiveness all the way to the capability level.
- The nature of distributed events will dictate that a centralized controlling element be designated or established to control test operations, even though each participating facility or range is responsible for their internal operations. The designated event manager is

responsible for ensuring that all participating facility and range operations are synchronized and work together seamlessly during execution. This includes monitoring participants, ensuring the proper execution of time-critical events, and making *GO/NO-GO* decisions based on pre-established criteria.

2.2.6 CTM Step 6 (CTM 6), Evaluate Capability

This step executes planned data analysis by turning test event data into information about results achieved and capability demonstrated during test(s). It culminates in joint capability evaluations of capability sets, including SoS performance, task performance, overall JMe and relationships between these performance and effectiveness areas. There is often an evaluate-analyze-evaluate iterative flow in CTM 6, as different levels of SoS, task, and mission measure levels are evaluated and the causality between levels is analyzed and evaluated with appropriate analysis techniques.

- Analyze Data – Turns the processed test data into information about what happened in the test and provides insight into why it happened the way it did. Qualitative and quantitative data collected during the test runs are analyzed to determine how well the SUT functioned when compared against the system/SoS attribute performance measures, system/SoS task performance measures, and JMe measures under various test trials. These measures are then analyzed across trials and types of measures to assess statistical significance related to system/SoS contributions to overall mission performance in the JME and to identify what significant results or important trends occurred during the test.
- Evaluate SoS Performance and JMe – Once the test data has been analyzed, evaluators will use the test results to evaluate the overall JMe and the contribution an individual SUT makes to the accomplishment of the joint mission. Evaluators integrate exploratory analysis results, system or SoS, task, and mission effectiveness evaluations, to identify significant findings and make recommendations.

2.2.7 Focus Areas

There are three focus areas identified in Figure 2-1. These are:

- Capability Set – The higher, more comprehensive area focuses on capability. In this area, the first and last steps of the CTM, CTM 1 and CTM 6, are generally oriented on the overall joint capability under test.
- Capability Sub-Set – The second area focuses on a subset of capability, where CTM 2 and CTM 3 characterize and plan capability T&E designs on selected sub-sets of the SoS, SoS attributes, system attributes, joint tasks and conditions, and mission outcomes. This second focus area test design can define a capability sub-set test design for one or more test events.
- Event Focus – The third area focuses on the event itself; developing an LVC-DE in CTM 4 and the event execution in CTM 5. Once the event has been completed, the evaluation in CTM 6 results from the event data. The evaluation is not only on the capability sub-set, but on the overall capability as well. This evaluation then feeds back into the capability evaluation strategy in CTM 1. Refinements may occur in the evaluation strategy and the CTM steps repeated as future test events are planned and executed.

2.3 A MODEL-DRIVEN APPROACH

JTEM employed a model-driven approach in developing the CTM. These models, illustrated in Figure 2-2, provide the underlying structure for the CTM. The models are:

- The CTM Process Model provides samples of process thread activities and dependencies. It builds upon existing T&E practices to incorporate those elements that are necessary to support testing in a JME.
- The Capability Evaluation Metamodel (CEM) is designed to provide consistent joint capability assessments and evaluations. It provides the underlying measures framework for the CTM's evaluation thread and operational sub-thread.
- The Joint Mission Environment Foundation Model (JFM) provides guiding structure for the CTM's systems engineering thread. It focuses on consistent systems engineering of a JME.

These models all draw upon a common CTM lexicon that includes new descriptions of concepts that are necessary to describe fully the methods and processes that support testing in a JME. The *CTM Lexicon* is a cross-domain dictionary of CTM-relevant DoD terminology and definitions intended to provide more consistency across separate Services and agencies testing in a JME.

The following sections further describe these model-driven CTM structures.

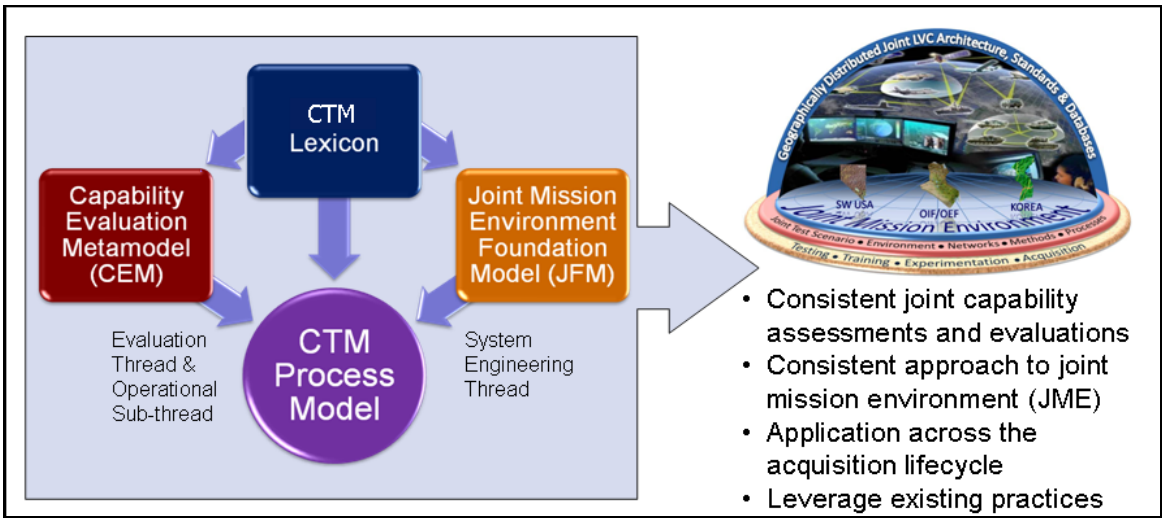

Figure 2-2. Model-Driven Approach for Capability T&E

2.3.1 The CTM Process Model

CTM version 3.0 uses a process model to describe process threads critical to conducting consistent joint capability assessments and building consistent JMEs. The CTM is organized by steps, but it is functionally implemented using three process threads. The process flow is illustrated in Figure 2-3 through Figure 2-8 as a Global View showing the six steps and two-level processes. This view is necessary in order to understand fully the dependencies between threads.

These functional flow block diagrams (FFBD) describes process activities (depicted as rectangles), process flow sequential dependencies (arrows), and parallel process sequencing (indicated by "AND" logical constructs). The FFBD does not show the CTM's product flow, iterative process flows, or decision branching. Detailed activity flows in the CTM guides represent these aspects of the CTM Process Model. The FFBD has a left-to-right temporal flow and also includes test event decision point milestones as diamonds. This model can be viewed as a template for CTM process flow when conducting test event planning and execution.

Figure 2-9, Figure 2-10, and Figure 2-11 show the top level thread view of the CTM process model. The CTM Process Model contains an evaluation thread that includes an operational sub-thread, a systems engineering thread with an infrastructure sub-thread, and a test management thread. CTM evaluation thread processes and output products structure the planning and execution of CTM capability assessments. The evaluation thread also drives the CTM systems engineering thread, which builds consistent representations of JMEs, and the test management thread, which plans and executes the actual test events. CTM systems engineering thread processes and output products structure the design and execution of SoS tests in the JME.

The CTM test management thread consists of test management planning and execution activities with a test event focus. Decision points (DP) in the model are a combination of three different schedule paradigms: test, development, and exercise. Traditional test activities reflected by the decision points include reviewing the test concept and test plan, a test readiness review, and a new decision point called the JCE review. Development type activities include reviewing the logical and physical designs. The exercise paradigm includes activities such as an initial planning conference (IPC), mid-planning conference (MPC), and final planning conference (FPC). These exercise conferences can provide a useful construct for larger or more complex programs encompassing a broad LVC-DE with numerous participants. This synthesis of different approaches to management is helpful since the creation of a JME involves test management, LVC-DE development activity, and (in some cases) a large distributed event much like an exercise.

DP entry criteria are the process products from the applicable CTM step. DP 1 occurs at the end of CTM 1 and the primary purpose is to validate the JOC-T and preview the evaluation strategy with appropriate stakeholders. Approval of the JOC-T is critical at this point so subsequent LVC-DE development can proceed. DP 2 occurs at the end of CTM 2 and reviews the test concept, refined evaluation strategy, and the technical recommendation for resourcing the LVC-DE. This review/conference is necessary to establish the baseline resources needed to instantiate the required JME. DP 3 occurs at the end of CTM 3 with the production of the test plan and detailed operational and functional systems engineering descriptions of the LVC-DE. This review verifies and validates the scenarios and vignettes, and solidifies roles and

responsibilities. DP 4 is a focused engineering review to verify and validate the LVC-DE logical design. The purpose of DP 5 is to verify and validate the physical design and establish the Event Management Plan (EMP). DP 6 provides for review of the VV&A of the instantiated LVC-DE as representative of the intended JME, and ensures the test team and participants are ready to execute. This review includes such traditional concerns as logistical readiness, safety, and limitations. Finally, the DP 7 examines the results of the test for all applicable stakeholders and is the culmination of CTM 5 and CTM 6.

A valuable resource that can provide helpful information for the planning and use of modeling and simulation (M&S) in building the LVC-DE is the "Modeling & Simulation Guidance for the Acquisition Workforce", published by Office of the Deputy Under Secretary of Defense for Acquisition and Technology, Systems and Software Engineering, Developmental Test and Evaluation (ODUSD(A&T)SSE/DTE), and located at http://www.acq.osd.mil/sse/docs/M-S-Guidance-Acquisition-Workforce.pdf. Additionally, for useful training and implementation information on VV&A of the resulting environment, the DoD Modeling and Simulation Coordination Office (MSCO) maintains the "VV&A Recommended Practices Guide," available at http://vva.msco.mil/.

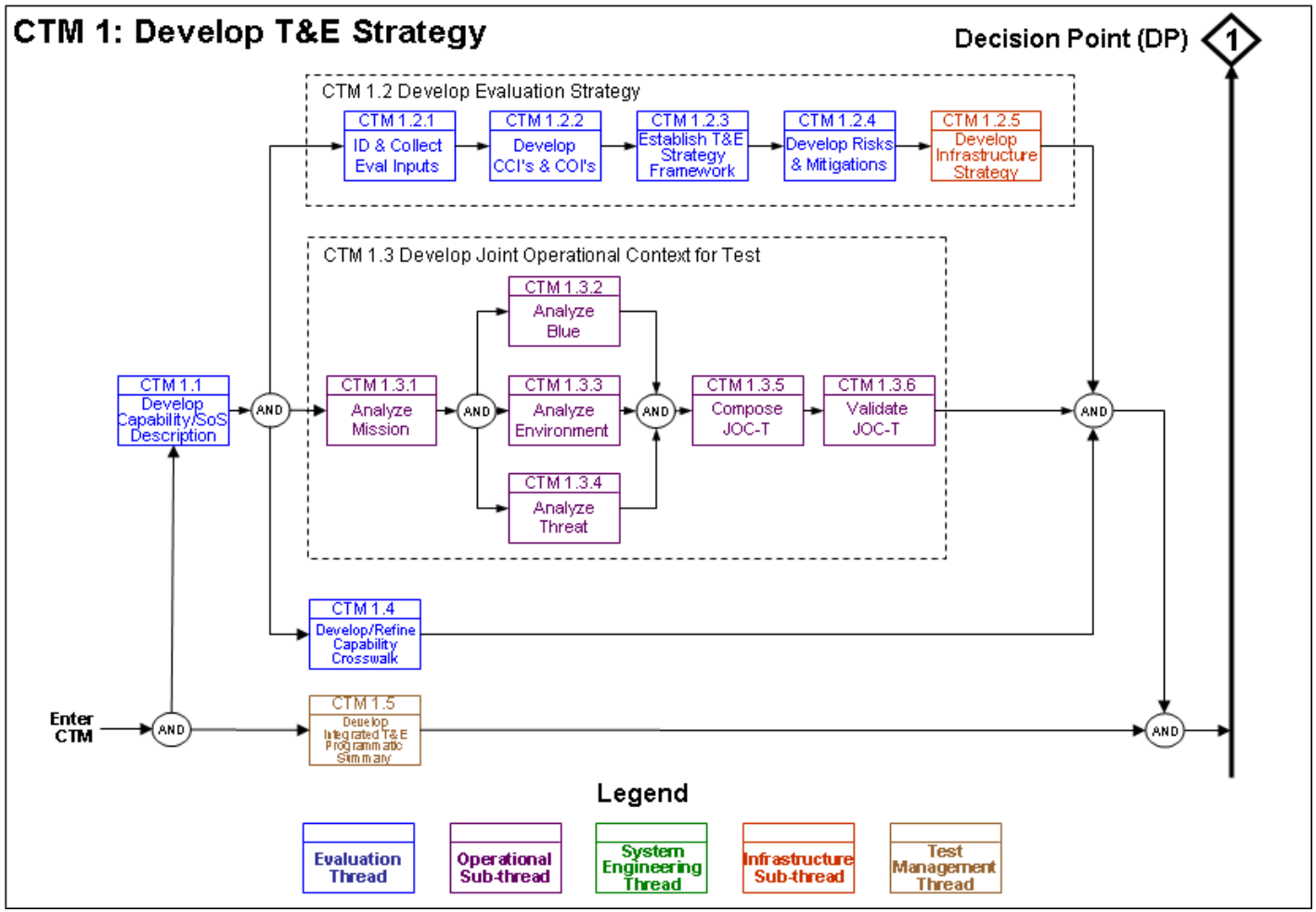

Figure 2-3. CTM Global View (1 of 6)

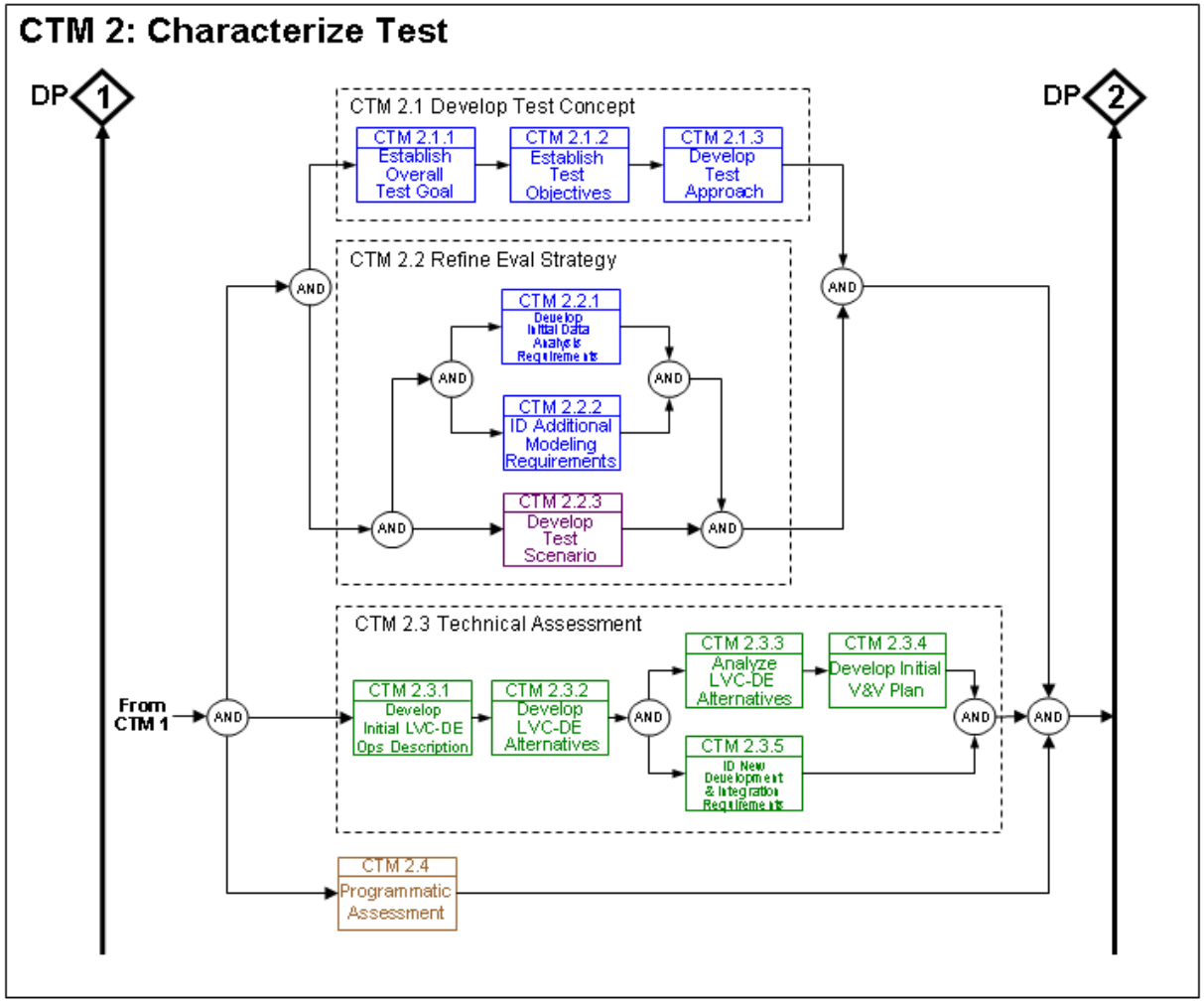

Figure 2-4. CTM Global View (2 of 6)

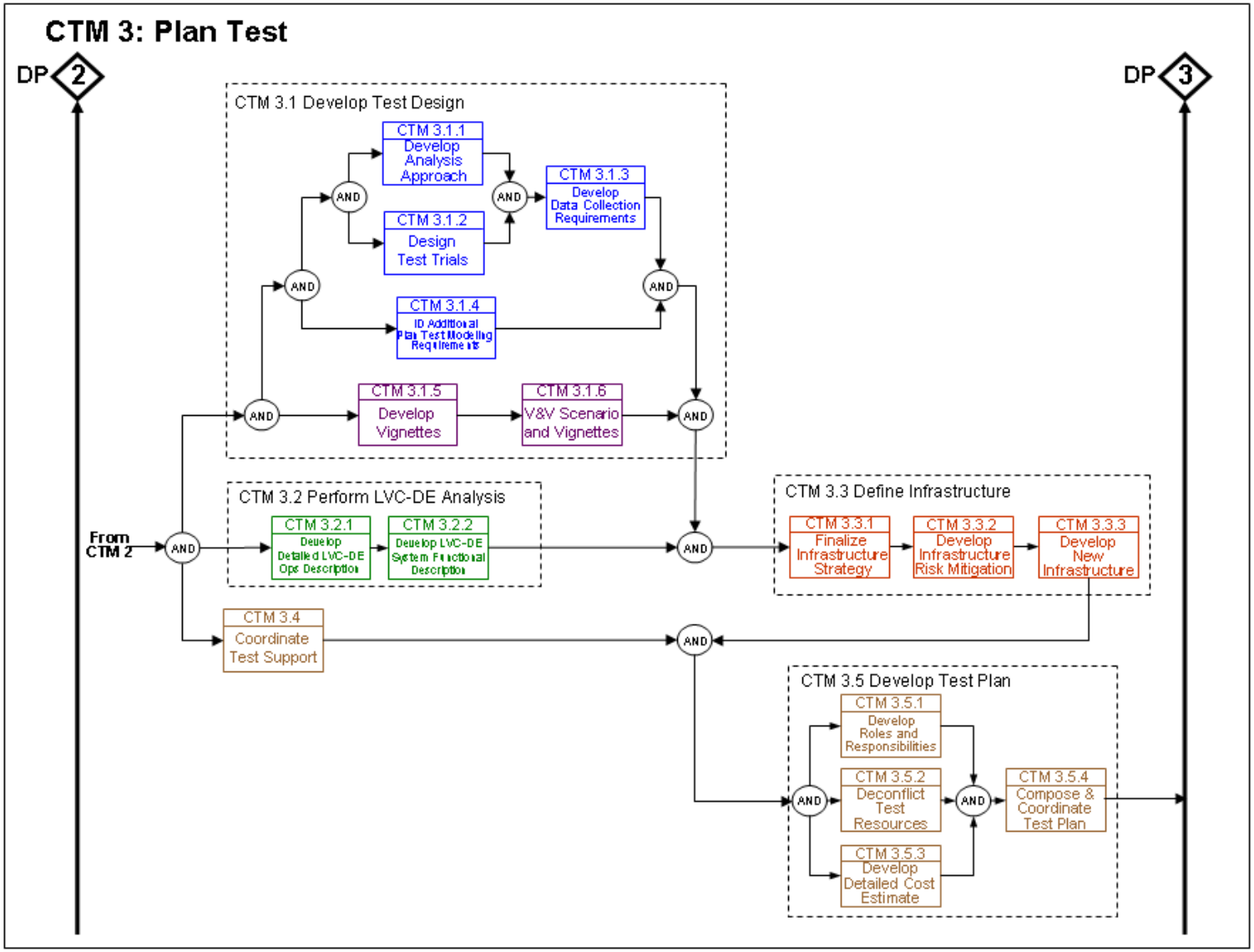

Figure 2-5. CTM Global View (3 of 6)

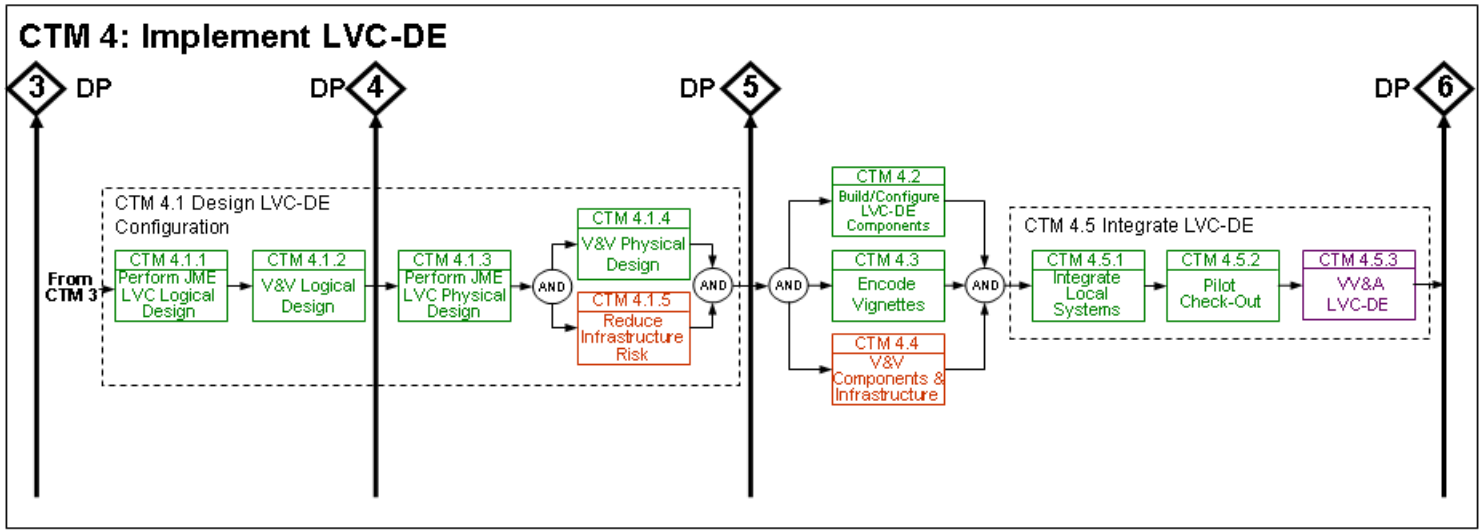

Figure 2-6. CTM Global View (4 of 6)

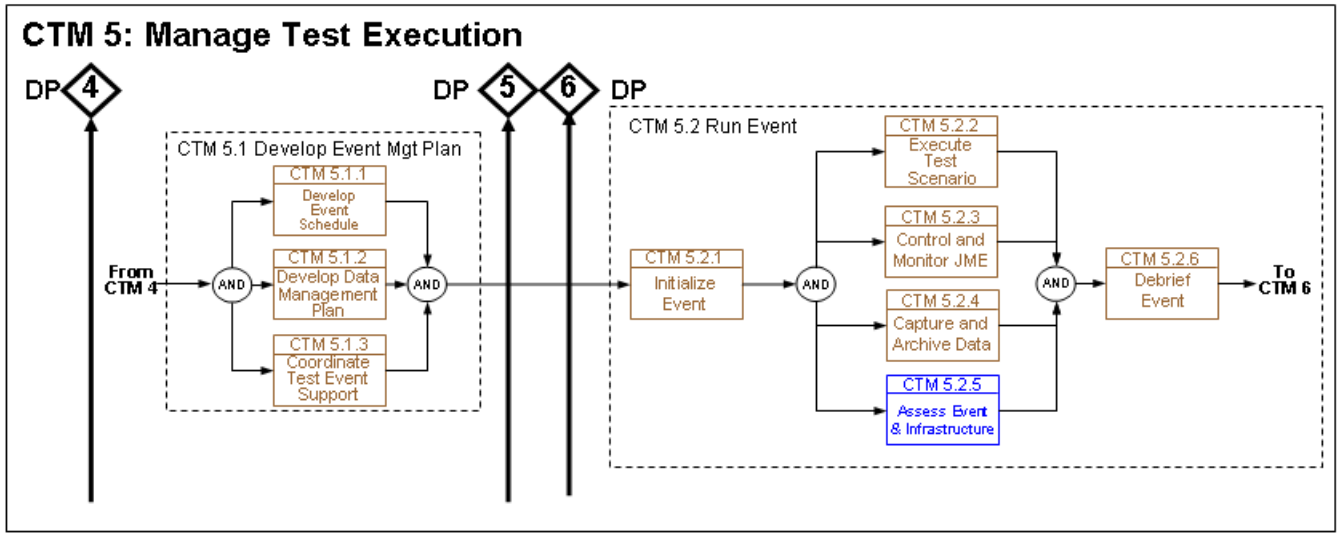

Figure 2-7. CTM Global View (5 of 6)

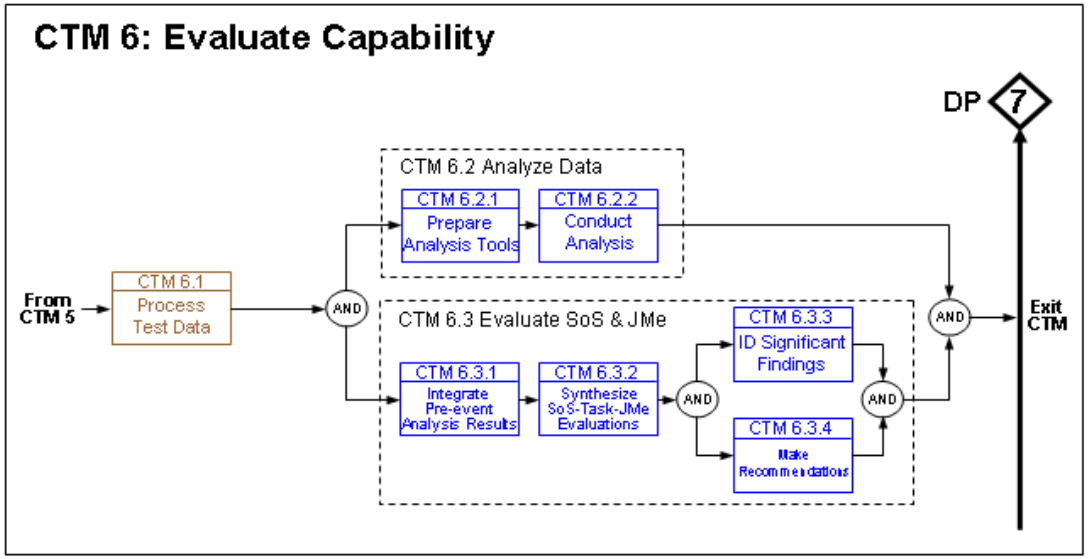

Figure 2-8. CTM Global View (6 of 6)

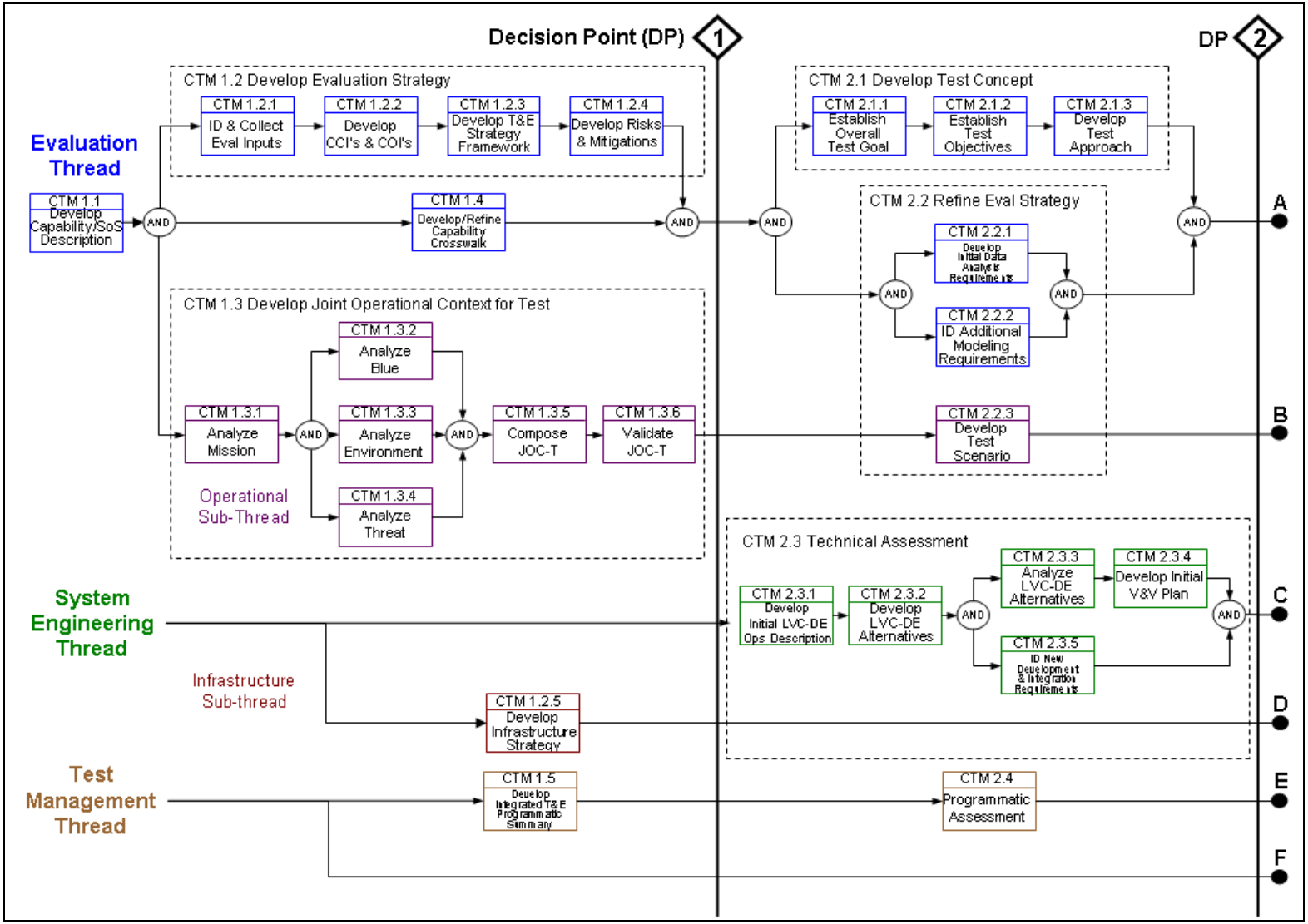

Figure 2-9. CTM Version 3.0 Process Model (1 of 3)

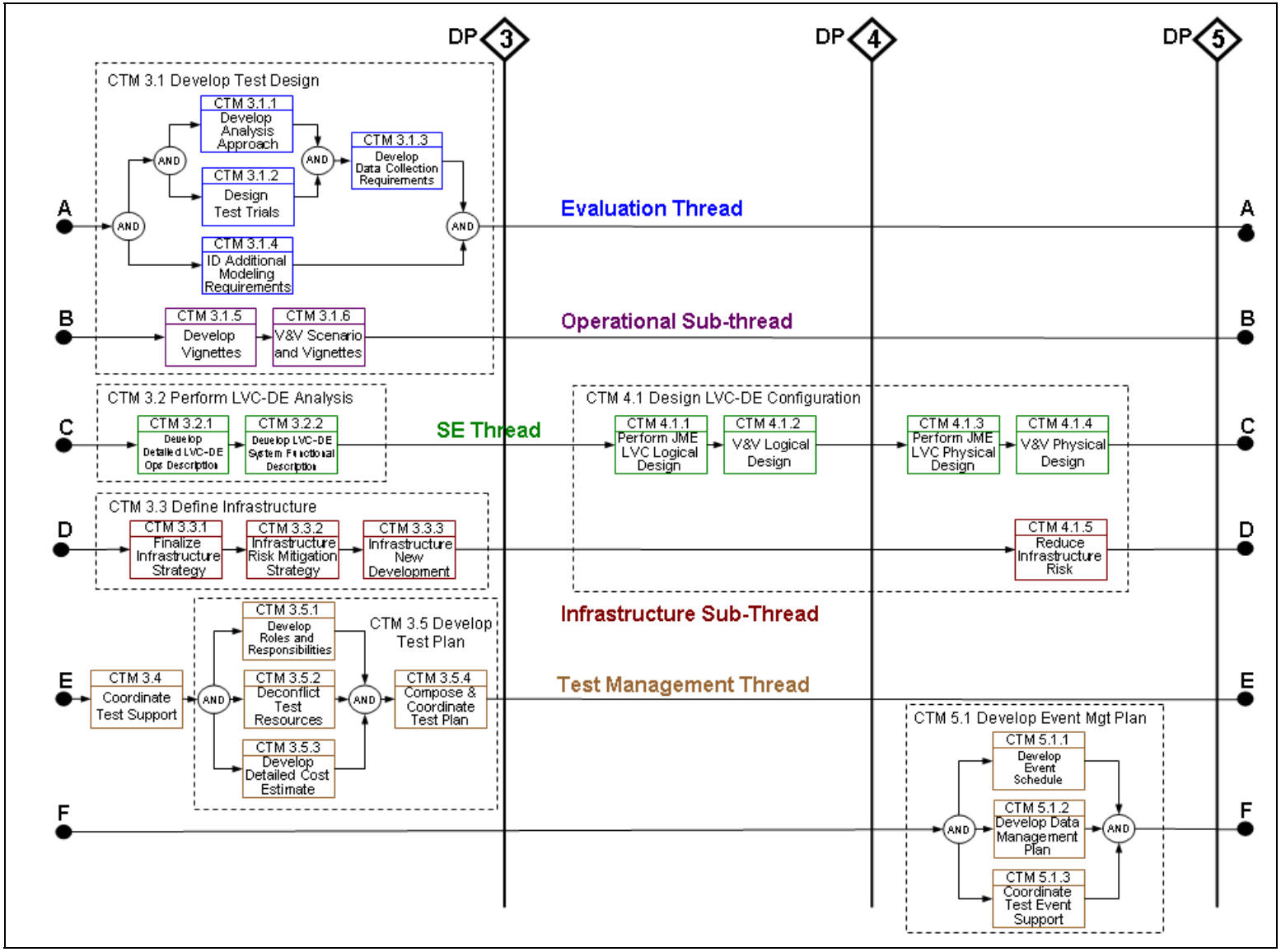

Figure 2-10. CTM Version 3.0 Process Model (2 of 3)

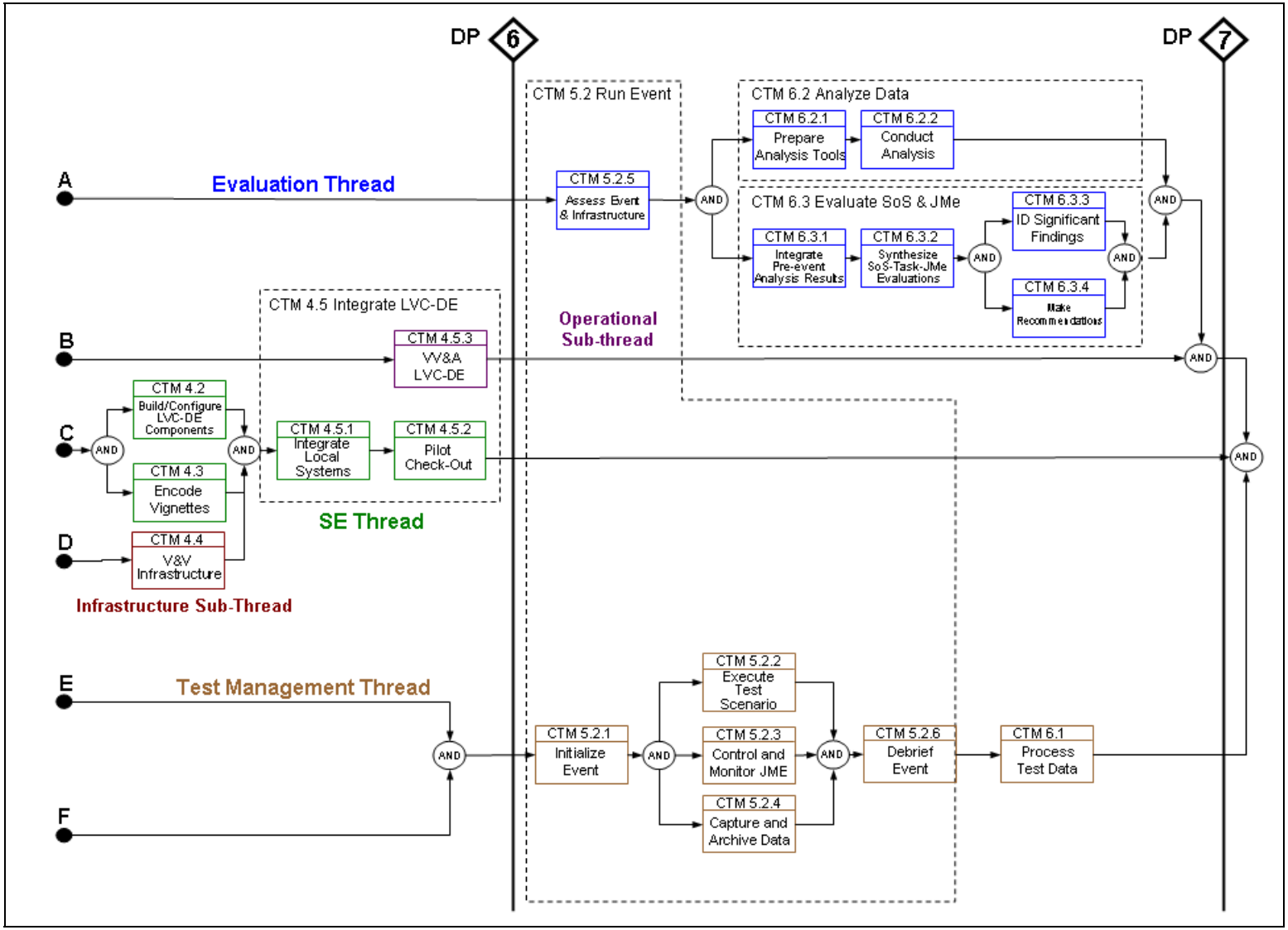

Figure 2-11. CTM Version 3.0 Process Model (3 of 3)

2.3.2 The Capability Evaluation Metamodel (CEM)

The CEM provides the underlying measures framework and analytic rules for JMe assessment activities in the CTM's evaluation thread and operational sub-thread. The CEM provides the rules for relating capability concepts that are developed in the CTM, a capability measures framework, and analysis structures beneficial in analyzing JMe. The AO's Handbook explains the CEM. The CTM process axes produce the CEM outputs, as shown in Table 2-1. CTM 1.3 is listed before CTM 1.2 due to the need to start developing the JOC-T prior to developing the evaluation strategy.

Table 2-1. CTM Process Axes with CEM Outputs

CTM Process Axis		CEM Output
CTM 1.3	Develop JOC-T	JOC-T
CTM 1.2	Develop T&E Strategy	Evaluation strategy, includes a capability focused measures framework at mission, task, and system/SoS levels
CTM 2/3	Characterize/Plan Test	Capability test design
CTM 4	Implement LVC-DE	JME
CTM 5	Manage Test Execution	Test event
CTM 6	Evaluate Capability	JCE

Figure 2-12 shows the CEM axes and key outputs, with a CTM process mapped to each axis.

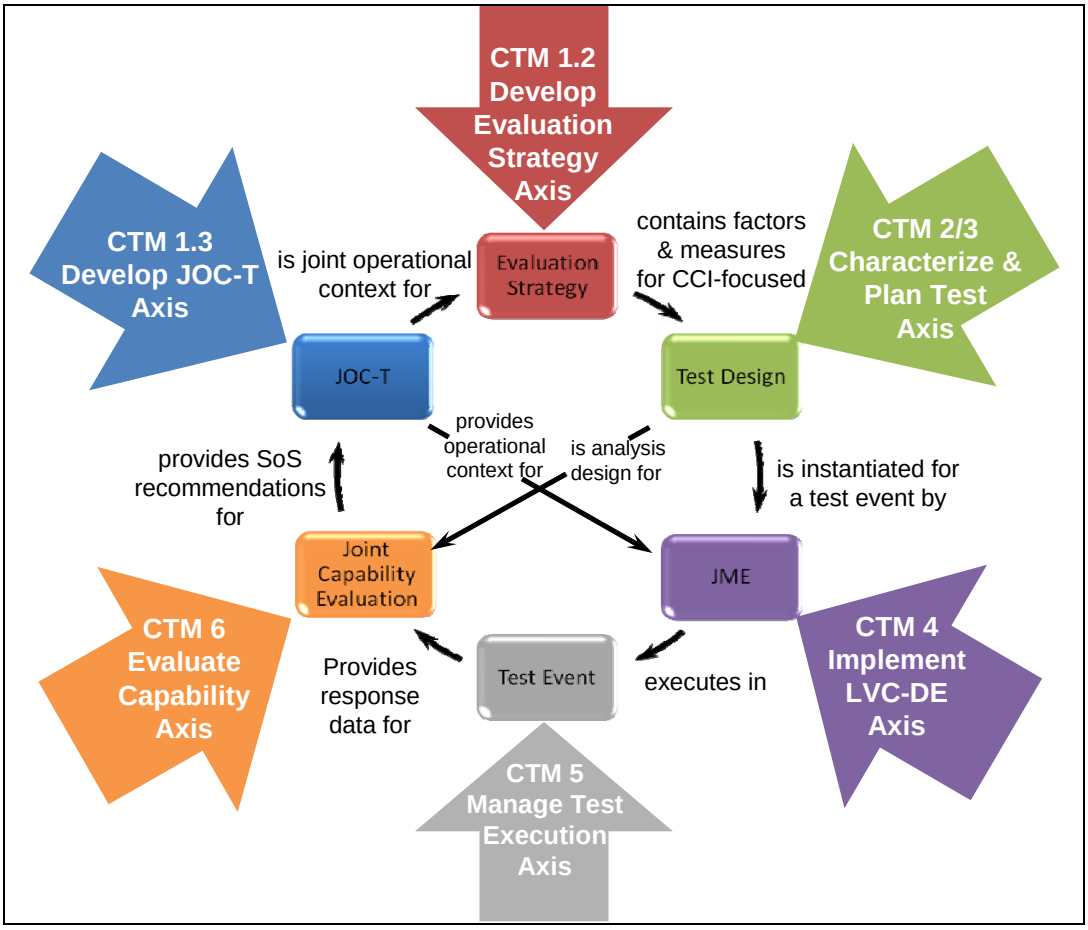

Figure 2-12. Capability Evaluation Metamodel (CEM) Axes and Outputs

The JOC-T provides the joint operational context for the evaluation strategy. This evaluation strategy contains design of experiment (DOE) factors and measures that are filtered to produce various test designs focused on one or more CCIs. The test design is instantiated in a test event using LVC test technologies. Testers use the LVC-DE to execute the test design in a test event that provides response data for a joint capability evaluation (JCE). JCEs are conducted based on analysis structures in the test design. The JCE provides SoS recommendations for DoD acquisition and other capability development managers, and can be either a separate product or part of a programmed T&E report.

CEM figures are provided as part of CTM capability evaluation process descriptions to assist in describing essential capability evaluation concepts and relationships. The CEM is based on the definition of a capability in JCIDS, which is portrayed in Figure 2-13. A capability, as defined in JCIDS, is the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks (CJCSI 3170.01G, March 2009).

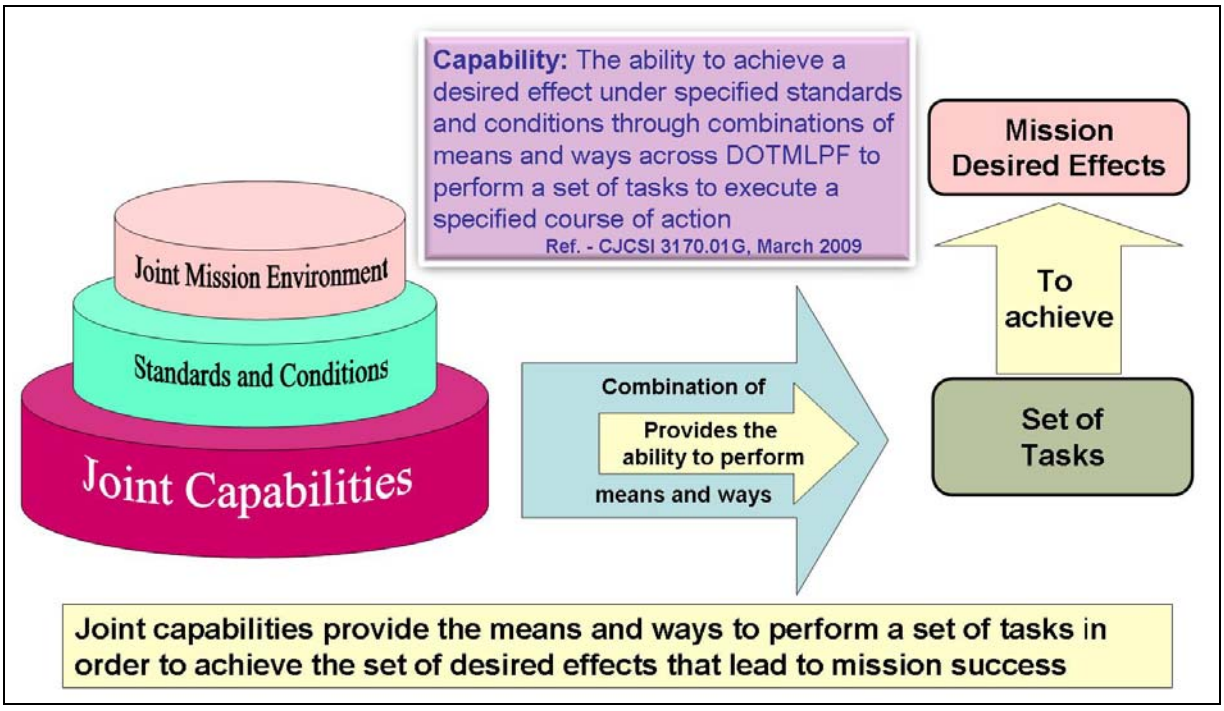

Figure 2-13. Joint Capability Definition

2.3.3 The Joint Mission Environment Foundation Model (JFM)

The JFM provides an authoritative framework for applying a logical, capabilities-based process across a wide range of situations and test capability applications. The JFM design template can be used to guide the development and reuse of LVC-DE systems during the CTM systems engineering thread. It is a theoretical construct that represents physical processes, with a set of components and component interaction definitions and the logical and quantitative relationships among those components and component interactions. The JFM is a conceptual model in this sense, and it is constructed to enable implementation-independent reasoning within an idealized conceptual framework about these processes.

The JFM has four core components:

- LVC Platform
- LVC Platform Behavior
- Mission Function
- LVC Environment

Figure 2-14 illustrates these core components and their relationships. The end state of the JFM serves as a frame of reference for LVC-DE configuration design. The JFM description is an evolutionary document that will be modified over time to promote the robustness of the model. The AO's Handbook provides more detail on the JFM.

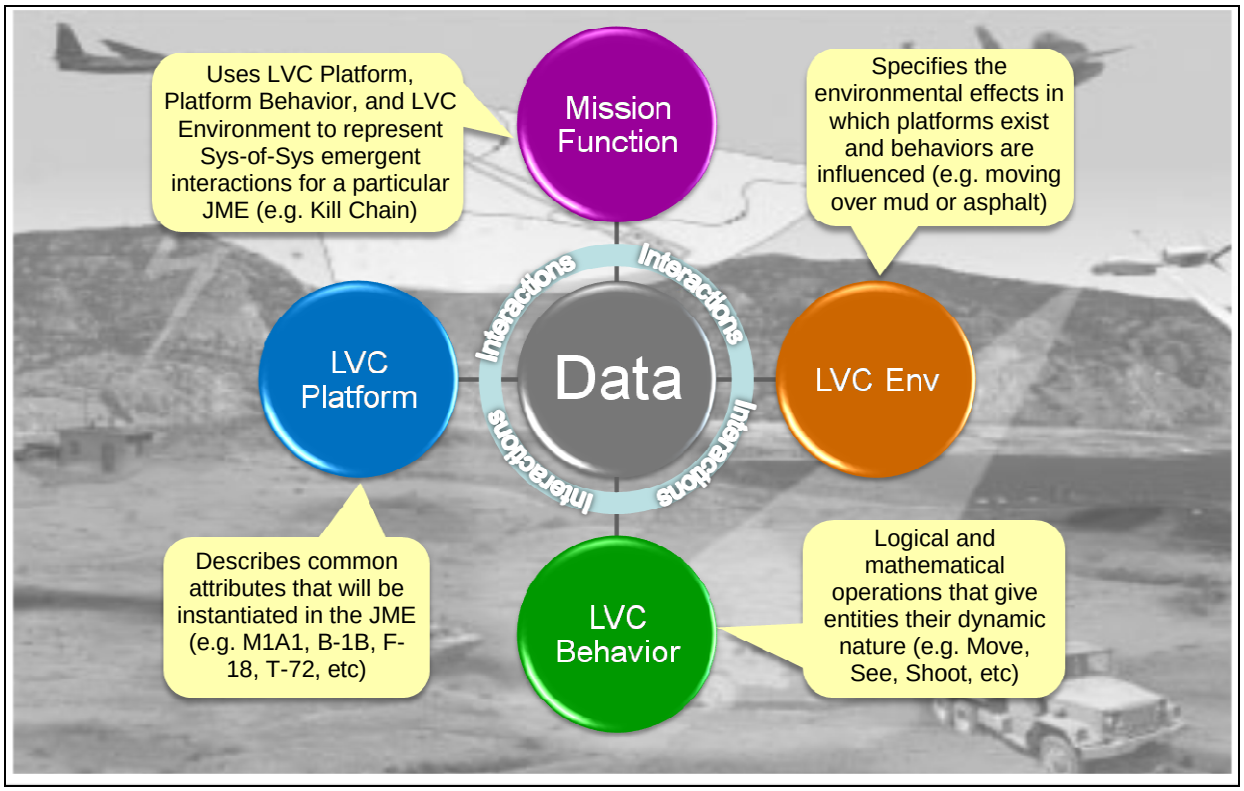

Figure 2-14. Joint Mission Environment Foundation Model Core Components

2.3.4 CTM Lexicon

The *CTM Lexicon* provides definitions of the terms and underlying concepts necessary for understanding and applying the CTM. Authoritative DoD sources are used for CTM terms and definitions wherever possible. Modifications to current terminology or additional terms not currently defined in other authoritative sources are noted in the *CTM Lexicon* as originating in the CTM version 3.0 release.

2.4 DODAF RELEVANCE TO THE CTM

The CTM incorporates DoDAF products, including underlying DoDAF data classes and relationships, in its evaluation and systems engineering threads. As shown in Figure 2-15, a multitude of DoDAF products from the JCIDS CDD are used in the evaluation thread to help describe the JOC-T necessary for a system or SoS test. These products are then evolved in the systems engineering thread to provide operational and system descriptions of instances of the JME to be used for testing. This DoDAF product evolution is further described in the AO's Handbook. DoDAF products are defined in the *CTM Lexicon*, Annex B.

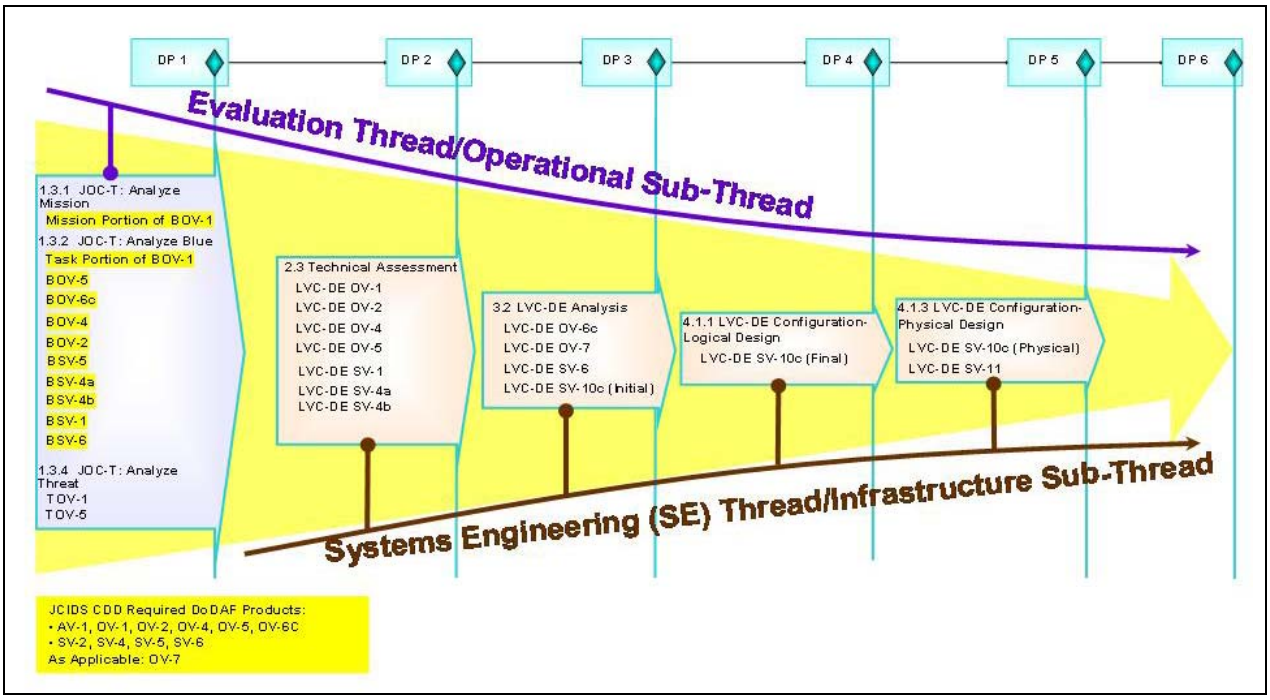

Figure 2-15. CTM DoDAF Evolution from JCIDS Authoritative Source

2.5 CTM IMPLEMENTATION

As shown in Figure 2-1, the CTM is organized into six steps that represent when the individual processes occur within a test iteration, from initial definition of the system before program initiation, through the T&E processes of an individual test cycle. The CTM is implemented via three broad threads and two subordinate threads (sub-threads). These threads represent the perspectives of the different major participants in a program's T&E organization. In most cases, the individual participants will execute their thread independently, but in concert and coordination with each other. Figure 2-16 illustrates the relationship among the individual threads and the temporal view of the CTM steps.

The threads are:

- Evaluation thread, with an operational sub-thread
- Systems engineering thread, with an associated infrastructure sub-thread
- Test management thread

CTM guides provide "how to" information on developing recommended CTM products for testing in a JME. Since the CTM is intended to be implemented by threads, the guides are organized by thread. Figure 2-16, provided to illustrate these threads, horizontally maps CTM guides to CTM steps. The user can select a guide and navigate to the appropriate section in the AO's Handbook.

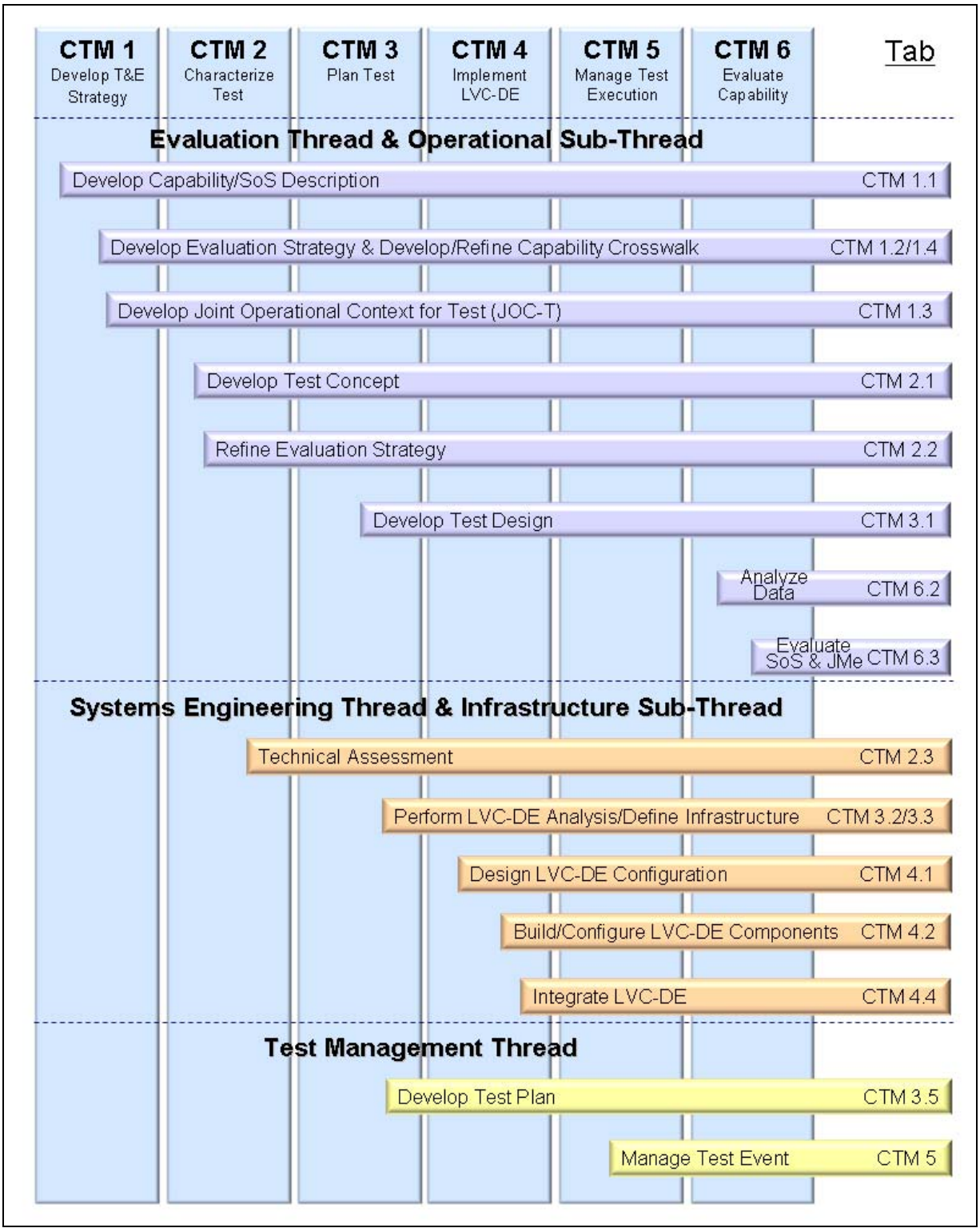

Figure 2-16. CTM Implementation Threads with User Guides

The following paragraphs provide an introduction to the threads. The AO's Handbook describes the threads in detail.

2.5.1 Evaluation Thread

Figure 2-17 shows the CTM evaluation thread with its operational sub-thread. CTM evaluation thread processes and output products structure the planning and execution of CTM capability assessments. The evaluation thread also drives the CTM systems engineering thread, which builds consistent JMEs, and the test management thread, which plans and executes test events in a JME.

In order to conduct a test event IPC, the evaluation thread processes from CTM 1 should have been completed. CTM 1 produces the required initial capability/SoS description, evaluation strategy at the capability level, and capability crosswalk to relate capability concepts. In addition, a JOC-T will have been developed and validated in the operational sub-thread to provide the operational context for IPC discussions.

By DP 2, these evaluation concepts will have been refined into one or more capability evaluation sub-sets using CTM 2 processes. DP 2 will include a test concept and an evaluation strategy that focuses on a single evaluation sub-set. The JOC-T may be refined into one or more test scenarios for the TCR.

The evaluation thread continues with CTM 3 processes to characterize the test's logical and physical design requirements, initial data analysis requirements, and test vignettes for DP 3, a critical DP. The test scenario and test vignettes will have been developed, verified, and validated to provide operational context for the DAP. The DAP provides evaluation concepts for the test event including an analysis approach, test design trials, data collection requirements, and additional plan test modeling requirements.

The operational sub-thread continues with the VV&A of the JME's operational context in a VV&A LVC-DE process and with the development of data collection requirements prior to DP 6. During test event execution, the CTM 5 evaluation process assesses data collection activities in real time for completeness and accuracy. After event execution, the processes of CTM 6 - Analyze Data and Evaluate SoS and JMe - are iteratively executed to provide analysis and recommendations for a JCE.

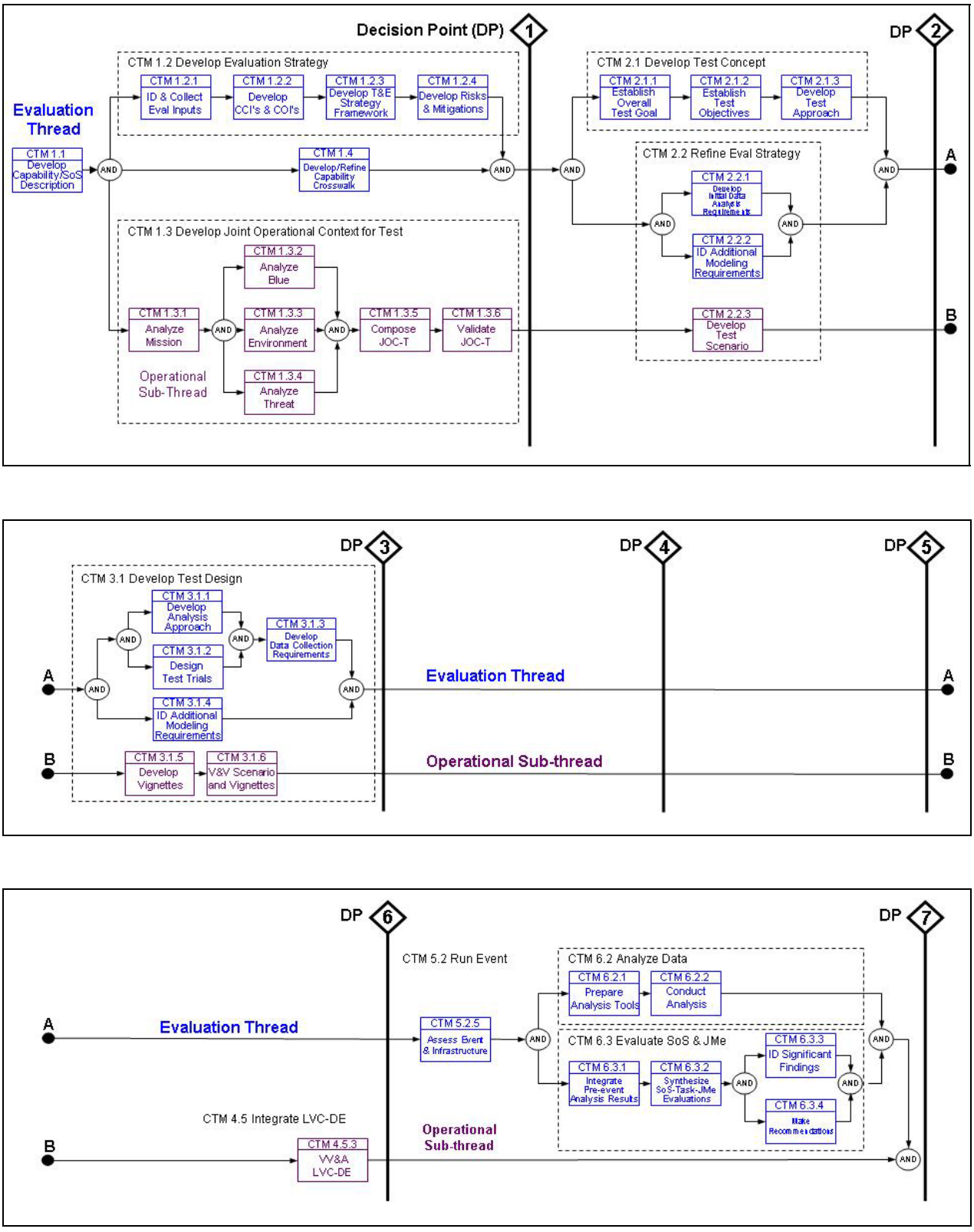

Figure 2-17. CTM Evaluation Thread

2.5.2 Systems Engineering Thread

Figure 2-18 shows the CTM systems engineering thread, with its infrastructure sub-thread. CTM systems engineering thread processes and output products structure the design and execution of SoS tests in the JME. Evaluation strategy and JOC-T inputs from the evaluation thread are used to initiate the systems engineering thread using the Technical Assessment process of CTM 2. The technical assessment sets the stage for DP 2, by developing an initial LVC-DE operational description, an analysis of LVC-DE alternatives, and identifying any new LVC-DE development and integration requirements.

The systems engineering thread continues with the Perform LVC-DE Analysis process of CTM 3, which is essential for DP 3. Detailed LVC-DE operational descriptions and initial LVC-DE system functional descriptions are developed with associated DoDAF products. The systems engineering thread, with its infrastructure sub-thread is the focus of CTM 4 processes that support DP 4 and DP 5.

The systems engineering thread JME LVC logical design, associated DoDAF products, and an initial infrastructure sub-thread test infrastructure performance characterization are developed, verified, and validated to prepare for DP 4. The systems engineering thread JME physical design, associated DoDAF products, encoded vignettes, and LVC-DE component configurations are developed, and verified and validated to prepare for DP 5. Systems engineering thread integration of local systems and verification of distributed systems during pilot check-out are conducted as part of DP 6 preparation.

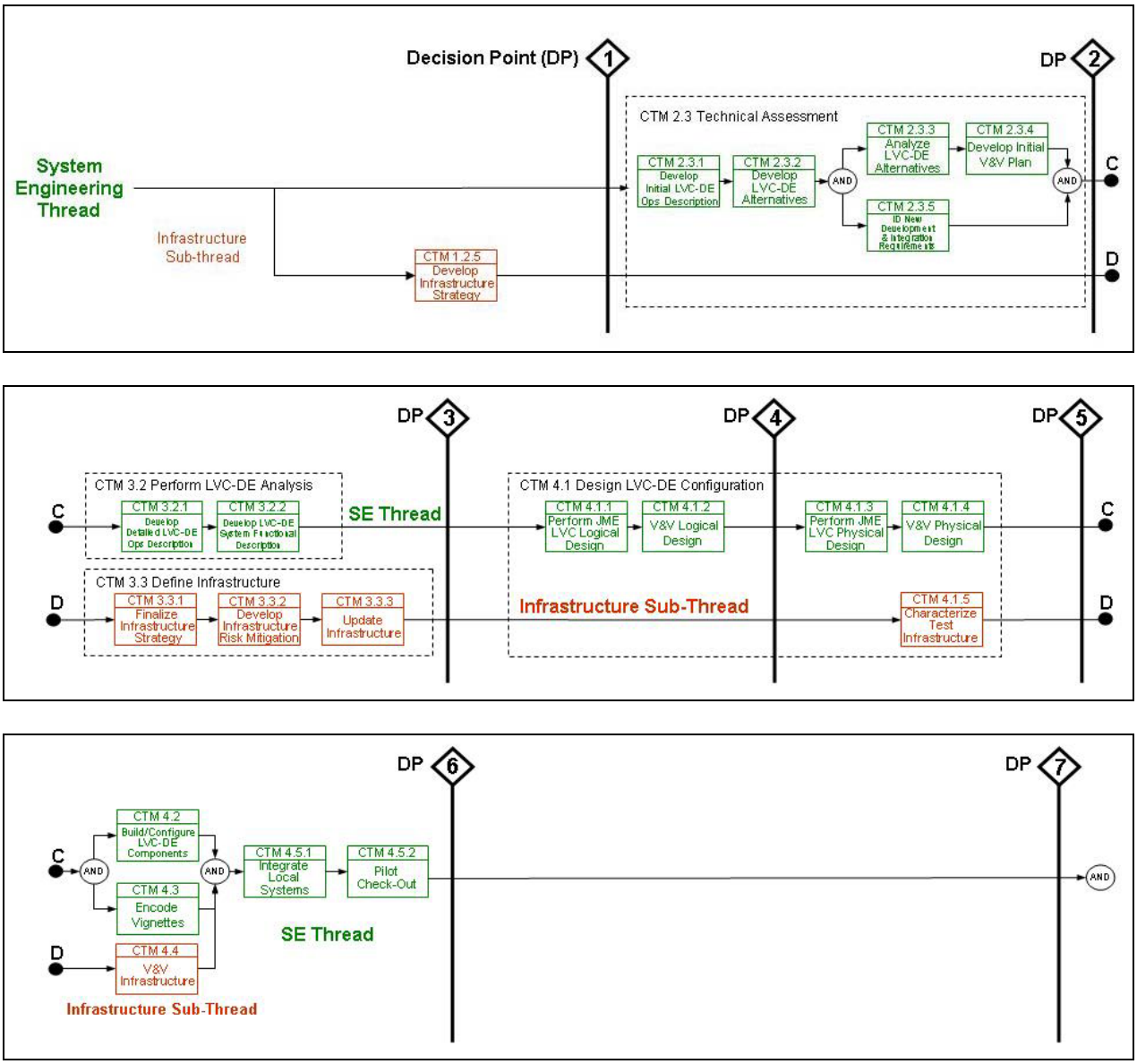

Figure 2-18. CTM Systems Engineering Thread

2.5.3 Test Management Thread

Figure 2-19 shows the CTM test management thread. For DP 1 test management information involved in CTM 1 must be developed and tailored for the test event. This information is typically associated with one or more TEMPs, including the integrated time sequencing of the major T&E phases and events, related activities, and planned cumulative funding expenditures combining DT and OT activities.

The test management thread continues with the programmatic assessment process of CTM 2, to prepare for DP 2. CTM programmatic assessment includes developing initial test high-level schedule and test resource estimates. The CTM 3 processes are essential for DP 3. The test support plan produced should outline the personnel, resources, and strategy to support T&E.

Test plan evaluation, system engineering, and test management functional areas of the test planning phase are then synthesized into an overall, coordinated test plan.

In addition, essential to DP 3 is CTM 5 including an event schedule, data management plan, and event support coordination. After DP 6, the CTM 5 process, Run Event, manages the execution of event iterations and data collection. During and after test execution, Process Test Data, part of CTM 6 activities occurs. Data processing activities can include collecting the data, reducing the data, and distribution of the data to the appropriate analysis sites.

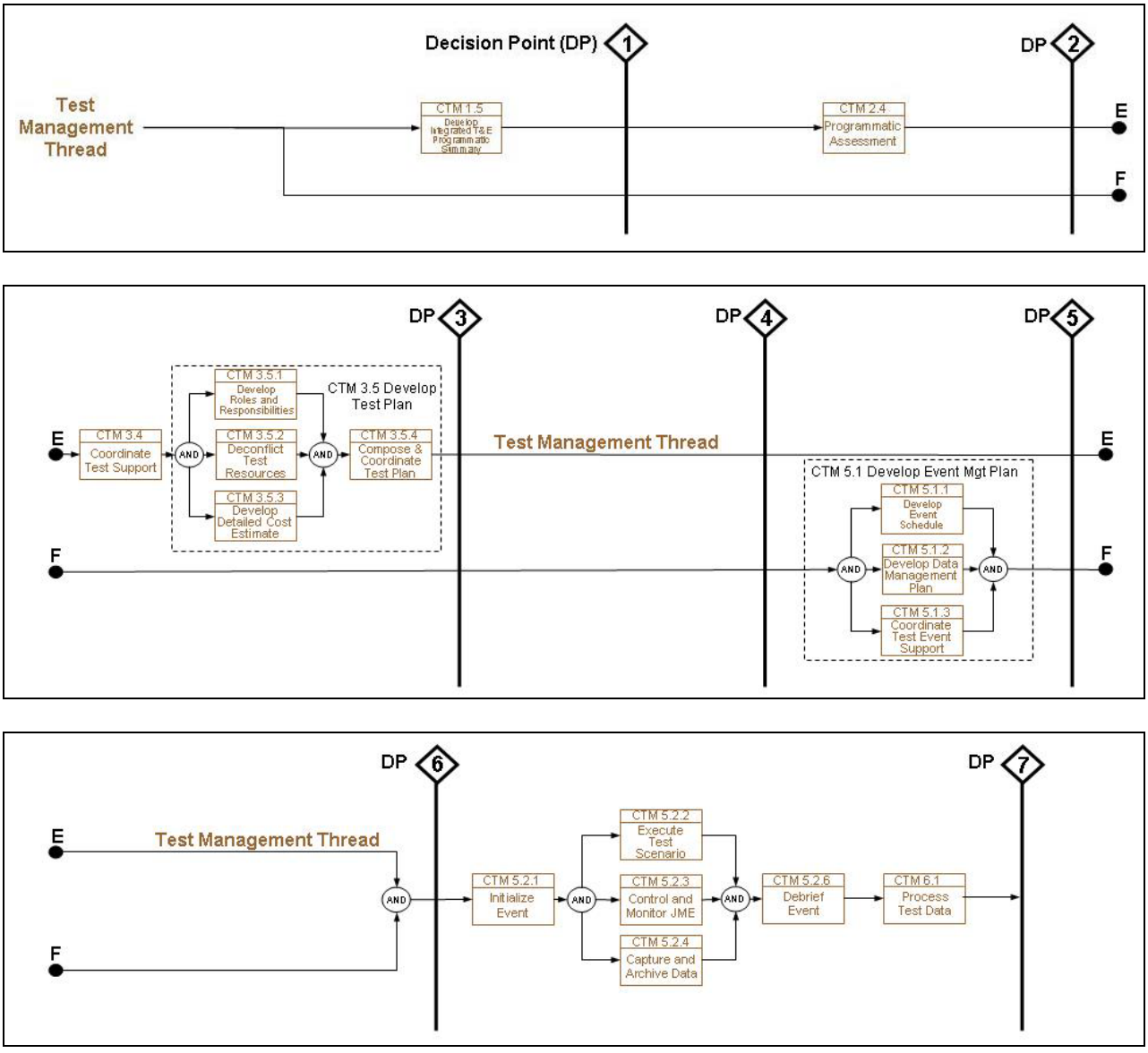

Figure 2-19. CTM Test Management Thread

2.6 SUMMARY

The CTM is one part of an effort within DoD to improve the capability to perform T&E of systems and SoS that will be employed in a JME. This collection of methods and processes is designed to be tailored to the needs of the user within the context of an acquisition program at any stage of the program's development life cycle.

The CTM is a collection of processes grouped into six iterative steps. These steps run from the earliest processes of developing the detailed description and initial test documents for the system or SoS, through planning and executing the required tests, to performing an analysis of test results to produce a thorough evaluation of the system's contribution to JMe. These steps are sequential, but would normally occur iteratively within the life cycle.

Organized by steps, the CTM is implemented via three broad threads and two subordinate threads, each representing the perspective of the participating communities that contribute to a program's test organization. The threads are accompanied by a collection of CTM user guides, one for each of the principal processes described within the CTM. The AO's Handbook, which is included as part of CTM version 3.0 release, describes the CTM, with associated thread descriptions and user guides.

3

MEASURES FRAMEWORK FOR TESTING IN A JOINT ENVIRONMENT

3.1 INTRODUCTION

Testing in a JME is more complex than testing in a traditional environment. JCIDS and recent updates to T&E policy have changed the perspective of both DT and OT such that there is more emphasis on joint task performance and JMe. Testing in a JME also involves evaluating the contribution a system makes to a needed capability or of the proposed solution to overall JMe.

Although the measures employed in traditional system-level testing are adequate for system evaluations, they need to be augmented to support testing SoS in a JME. A more comprehensive measurement approach and framework are needed. This chapter addresses the approach and measures that support testing in a JME.

3.2 JOINT CAPABILITY

The measures framework for testing an SoS in a JME is centered on the JCIDS definition of a capability. A capability is defined as the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks. Figure 2-13 illustrates this definition and shows the major themes that are included as part of a joint capability definition:

- Mission-desired effects: The intended overall result, outcome, or consequence that should achieve the mission end state or objectives.
- Standards and conditions: Standards are quantitative or qualitative measures and criteria for specifying the levels of performance of a task. Conditions are those threat and environmental variables of the mission environment that affect task performance.
- Means and ways: Means are the materiel solutions to a capability gap; the SoS that would deliver the needed joint capability. Ways are the non-materiel solutions to the capability gap or the method in which that SoS is employed.
- Set of tasks: The set of tasks are those joint and Service tasks that should be performed in order to achieve mission-desired effects.

The definition of joint capability, as shown in Figure 2-13, should illustrate the kinds of measures needed to assess adequately the effectiveness in a joint environment.

Mission-Desired Effects

Systems and SoS are ultimately used as the means to perform a set of tasks in order to achieve mission-desired effect(s). A mission-desired effect is the intended overall result, outcome, or consequence that should achieve the combatant command's (COCOM) mission end state or

objective. For example, a mission-desired effect in an operational joint mission might be: "Threat (enemy) forces neutralized in the joint operational area."

Mission-desired effects are derived from mission objectives and end states that are outlined in the authoritative documents such as the defense planning scenario (DPS), the Multi-Service Force Deployment (MSFD) database, and the Analytical Baselines included as part of the Analytic Agenda (see Annex A). These documents, vetted at the joint level, formally describe what the DoD and the Services need to be able to do based upon a common set of assumptions and issues. They confirm the stated mission-desired effects are legitimate military needs.

Standards and Conditions

Standards define the degree of performance expected of the capability or system in performing a task. Standards would typically be identified in operational plans or operational orders as dictated by the operational commander. Examples of standards include:

- Deconfliction time of 10 minutes (performance threshold or objective)
- Zero tolerance for non-combatant fatalities

Conditions refer to the circumstances under which the task should be performed. Conditions can be categorized as either threat or environmental conditions. Environmental conditions can be further sub-divided into physical or civil environment. Examples of conditions might be:

- Urban or open terrain
- Unhindered weather conditions
- Hostile forces mixed with non-combatants

Means and Ways

Means refers to the forces, units, equipment, and other resources used to accomplish the mission. It is the materiel systems/SoS; it is the "what" that is used to carry out a mission. Ways refers to the concepts, doctrines, or other elements of DOTMLPF used to accomplish the mission, the non-materiel attributes of a system/SoS. It is "how" a mission is carried out. Together, the means and ways make it possible to accomplish a required task. Means and ways imply the need to measure both materiel and non-materiel attributes of a system or SoS.

For example, for a task such as, "Execute Personnel Recovery Operations," the means might be an airborne HH-47 helicopter and a Combat Survivor Evader Locator used by a downed aircrew member. The ways might be the TTP used by the helicopter crew and the downed aircrew member to locate and recover the aircrew member. For instance, will the recovery crew communicate with the pilot or maintain radio silence? What search methods will the recovery crew employ? Should the recovery crew be provided attached or detached escort for security during the recovery?

Tasks

A task is an action or activity (derived from an analysis of the mission and concept of operations) assigned to an individual or organization to provide a capability.[8] Several tasks may contribute

[8] CJCSM 3500.04D UJTL, <http://www.dtic.mil/cjcs_directives/cdata/unlimit/m350004.pdf> , 1 August 2005.

to the desired capability. For example, a mission whose goal is to destroy or neutralize enemy forces in the joint operations area might include tactical recovery of personnel as a supporting mission. The Universal Joint Task List (UJTL) lists tasks that support the tactical recovery of personnel in combat including[9]:

- OP 6.2.9.2 Provide Combat Search and Rescue
- OP 6.2.5 Provide Positive Identification of Friendly Forces Within the JOA
- OP 1.5.3 Gain and Maintain Air Superiority in the Joint Operations Area
- OP 3.1.7 Employ Fire Support Coordination Measures

A single task may incorporate multiple individual actions. Taken in combination, tasks provide a capability and allow the accomplishment of the mission.

Joint tasks are defined in the UJTL and in the COCOM's Joint Mission Essential Task List (JMETL). The UJTL and JMETL are supported by each of the Services' corresponding task lists. Current (as of 2008) UJTL and JMETL can be found at the following links:

UJTL: http://www.dtic.mil/cjcs_directives/cdata/unlimit/m350004.pdf

JMETL: http://www.dtic.mil/doctrine/training/JMETLbook.pdf

3.3 CONSTRUCTING AN EFFECTIVE CRITICAL CAPABILITY ISSUE (CCI)

CCIs provide the foundation for measures that support testing in a JME. CCIs are questions that should be answered in order to evaluate/assess the capability of an SoS to perform a set of tasks under a set of standards and conditions in order to achieve desired mission effects. A CCI addresses all levels of measures required to support testing in a JME and captures the essential elements and structure of a capability as illustrated in Figure 3-1.

A CCI addresses the ability to contribute to overall mission effectiveness. A CCI is an analytical statement whose answer will tell the evaluator how well the system or SoS under test will deliver the capability in question. It includes the four key components of a capability definition: the system/SoS configuration, task, mission-desired effect, and conditions. The question asks if a system or SoS can:

- Achieve a desired effect . . .
- Under specific standards and conditions . . .
- Through a combination of means and ways of performing a set of tasks.

The format of the CCI is dependent on the analysis being conducted and can be tailored by the user; whether the CCI is written as "How well…", "Can the…", or "Assess the…" is less important than ensuring that the key elements of a capability are addressed and that their relationships are captured in the CCI. In constructing an effective CCI, it is important to state how the test issue contributes to achieving the mission-desired effect. A generalized CCI construct that captures the essential elements and structure of a capability is shown in Figure 3-1.

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[9] JP 3-50.21 JTTP for CSAR, <https://www.netc.navy.mil/centers/csf/docused/3_50_21.pdf> , 23 March 1998.

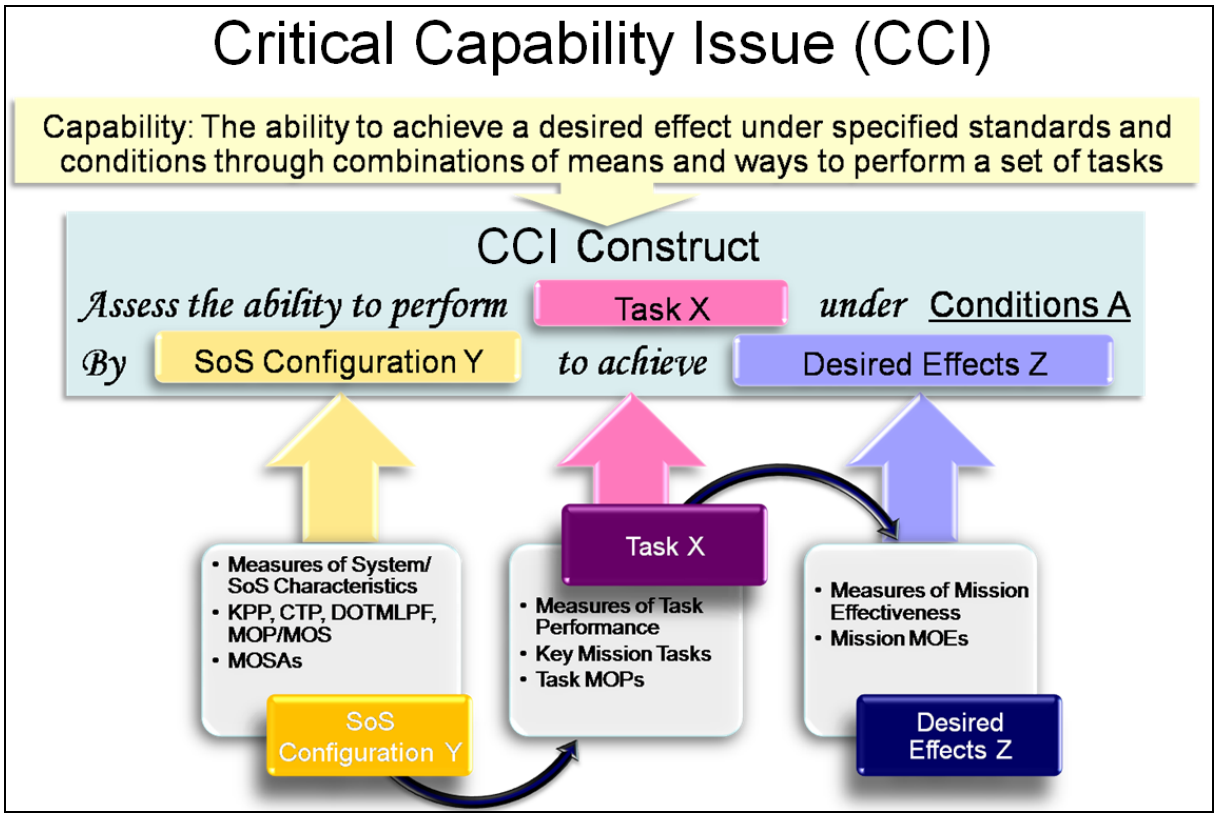

Figure 3-1. Assembling the Statement for a Critical Capability Issue (CCI)

An example of a CCI is: "Assess the ability to perform Joint Dynamic Deconfliction C2 under a military threat environment by a Joint Air-to-Ground System configuration to achieve neutralization of threat systems in a JOA."

3.4 MEASURES REQUIRED FOR TESTING IN A JOINT ENVIRONMENT

To thoroughly test a system and SoS in a joint environment, a set of measures should be developed that can accurately portray both the overall JMe of the SoS and the contribution of the component systems which comprise the SoS. If the test is properly constructed, the resulting data should reveal the correlation of the system performance to the overall mission effectiveness.

Table 3-1 shows a summary of measures for testing in a joint environment contrasted with the traditional measures used during operational and developmental testing. The specified and implied measures for testing in a joint environment are derived from the JCIDS requirements for KSAs and KPPs. Note that testing in a joint environment involves additional measures to demonstrate that a system is contributing to a specific set of joint tasks which contribute to joint missions. Terms such as measures of systems/SoS attributes (MOSA), Mission MOEs, and Task MOPs can be used to differentiate system measures from SoS or family of systems (FoS) measures.

Table 3-1. Test Measures Compared

Level of Measure	REQUIREMENTS GENERATION SYSTEM (RGS):		JOINT CAPABILITIES INTEGRATION & DEVELOPMENT SYSTEM (JCIDS)	TESTING SYSTEM OF SYSTEMS (SOS) IN A JOINT MISSION ENVIRONMENT (JME)
	DT	OT	Integrated DT/OT	Integrated DT/OT
Issue	DT issues	COI	N/A	DT issues, COI, CCI
Mission	N/A	N/A	Mission-Desired Effects	Mission MOE
Task	N/A	MOE	Task Performance	Task MOP
System	KPP, other system measures	MOP, MOS, KPP	KPP, KSA, other joint force characteristics	MOSA; i.e., KPP, KSA, joint force characteristics

These additional measures are derived from the JCIDS documentation for the demonstrated capability and are necessary to support testing SoS in a JME. The JCIDS documents communicate capability gaps for task performance and achievement of mission-desired effects. Testing of SoS in a JME builds on the JCIDS requirements to measure SoS contributions to JMe. This requires a broader set of measures that includes Mission MOEs, Task MOPs, MOSAs, and CCIs. CCIs are similar to COIs; they are analytical statements that should be assessed in order to evaluate the capability of an SoS to perform a set of tasks under a set of standards and conditions in order to achieve desired mission effects. In contrast to COIs, however, CCIs focus on the broader joint context, examining whether the capability delivers the desired joint mission effect.

3.5 A MEASURES FRAMEWORK FOR TESTING IN A JOINT MISSION ENVIRONMENT

There are three distinct perspectives, or levels of measures, that should be evaluated for testing joint capabilities in a joint environment. These are:

- System or SoS level
- Task level
- Joint mission level

To evaluate fully a system/SoS in the JME, each of these levels of measures should be observed and analyzed. The relationship between these three levels and the supporting measures is known as the measures framework, which is described in the following sections:

3.5.1 System/SoS Level Measures

The lowest level represented in the JME is the system or SoS level. Test measures at this level measure performance of the system and SoS against documented technical requirements. These measures include:

Critical Technical Parameters (CTP)

CTPs are measurable critical system characteristics that, when achieved, allow the attainment of a desired operational performance capability. They may also be written to assess characteristics

at the sub-system or component level. CTPs are measures derived from desired user capabilities and are normally assessed during DT&E.

Key Performance Parameters (KPP)

KPPs are system attributes that:

- Are considered critical or essential to the development of an effective military capability.
- Make a significant contribution to the characteristics of the future joint force as defined in *Capstone Concept for Joint Operations*.[10]
- Are validated by the Joint Requirements Oversight Council (JROC) for JROC-interest documents, and by the DoD component for joint integration, joint information, or independent documents.
- Are statutory requirements that must be met if the program is to successfully enter production.

Key System Attributes (KSA)

KSAs are attributes considered crucial in support of achieving a balanced solution/approach to a KPP or some other key performance attribute deemed necessary by the sponsor. KSAs provide decision-makers with an additional level of performance characteristics below the KPP level.

In a joint context, system and SoS measures are applied using the same practices as used in traditional, Service-specific contexts.

Joint Force Characteristics

Joint force characteristics are traits, qualities, or properties of an SoS that describe key attributes of the SoS and guide how the joint force is developed, organized, trained, and equipped. Examples of joint capability key characteristics are:

- Knowledge empowered
- Networked
- Interoperable
- Expeditionary
- Adaptable/tailorable
- Enduring/persistent
- Precise
- Fast
- Resilient
- Agile
- Lethal

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[10] *Capstone Concept for Joint Operations*, version 2.0, August 2005.

These measures are generated as part of the JCIDS process and can be found in the relevant requirements documentation (program initial capabilities document [ICD], CDD, or capability production document [CPD], or equivalent).

3.5.2 Task-Level Measures

The next level represented in the JME is the task level. Test measures at this level are Task MOPs. Task MOPs are used to measure the accomplishment of joint tasks. For example, one joint task might be the ability of the friendly force to implement effective command and control (C2) activities and to respond to conditions. Tasks contribute to the accomplishment of the overall mission.

Task MOPs assess how well a system can accomplish a task. For example, Task MOPs could be used to assess the timeliness, completeness, and precision of the blue force execution of C2 activities. Task MOPs may be derived from the UJTL tasks. In a joint context, Task MOPs are observed using the same practices used for traditional, Service-specific mission tasks.

3.5.3 Joint Mission-Level Measures

The highest level represented in the JME is the joint mission level. Test measures at this level are Mission MOEs. Mission MOEs are tied to mission-desired effects. As stated in section 3.4, mission-desired effects impact the COCOM's intended mission end state(s) or objective(s). Mission-desired effects are derived from an authoritative source such as the DPS, MSFD, and Analytical Baseline.

Mission MOEs are developed during the JCIDS process and quantify the change in condition, behavior, or degree of freedom that will result in the mission-desired effects. Each Mission MOE should map to one or more mission-desired effects. Because resource constraints will not allow every possible degree of freedom or scenario to be tested, Mission MOEs should be selected for a representative cross-section of potential scenarios

3.6 DEVELOPING MEASURES FOR TESTING IN A JOINT MISSION ENVIRONMENT

The importance of measuring effectiveness, suitability, and survivability, whether in a traditional environment or in a JME is clear. How we develop these measures and where they come from have to be determined. In traditional DT&Es and OT&Es, test measures are derived from the system specifications, KPPs, CTPs, and COIs. Test measures focus on determining the effectiveness, suitability, and survivability of a system when operating under increasingly realistic conditions.

Table 3-2 summarizes traditional measures and demonstrates how they support specific DT and OT evaluations.

Table 3-2. Measures Supporting Traditional DT & OT Evaluations

Test Measure	DT Evaluation Supported	OT Evaluation Supported
Detection range at -10 degrees C on an open air range	System specification	System MOP that supports the evaluation of, "Will the system detect the threat at an adequate range to allow successful engagement?"
Detection range at 30 degrees C on an open air range	System specification	System MOP that supports the evaluation of, "Will the system detect the threat at an adequate range to allow successful engagement?"
Mean time between failures	KPP	System MOP that supports the evaluation of, "Will the system mean time between failures be adequate to support sustained combat operations?"

It is important to note that neither the COIs nor the system measures relate directly to the system's performance when that system is used to support an overall joint mission within the context of a larger SoS. In a JME, the traditional test measures are still important, but they will need to be augmented with additional measures that can assess the SoS at the level of its task performance and its contribution to JMe. In the CTM, these measures are organized into three categories: MOSAs, Task MOPs, and Mission MOEs. These measures should be derived from the appropriate requirements documentation, such as a system ICD or CDD.

Measures of System/SOS Attributes (MOSA)

Systems/SoS have various materiel and non-materiel performance attributes associated with them. These may be derived from KPPs, KSAs, joint force characteristics, and other attributes.

Examples of materiel attributes are:

- The launch range of an aircraft (system performance)
- The time needed to disseminate information to the battlespace components from a higher-echelon headquarters (SoS performance)
- The lethality of the SoS against certain threat systems

Non-materiel attributes are items such as DOTMLPF. Some examples are:

- The employment doctrine or the TTP governing the SoS
- The quality and responsiveness of the system's logistical support base

In a comprehensive joint test program, there will normally be several different SoS configurations that will be tested. These differences in SoS configurations will represent test factors (independent decision variables) that will be the basis for the evaluation strategy. SoS

attributes may differ with each configuration and therefore need to be measured across SoS configurations.

Task Measures of Performance (Task MOP)

The systems and SoS are ultimately used to perform joint and Service tasks. A task refers to the actions or activities whose accomplishment is essential to accomplishing the overall mission.

For example, in order to accomplish the mission-desired effect of neutralizing threat (enemy) forces in the joint operational area, one joint task might be to "Execute Joint Battlespace Dynamic Deconfliction (JBD2) C2." This task may be required to support other joint and Service tasks such as:

- Conduct close air support
- Conduct joint fires
- Provide for combat identification

Joint tasks are defined in the UJTL and the COCOM JMETL, which also outline associated Task MOPs. Specific task descriptions for a capability may be documented in the ICD. In the case of some assessments performed under older implementations of the JCIDS, tasks may be listed in the Joint Capabilities Document (JCD).

Task MOPs are documented for each joint task in the UJTL and for Service tasks. Not all measures may be appropriate, so Task MOPs should be selected that apply to the capability under test. Example Task MOPs for the joint task, "Execute JBD2 C2," might include:

- Number of airspace clearance requests for fire missions
- Percent of approved airspace clearances
- Time to deconflict and approve fire missions
- Time to approve all airspace clearances

Mission Measures of Effectiveness (Mission MOE)

Mission MOEs are based on mission-desired effects, which in turn are based on the COCOM's mission objectives and end state. An example of a mission-desired effect is "Threat (enemy) forces are neutralized in the joint operational area." Examples of Mission MOEs for the desired effect may be:

- Percentage of threat forces neutralized in the joint operational area (JOA)
- Time needed for threat systems to be rendered ineffective

Mission-desired effects and Mission MOEs may be found in the ICD (or JCD) and should be derived from the Analytic Agenda.

3.7 SUMMARY

Traditionally, the focus of testing has been on demonstrating a system's effectiveness, suitability, and survivability in response to system-specific requirements, with little emphasis placed on the system's contribution to a larger, joint capability and joint missions.

Testing in a joint environment should include evaluating the contribution that a system or SoS makes to overall JMe. Test metrics should assess:

- The required performance system or SoS attributes
- How well the system or SoS performs joint and Service tasks
- How the system or SoS contributes to JMe

The measures framework for assessing joint capabilities in a joint environment augments traditional test measures with measures of SoS attributes, Task MOPs, and Mission MOEs to assess fully a system or SoS contributions to JMe. These additional measures are used to support evaluating CCIs, which in turn help the evaluator make an assessment of how well the system or SoS contributes to the joint mission.

4

THE JOINT MISSION ENVIRONMENT (JME) FOR TESTING

4.1 INTRODUCTION

Establishing a JME for testing is much more challenging than establishing a test environment for traditional, Service-specific testing. Building a suitable test environment involves a complex mix of many different combat systems from different Services. Because of the difficulty in obtaining live units from other Services, it may require a highly sophisticated, networked infrastructure that connects LVC resources in geographically dispersed locations. Establishing such a test environment takes careful planning and preparation. This chapter addresses building the JME needed for effective testing.

4.2 THE JOINT MISSION ENVIRONMENT (JME)

As depicted in Figure 4-1, testing in a JME accommodates a wide variety of multi-Service systems across a spectrum of environmental and operational conditions. It is important to clarify the distinction between the JME and similar related concepts.

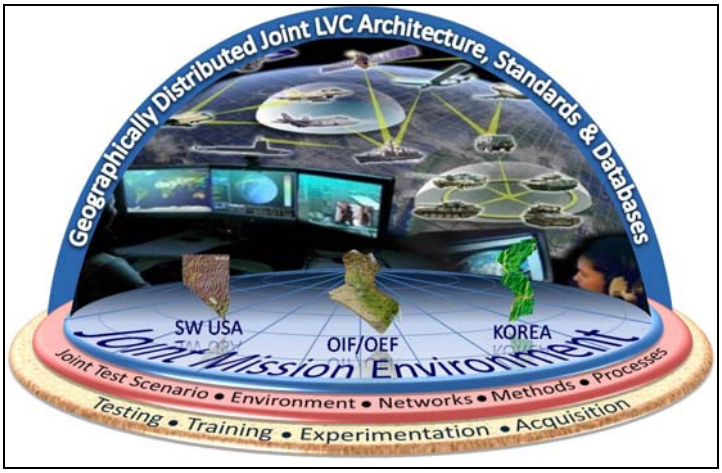

Figure 4-1. The Joint Mission Environment for Testing

The joint *operating* environment is defined as the environment of land, sea, and/or airspace within which a joint force commander employs capabilities to execute assigned missions. It is the broad area of operations and key features of that area where a joint force commander is expected to operate. While helpful, this definition is too broad to be useful in determining the environment needed for a specific test or series of test events.

The joint *operational* environment is defined as a composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. It includes:

- Physical areas and factors (of the air, land, sea, and space domains)
- The information environment
- Adversary, friendly, and neutral systems relevant to a specific joint operation

Although this definition is more specific, it is still too broad for a PM or test planner to use in designing the environment for a specific test or series of test events.

The term joint *mission* environment (JME) is defined as a sub-set of the joint operational environment with entities and conditions within which forces employ capabilities to execute joint tasks to meet a specific mission objective. This definition of the environment is the best suited of the three because it focuses on the specific capability that a system should support. As such, it provides the direction needed to scope the environment for a specific test, or series of test events.

4.3 THE JOINT OPERATIONAL CONTEXT FOR TEST (JOC-T)

For the purpose of evaluating a system or capability, some aspects of the joint operating environment should be described in greater detail than usually provided in source documentation. Such a description includes details of the mission, task, conditions, and SoS under evaluation, and should include measurable criteria upon which an evaluation can be based. It also addresses how the relevant aspects can be represented for the purpose of executing a test.

This specific, detailed description, referred to as the JOC-T in the CTM, is defined in brief as the appropriate combination of representative systems, forces, threats, and environmental conditions assembled for testing in a JME. It includes a description of the resources – live, virtual, or constructive – that will be employed to create this environment for the purposes of testing.

The JOC-T incorporates the elements of a capability, as defined in JCIDS, including mission, task, condition, and SoS as follows:

- Mission aspects include the mission statement, mission-desired effects, and mission end state.
- Task aspects include mission concept of operations (CONOPS), Blue force UJTL-based Joint Mission Essential Tasks (JMET), Service tasks, and TTP.
- Condition aspects include threat conditions (for example, threat actions, threat order of battle, threat C2 structure, threat systems, threat force laydown), and environmental conditions (for example, physical and civil environment).
- SoS aspects include joint capability area (JCA) operational functions and DOTMLPF materiel and non-materiel resource descriptions across DOTMLPF.

These representations can be live, virtual, or constructive, and can exist in geographically distributed combinations.

4.3.1 Elements of the Joint Operational Context for Test (JOC-T)

The primary elements of the JOC-T, as described in 4.3, are:

- Operational Mission: The overarching element of the JOC-T is a description of the overall operational mission that is being conducted. It includes:
  - Joint mission statement – A clear statement of the action to be taken and the reason for doing so.
  - Joint mission-desired effects – The overarching result, outcome, or consequence the COCOM desires to achieve and which will lead to the desired mission end state or objective.
  - Joint mission end state or objective.
  - DoDAF OV-1 high-level joint mission graphic – Describes the capability and highlights main operational nodes.
- Friendly and Threat Forces description includes:
  - Force descriptions/orders of battle (identification, strength, command structure and disposition of the personnel, units and equipment).
  - Actions - joint/Service task decompositions and mission threads.
  - Operational activity flows and general schemes of maneuver with phasing.
- Environment description addresses both the physical (for example, terrain and weather) and the civil (for example, civilian government, authorities, populace) environment.
- Interactions: description of potential testing implications including:
  - Interactions among forces (both friendly-to-friendly and friendly-to-threat).
  - The interactions among these forces and their environments. This element includes DoDAF views that describe interactions among friendly forces, and the criteria used to evaluate those interactions.

Information used to construct the JOC-T comes from a variety of authoritative sources, such as:

- DoD policy and planning documents
- Threat descriptions; System Threat Assessment Report (STAR)
- Acquisition program documents
- JCIDS process and products
- Analytic Agenda
- UJTLs, JMETLs, and Service Task Lists
- TEMP or TES
- Joint Operations Concepts (JOpsC) family of products

Example: Joint Operational Context for Test (JOC-T) for a Simple Test Scenario

An example of a relatively simple test scenario is depicted in Figure 4-2. The operational scenario to be tested consists of a mix of air-launched and ground-launched weapons used by joint forces in a battlespace. These weapons may have to fly through the same airspace, and thus must be deconflicted in real time as ground forces call for supporting fires. The system under test in this case is a notional joint system designed to deconflict close air support and joint fires missions.

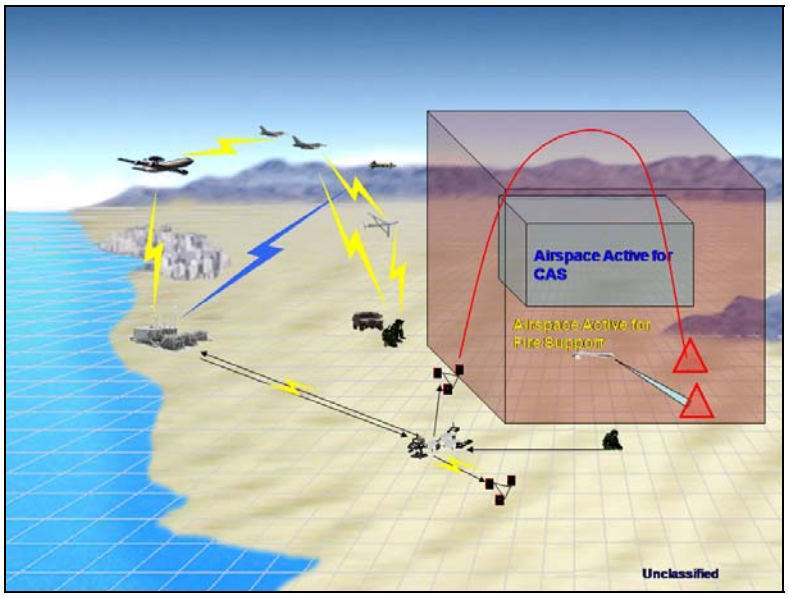

Figure 4-2. Simple Test Scenario

Constructing a JOC-T for our sample scenario involves three primary challenges:

- Identifying the elements that should be represented from the JME.
- Determining the mix of elements ─ which elements will be live, virtual, or constructive.
- Identifying where the elements will be located in the distributed environment.

4.3.2 Joint Operational Context for Test (JOC-T): Mix of Live, Virtual, Constructive

Even in the relatively simple notional test situation shown in Figure 4-3, a wide variety of assets is required for a single test run. These include:

- Multiple aircraft with distinctive mission tasking (F-15E, F-16C, JSTARS, or Airborne Warning and Control System [AWACS])
- Non-Line of Sight Launch System (NLOS-LS) Control Cell
- Joint Terminal Attack Controller (JTAC)
- Threat surface-to-surface system (Scud)
- Threat armor

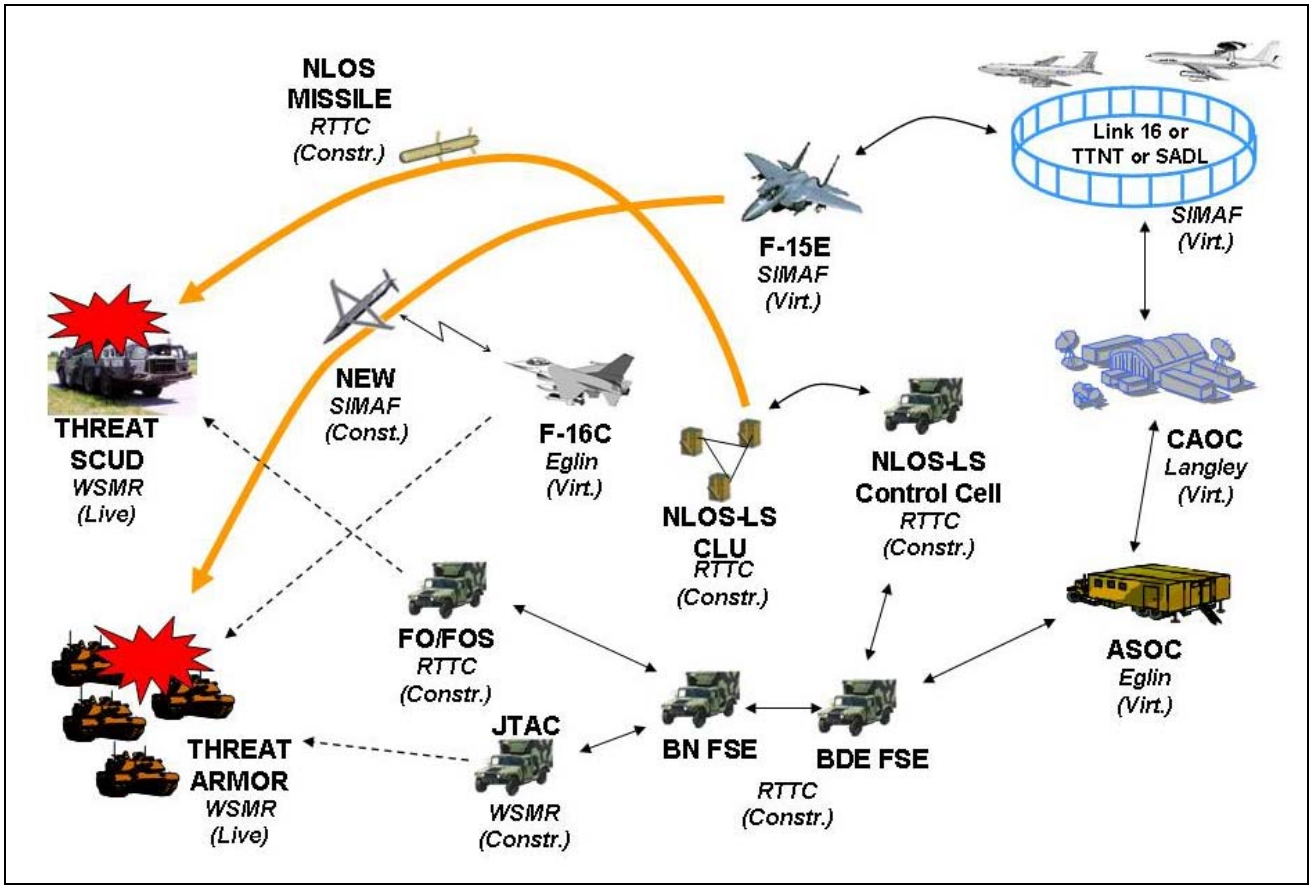

Figure 4-3. Sample Test Scenario Showing Mix of LVC Assets

Once the assets needed to fully describe the JME are identified, the mix of assets should be determined. Specifically, this means determining whether the assets represented in the JME will be live (real people operating real systems), virtual (real people operating simulated systems), or constructive (simulated people operating simulated systems; a pure computer model).

A live test environment features the highest fidelity. However, a purely live test environment, with all elements represented by real forces and weapons, is not usually practical or affordable. In addition, there may be test points that cannot be performed safely in a live environment (for example, a live-fire situation with a high potential for fratricide). The preferred solution is to determine an optimal mix of live systems and virtual and constructive simulations.

In order to guarantee accurate test data are collected, any use of M&S should include a formal process of VV&A.

A disciplined system engineering process is critical in determining the appropriate mix. This process starts with the joint capability that a given system or SoS is designed to support, and guides the test personnel through a selection of the best representation for each system and asset included in the JME. The test personnel would also consider which representation is most suitable for a specific test or series of tests.

4.4 THE JOINT OPERATIONAL CONTEXT FOR TEST (JOC-T) ACROSS THE LIFE CYCLE

The LVC assets in the JME can be used across the entire acquisition life cycle, shown in Figure 4-4. For example:

- During capability gap analysis and AoA, constructive and virtual simulations can be used. These are helpful in determining capability shortfalls and the system/SoS attributes needed to address those shortfalls. These simulations are also useful in conducting trade studies.
- For early (prior to initial design reviews) refinement of system or SoS, systems engineers can use constructive simulations.
- During DT&E, developers can use constructive or virtual simulations to assess system performance and how it supports joint mission capabilities.
- In early Operational Assessments, operational testers can use constructive and virtual system representations to assess trends in JMe.
- During IOT&E, a production-representative live system can interact with other supporting systems using a mix of appropriate simulations to evaluate overall system effectiveness and suitability.

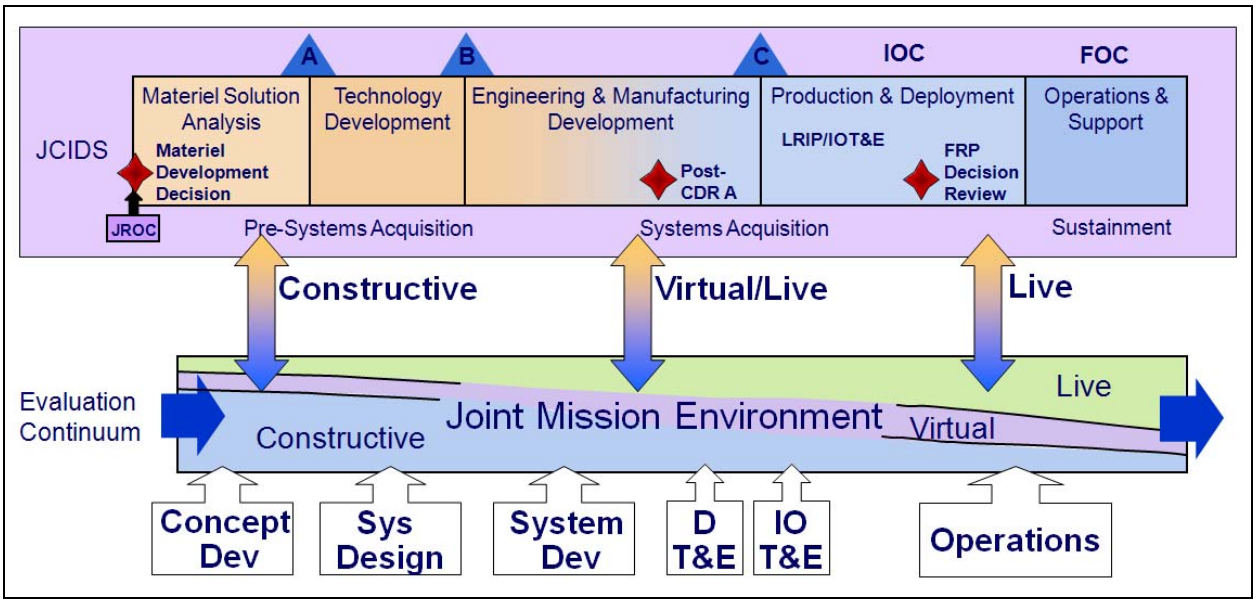

Figure 4-4. LVC Assets Across the Life Cycle

It is important to note that Title 10 U.S. Code[11] does not allow the exclusive use of computer modeling or simulations to meet OT&E requirements for a major defense acquisition program.

[11] "Operational Test and Evaluation of Defense Acquisition Programs." Title 10 U.S. Code, §2399(h)

4.5 SUMMARY

The JME is a broad description of the environment within which joint forces are employed. Establishing a test environment that adequately represents the JME requires careful planning and preparation. The methods and processes that comprise the CTM are designed to facilitate recreating such an environment with enough fidelity to support robust testing in a joint environment.

Creating such a test environment demands a detailed description of the operational mission which the system or SoS will support, friendly and threat forces, environmental factors, and the interactions among all of these elements. This description is known as the JOC-T. Part of this description is the LVC-DE, which indentifies the mix of live, virtual, and constructive assets that will be used to support the test events, and which may be drawn from among the different Services from geographically dispersed sources in a networked environment. The right LVC-DE for the different phases of testing along a system's development life cycle will involve a different mix of LVC components, and should be crafted for the specific requirements of each test or series of tests.

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ANNEX A
DOD INITIATIVES THAT SUPPORT TESTING IN A JOINT ENVIRONMENT

A.1 INTRODUCTION

Among the more significant changes since 2003 is the shift in focus from the procurement of systems in response to a perceived threat to a focus on acquiring capabilities. At the same time, the increasingly multi-Service nature of current operational missions has led to a stronger emphasis on the need for planning from a joint perspective. This emphasis naturally extends to development and testing of new systems and system of systems (SoS) that provide these joint capabilities.

Several Department of Defense (DoD) policy initiatives reflect this joint perspective. These are influencing both current testing practices as well as those practices that will emerge as testing in a joint mission environment (JME) continues to evolve. This section describes some of these initiatives and their impact on acquisition program managers (PM) and their test and evaluation (T&E) teams. These initiatives include:

- Joint Capabilities Integration and Development System (JCIDS)
- DoD Architecture Framework (DoDAF)
- Analytic Agenda
- Testing in a Joint Environment Roadmap (TIJE Roadmap)

A.2 JOINT CAPABILITIES INTEGRATION AND DEVELOPMENT SYSTEM (JCIDS)

JCIDS is a process created to assess and prioritize the capabilities needed by joint forces in order to ensure that the warfighters receive what they need to successfully execute the joint missions assigned to them. JCIDS was developed to:

- Identify and prioritize capabilities based on the needs of joint forces.
- Implement a process to guide the development of new capabilities.
- Create a better definition of the relationship and integration between materiel and non-materiel (or doctrine, organization, training, materiel, leadership and education, personnel, and facility [DOTMLPF]) considerations and policy.

JCIDS is designed to ensure that the joint force has the capabilities necessary to perform across the range of military operations and challenges. Recent operations have emphasized the necessity of integrated and interoperable joint warfighting capabilities. This process establishes the linkage between joint concepts, the analysis needed to identify capabilities required to execute the concepts, and the systems delivering those capabilities. JCIDS implements an integrated, collaborative process to guide development of new capabilities through changes in DOTMLPF and policy. Change recommendations are developed, evaluated, and prioritized based on their contribution to future joint operations.

Figure A-1 provides an overview of the acquisition life cycle along with the JCIDS system.

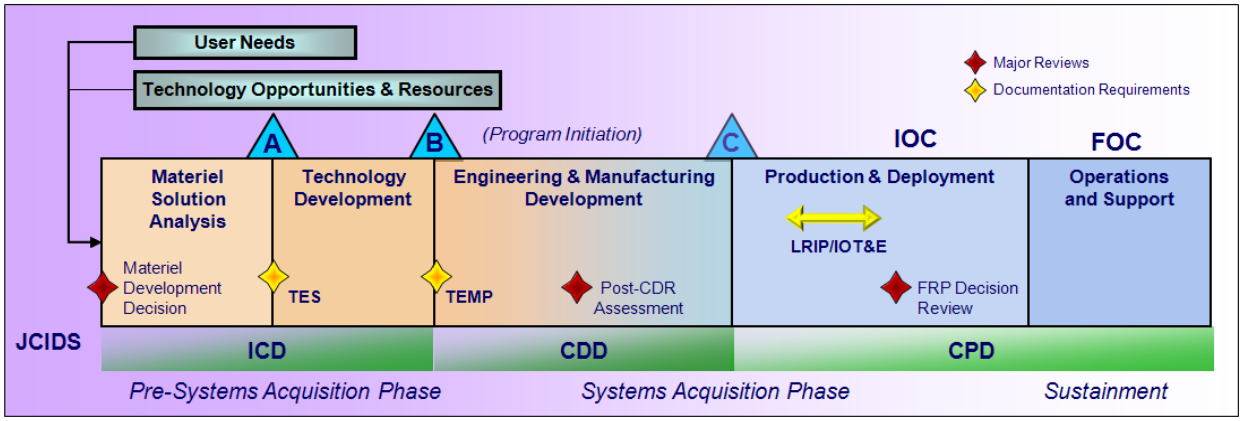

Figure A-1. Defense Acquisition Management System

JCIDS replaces the older requirements generation system (RGS) and changes many of the terms associated with that system. It is based on the need for a joint, concepts-centric capabilities identification process that will enable joint forces to meet the full range of military challenges in the future. A key tenet for meeting these challenges requires that the US military transforms itself into a fully integrated, expeditionary, networked, decentralized, adaptable, and lethal joint force able to achieve what is known as decision superiority.

JCIDS:

- Ensures the joint force has the capabilities to perform across the range of operations.
- Is a primary interface to the DoD acquisition system.
- Implements an integrated process to guide new capabilities development.
- Is a key linkage on how the future joint force will fight.
- Provides the analytical baselines to support studies to inform capability development.
- Leverages expertise to identify improvements to existing capabilities and to develop new warfighting capabilities.

JCIDS is not:

- Capabilities-based planning
- The Joint Requirements Oversight Council (JROC)
- Joint Concepts
- The Analytic Agenda
- Designed to obtain or address near-term funding or urgent warfighting needs

To accomplish this transformation, DoD is implementing processes within JCIDS that assess existing and proposed capabilities in light of their contribution to future joint, allied, and

coalition operations. The process is expected to produce capability proposals that consider and integrate the full range of DOTMLPF solutions in order to advance joint warfighting in both a unilateral and multi-national context.

- The JCIDS process is addressed in CJCSI 3170.01 and CJCSM 3170.01. The instruction provides an overview of JCIDS. The manual outlines more detailed procedures.

A Decision Support System

JCIDS, the Defense Acquisition System, and the Planning, Programming, and Budgeting System (PPBS) form the principal DoD decision support processes for adapting and transforming the military forces to support the national military strategy and the defense strategy in accordance with DoD's vision of the future.

These three decision support systems work in concert and support one another. For example, JCIDS supports the acquisition system by providing validated joint capabilities and associated performance criteria needed to acquire the right solutions to address shortfalls in those capabilities. Additionally, both JCIDS and the Defense Acquisition System provide the planning, programming, budgeting, and execution (PPBE) process with information to support decisions on prioritization and affordability. The PPBE process also ensures adequate resources are available to the acquisition system to procure equipment that meets warfighter needs.

The JCIDS process provides the statutory requirements and information needed to make decisions about joint capabilities to the JROC. The process begins early in the acquisition process and continues throughout a program's life cycle.

Joint Requirements Oversight Council (JROC)

As part of the DoD acquisition process, the JROC reviews programs of interest and supports the acquisition review process in accordance with law (Title 10 USC, section 181). The JROC accomplishes this by reviewing and validating all JCIDS documents for acquisition category I and IA programs, and other programs designated as high interest. For acquisition category ID and IAM programs, the JROC makes recommendations to the Defense Acquisition Board (DAB) or Information Technology Acquisition Board based on such reviews.

The JROC assists the Chairman of the Joint Chiefs of Staff (CJCS) in identifying and assessing the priority of joint military requirements (including existing systems and equipment) to meet the National Military Strategy (NMS).

The Vice Chairman of the Joint Chiefs of Staff (VCJCS) chairs the Council and decides all matters before the Council. The permanent members include the Vice Chiefs of Staff of the US Army (VCSA) and US Air Force (VCSAF), the Vice Chief of Naval Operations (VCNO), and the Assistant Commandant of the Marine Corps (ACMC).

The Council directly supports the DAB through the review, validation, and approval of key cost, schedule, and performance parameters. This occurs at the start of the acquisition process, prior to each milestone review, or as requested by the Under Secretary of Defense for Acquisition, Technology and Logistics USD(AT&L).

The JCIDS process was created to support the statutory requirements of the JROC in its role as an advisory council to the CJCS.

Initiating the JCIDS Process

The JCIDS process begins with a Capabilities-Based Assessment (CBA). The CBA is based on an existing joint operating concept (JOC), joint integrating concept (JIC), or concept of operations (CONOPS). The CBA identifies:

- The capabilities (and operational performance criteria) needed to execute successfully joint missions.
- The shortfalls in existing weapon systems needed to deliver those capabilities, along with the associated operational risks.
- The possible solutions for the capability shortfalls.

The results of the CBA are documented in an Initial Capabilities Document (ICD), or a Joint Capabilities Document (JCD) in the case of some assessments performed under older implementations of the JCIDS. The ICD should be reviewed by the JROC. The review may result in one of the following courses of action:

- Approval of (New) Capability

  When the JROC approves an ICD, it is validating:

  - There is a need to address the capability gap(s).
  - There are potentially affordable and technically feasible solutions to address the gaps. While the JROC does not advocate any specific technical solution at this time, they are validating that a solution(s) does exist.

- Approval of a Non-Materiel Solution

  The JROC may also approve a non-materiel approach to address the capability gap. This might include changes to doctrine, organization, or any other element of DOTMLPF. Non-materiel solutions might be approved as alternatives or adjuncts to a material solution.

- No Action

  The JROC may also identify capability gaps where the operational risk is at an acceptable level. In this case, no further action will be taken.

When the ICD is approved, the lead Service or agency responsible for acquiring the system analyzes the ICD to identify the best technical solution, and documents the requirements in a capability development document (CDD). The CDD also specifies the operational and technical performance criteria for the system that will deliver the capability specified in the ICD.

The JROC reviews the CDD for approval. In approving the CDD, the JROC:

- Validates the key performance parameters (KPP) and their associated threshold and objective values.
- Assesses the risks in meeting KPPs in terms of cost, schedule, and technology maturity.
- Assesses the affordability of the system as compared to the operational capability being delivered.

The JROC's approval of the CDD is one of the key factors in the final decision by the Milestone Decision Authority (MDA) to initiate a development program.

Towards the end of the Engineering & Manufacturing Development phase, the acquiring lead Service or agency delivers a capability production document (CPD). The CPD describes the actual performance requirements of the system that will enter production, and should be validated and approved before a Milestone C decision review. The primary difference between a CPD and a CDD is the refinement of performance attributes and KPPs based upon lessons learned during the development process. The CPD contains the approved set of user requirements for the production system(s).

The CPD is reviewed and validated by the JROC. The JROC objective in approving the CPD is to ensure that the delivered weapon system meets the needs originally defined in the ICD at an affordable cost.

JCIDS: A Robust Process

JCIDS was designed to support a wide range of acquisition needs. Not all capabilities or systems require the same level of consideration, so the JCIDS process can be tailored to individual circumstances.

The JROC has identified several alternative paths to allow for accelerated identification of capability gaps and potential solutions. For example, allowing entry into the JCIDS process at a later, more appropriate stage can facilitate delivering capabilities more rapidly. The JROC continues to refine the JCIDS process and the information they require. Updates to policies and processes contribute to JCIDS' evolution and ensure that the needs of the warfighter are met effectively and in a timely manner.

A.3 TESTING IN A JOINT ENVIRONMENT ROADMAP (TIJE ROADMAP)

The *Strategic Planning Guidance (SPG) for Fiscal Years (FY) 2006-2011* directed the DoD to "provide new testing capabilities (for T&E in a joint operational context) and institutionalize the evaluation of joint system effectiveness as part of new capabilities-based processes." The SPG also tasked Director, Operational Test and Evaluation (DOT&E) to "develop a roadmap for the Deputy Secretary of Defense... that identifies the changes needed to ensure that T&E is conducted in a joint environment and facilitates the fielding of joint capabilities." DoD approved the TIJE Roadmap on November 12, 2004. The Deputy Secretary of Defense's SPG institutionalized the concept that DoD will conduct testing in a JME where applicable during developmental test and evaluation (DT&E) and operational test and evaluation (OT&E). The TIJE Roadmap was developed to enable this concept.

The TIJE Roadmap provides a set of recommendations (or actions) that represent what will be needed to establish a joint operational test environment. These actions are designed to ensure that DoD is able to:

- Acquire capabilities that were developed from the start to perform in a joint context.
- Test legacy equipment and systems so they can be properly evaluated in a joint context.

The objective of the TIJE Roadmap is to define the changes that will position DoD to support fully adequate T&E of warfighting capabilities developed under new capabilities-based acquisition methods in the appropriate JME. Testing in a JME requires changes in the following areas:

- T&E methodology and processes.
- A networking T&E infrastructure able to generate the JME.
- Policy and regulations to implement testing in a JME as a DoD-level policy, and institutionalize this expanded T&E capability.
- Prudent organizational recommendations and a DoD-wide common business process to support the networking infrastructure.
- Initial resources to begin development and implementation.

The TIJE Roadmap calls on the DoD to establish a framework for life cycle evaluation of systems and SoS in a joint operational environment that begins with the JCIDS process. A common task-based language derived from the Universal Joint Task List (UJTL) is essential.

The TIJE Roadmap recommends a series of actions to enable testing in a JME:

1. Establishing a Framework for Life Cycle Evaluation

   The TIJE Roadmap calls for the DoD to establish a framework for life cycle evaluation of systems and SoS in a joint operational environment. This begins with the JCIDS process. The explicit joint mission capability needed should be identified in the CDD and CPD with enough specificity to define jointness for both PMs and testers. In addition, the rationale behind KPPs, thresholds, and objectives should be articulated clearly.

2. Updating and Expanding Test Planning Processes

   Current test planning processes should be updated and expanded to identify clearly the needs for adequate testing of joint warfighting systems or SoS in their mission environment(s). The PM's T&E strategy should address the DT&E, OT&E, and Live Fire Test and Evaluation (LFT&E) needs for joint missions. In addition, these needs should be documented in each system's T&E Master Plan (TEMP). Multi-Service testing, including testing conducted by an Operational Test Agency (OTA), will require test teams that include members of other Services for designated joint mission test events.

3. Using Live Forces in Evaluation

   Live forces, including warfighters and their equipment, should be used to evaluate systems and SoS in a joint operational environment. Today's limited availability of forces to support T&E will be compounded when joint mission capabilities are tested in assigned mission environments. Properly trained and equipped Guard and Reserve forces can supplement

active units to provide the necessary live forces for OT&E in the joint context. Current in-service and production-representative military equipment should be available to live forces in both test and supporting roles to provide an adequate and realistic JME.

NOTE: When the TIJE Roadmap was published in 2004 the current operational demand for Guard and Reserve forces was not anticipated. Therefore, for the foreseeable future, it will be difficult to augment live tests with Guard and Reserve forces. The acquisition and operational test communities may need to consider augmenting live forces used in tests with simulated forces.

4. Requiring Development of Interoperable or Common Mobile Instrumentation

   Development of interoperable or common mobile instrumentation, embedded or non-intrusive, is required, where feasible. Such instrumentation is required for Services, ranges, and the Systems Engineering, Testing, Training, and Experimentation communities.

5. Developing a Robust, Modern Networking Infrastructure

   A persistent, robust, modern networking infrastructure for Systems Engineering, DT&E, and OT&E should be developed. This infrastructure should connect distributed live, virtual, constructive (LVC) resources; enable real-time data sharing and archiving; and augment realistic OT&E of joint systems and SoS.

   DOT&E and the OTAs should approve the selective use of distributed simulation for augmenting the live forces and equipment necessary for OT&E. Approval will be on a case-by-case basis as part of the normal test planning and TEMP approval process.

6. Establishing Strategic Partnerships

   DOT&E and the Services should partner with Office of the Under Secretary of Defense for Personnel and Readiness (OUSD(P&R)) and US Joint Forces Command (USJFCOM) to combine training exercises and test events in a common joint environment whenever possible. This includes establishment of a collaborative prioritization and vetting process to ensure there is no compromise of testing, demonstration, experimentation, and training objectives.

   DOT&E should also partner with Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD(AT&L)) and the Assistant Secretary of Defense for Networks and Information Integration (ASD(NII)), and others as needed, to develop the common, fully enhanced network infrastructure program addressed above as a core element for the DoD.

   The DoD should commit to develop/update models and simulations to ensure the needed virtual and constructive threat, environment, and system representations are funded and available via the enhanced networking infrastructure to support systems engineering and T&E requirements, as well as training and experimentation.

7. Updating Policy to Institutionalize the Requirement for Testing in a JME

   DoD policy and instructions, directives, and regulations should be updated to institutionalize that testing in the joint environment is required for all acquired or modified systems. These documents should also enable the creation and maintenance of the infrastructure necessary to generate the JME required for modern testing.

The Future of the TIJE Roadmap

The TIJE Roadmap identifies the changes needed to ensure the conduct of T&E in a JME and the fielding of joint capabilities. Several initiatives within the DoD are advancing the goals of the TIJE Roadmap:

- The DOT&E-led JTEM project has developed recommended best practices related to methods and processes for conducting tests in a JME.
- The Joint Mission Environment Test Capability (JMETC) program is developing the robust networking infrastructure needed to support the execution of tests in a JME.
- A DOT&E-led Policy Working Group is examining current department-level policy and making recommendations for policy changes to facilitate the implementation of testing in a JME.
- The Services and DoD agencies are investing in modeling and simulation (M&S) capabilities to support the LVC distributed environment (LVC-DE) required to plan for and execute tests in a JME.

A.4 THE DEPARTMENT OF DEFENSE ARCHITECTURE FRAMEWORK (DODAF)

The DoDAF defines a standard way to organize an enterprise architecture (EA) or systems architecture into complementary and consistent views. All major DoD weapons and information technology system procurements are required to develop and document an EA using the views prescribed in the DoDAF.

In the context of testing in a JME, the DoDAF serves as a guide for the development of standard architectures, and is used extensively within the methods and processes of the CTM. It ensures that architecture descriptions can be compared and related across programs, mission threads, and across the entire enterprise. Ultimately, DoDAF facilitates analyses that support effective decision-making across the DoD.

Architectures are created for a number of reasons. From a compliance perspective, the DoD's development of architectures is compelled by law and policy (Clinger-Cohen Act, Office of Management and Budget [OMB] Circular A-130). From a practical perspective, experience has demonstrated that the management of large organizations employing sophisticated systems and technologies in pursuit of joint missions demands a structured, repeatable method for evaluating investments and investment alternatives, as well as the ability to effectively implement organizational change, create new systems, and deploy new technologies.

DoDAF is administered by the Under Secretary of Defense for Business Transformation's DoDAF Working Group. DoDAF was formerly named the C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance) architecture framework.

A.4.1 DoD Architectures

Volume I of the DoDAF defines architecture as the structure of components, their relationships, and the principles and guidelines governing their design and evolution over time. Put another

way, it is a standard way to organize an EA or systems architecture into complementary and consistent views.

A.4.2 DoDAF Architecture Views

The DoDAF provides guidance and specific rules for developing, representing, and understanding architectures across DoD joint and multi-national boundaries. As illustrated in Figure A-2, it organizes architectures into complementary and consistent views, each one providing a different perspective on an architecture:

- Operational View (OV)
- Systems and Services View (SV)
- Technical Standards View (TV)
- All View (AV)

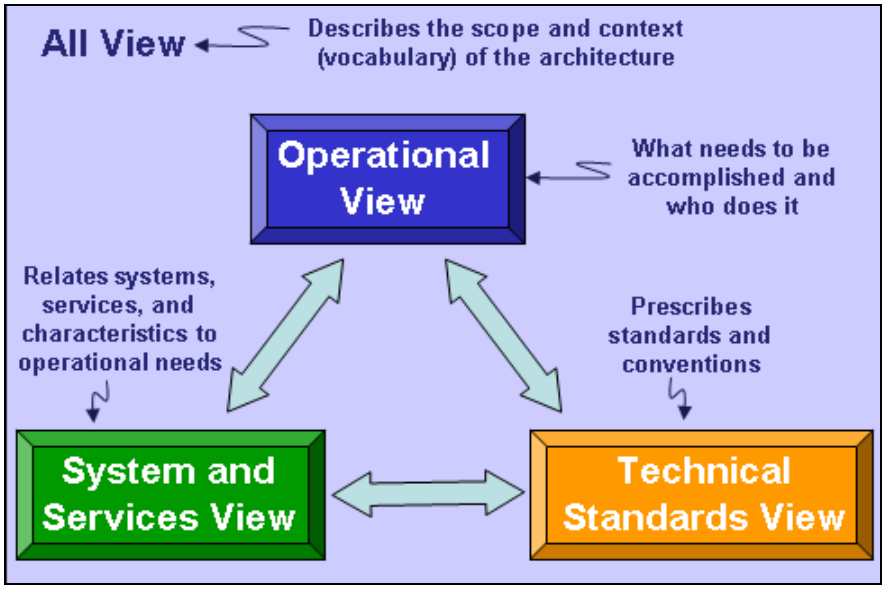

Figure A-2. DoDAF Architecture Views

Operational View (OV)

The OV captures the operational nodes, tasks and activities performed, and the information to be exchanged to accomplish DoD missions. It conveys the types of information, the frequency of exchange, the tasks and activities supported by the information exchanges, and the nature of information exchanges. DoDAF v1.5 defines nine specific OVs.

Systems and Services View (SV)

The SVs capture system, service, and interconnection functionality that provide for or support operational activities, including those associated with warfighting, business, intelligence, and infrastructure functions, and that facilitate the exchange of information among operational nodes.

The SV system and services resources/components may be linked to the architecture artifacts in the OV. DoDAF v1.5 defines 16 specific SVs.

Technical Standards View (TV)

The TV is the minimal set of rules governing the arrangement, interaction, and interdependence of system parts or elements. This view ensures that a system satisfies a specified set of operational requirements.

The TV provides the technical systems implementation guidelines upon which engineering specifications are based, common building blocks are established, and product lines are developed. It includes a collection of technical standards, implementation conventions, standards options, and rules and criteria. These can be organized into profiles that govern systems and system or service elements for a given architecture. DoDAF v1.5 defines two specific TVs.

All View (AV)

There are some overarching aspects of architecture that relate to all three views. These overarching aspects are captured in the AV. The AV provides information pertinent to the entire architecture, rather than representing any one distinct view of the architecture. AV products set the scope and context of the architecture. The scope includes the subject area and time frame for the architecture. The context refers to the setting in which the architecture exists, including all interrelated conditions, such as doctrine; tactics, techniques, and procedures (TTP); relevant goals and vision statements; CONOPS; scenarios; and environmental conditions. DoDAF v1.5 defines two specific AVs.

A.4.3 DoDAF Resources

The DoDAF is defined and described in three volumes:

- DoDAF v1.5, Volume I: Definitions and Guidelines

  This volume introduces the framework and addresses the development, use, governance, and maintenance of architecture data. It is available at http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_I.pdf.

- DoDAF v1.5, Volume II: Product Descriptions

  This volume outlines the essential aspects of architecture development and applies net-centric concepts to the DoDAF products. It is available at http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_II.pdf.

- DoDAF v1.5, Volume III: Architecture Data Description

  This volume introduces the architecture data management strategy and describes the pre-release Core Architecture Data Model (CADM) v1.5. It includes the data elements and business rules for the relationships that enable consistent data representation across architectures. This volume is available at http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_III.pdf.

In addition, an online DoDAF Journal replaces the DoDAF v1.0 Desk Book. The journal is designed to capture development best practices and architecture analytical techniques, and to

showcase exemplar architectures. It is hosted on the DoD Architecture Registry System (DARS) website at https://dars1.army.mil/IER/index.jsp. (This link requires registration.)

A.5 THE ANALYTIC AGENDA

The Analytic Agenda is a DoD-wide cooperative agreement to make major, joint analysis efforts more effective, and J8 Force Structure Resources more responsive. It seeks to align analytical efforts with strategic decisions milestones and the budget process. It also serves as a timeline for the development of Defense Planning Scenarios (DPS), Multi-Service Force Deployment (MSFD) documentation, and Analytical Baselines for use in strategic analyses based upon scenario priorities identified by the Under Secretary of Defense for Policy (USD(P)).

The publication of the *FY 2004 – FY 2009 Defense Planning Guidance (DPG)* in May 2002 initiated the Analytic Agenda. Three organizations were charged with creating and maintaining the Analytic Agenda: Office of the Secretary of Defense Program Analysis and Evaluation (OSD (PA&E)), Office of the Under Secretary of Defense for Policy (OUSD(P)), and Joint Staff J-8. Governance is provided by a steering committee that meets monthly and is chaired by the OSD (PA&E).

The principal goal of the Analytic Agenda is to make DoD-wide analyses more effective and relevant for decision-making by focusing debate on assumptions and issues, and by helping to synchronize strategic planning activities throughout DoD. It supports the planning, acquisition, experimentation, and training communities by providing a common starting point and framework for joint analyses.

A.5.1 Analytic Agenda Products

The Analytic Agenda includes the following major products:

- Defense Planning Scenarios (DPS)

  The DPSs are high-level descriptions of postulated conflicts. They describe strategy and objectives, operational concepts, warning times, and macro-level force commitments for both friendly and threat forces.

  The OUSD(P) is ultimately responsible for developing and maintaining the scenarios, with participation/coordination of the Joint Staff, Program Analysis and Evaluation (PA&E), combatant commands (COCOM), and the Services.

- Multi-Service Force Deployments (MSFD)

  MSFD data describes the CONOPS. These are descriptions of how the postulated conflicts unfold and include:

  - Orders of battle
  - Strategy/tactics at the operational level
  - Axes of attack and defensive dispositions
  - Tables of Organization and Equipment (TOE)
  - Force allocation to missions

- Operational tempo rates (average annual miles or hours of operation for its major equipment systems) and sortie rates (the number of missions that can be flown by a particular aircraft or unit in a day)
- Munitions
- Readiness factors and sustainment

The Joint Staff (J-8) is ultimately responsible for MSFDs. These are developed at quarterly conferences attended by the Services, COCOMs, Defense Intelligence Agency (DIA), and the Office of the Secretary of Defense (OSD).

- Analytical Baselines

  An Analytical Baseline includes a DPS and an MSFD packaged into a database that allows for analysis, which includes:

  - A scenario
  - CONOPS
  - Other integrated data used by the DoD components as a foundation for strategic analyses

  The Joint Staff (J-8) and PA&E are ultimately responsible for Analytical Baselines. Current year baselines are established by COCOMs with assistance by the J-8. Baselines for out years (future) are led by Joint Staff and PA&E with participation by the Services, the DIA, and the COCOMs.

- Studies

  The DoD uses studies to describe a wide range of analytic efforts used to plan for future combat operations or to address a particular issue or question. OSD, the Joint Staff, the Services, and/or defense agencies may conduct these studies.

  Examples of studies include:

  - CBAs.
  - Evaluations of current or projected numbers of personnel/equipment needed to support combat operations.
  - Analyses of alternatives that examine the costs and benefits associated with multiple solutions proposed in response to a capability shortfall.

A.5.2 Analytic Agenda Data and Access

The Analytic Agenda is designed to make major, joint analysis efforts more effective, efficient, and relevant. However, this can only occur if those needing the information are aware of what information exists and they know how to access it.

It is important to know what is included in the suite of Analytic Agenda scenarios. Joint Data Support (JDS), an OSD organization that maintains a repository accessible via the Secret Internet Protocol Router Network (SIPRNET), catalogues much of that information.

The Analytic Agenda provides data sets that can be immediately applied by users to their specific analysis effort. The intent is to save users many of the hours often needed to generate data for use as a starting point for analysis or as input to models, simulations, and other

analytical tools. Examples of the data available are scenarios, CONOPS, and integrated data used to conduct war games and theater campaign simulations.

Access to Analytical Agenda data is controlled by OSD (PA&E), JDS. Access is granted by written request. More information is available at this website: https://jds.pae.osd.mil/

A.6 SUMMARY

This annex touched on several topics relevant to the current effort to institutionalize testing in a JME within the DoD. A shift in emphasis from acquiring systems to the acquisition of capabilities resulted in a major re-design of the old RGS to JCIDS. At the same time, shortfalls in system capabilities that were not discovered before their operational deployment in joint operations drove the DoD to publish the TIJE Roadmap, directing DOT&E to improve the ability to evaluate JMe before new systems and capabilities are fielded.

Related developments are DoDAF, which prescribes standardized architecture illustrations to be used to facilitate system engineering and development, and the Analytic Agenda, which defines the basic analyses and operational scenarios upon which system capability needs should be based. Both of these developments are of critical importance to defining the requirements that a new system or capability should meet from the initiation of the JCIDS process, even before a program's formal creation at Milestone B.

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ANNEX B
ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Meaning
AB	Analytical Baseline
ABM	Agent Based Model
ABMS	Agent Based Modeling and Simulation
ABS	Agent-Based Simulation
ACMC	Assistant Commandant of the Marine Corps
ACV	Airspace Control Volume
AFATDS	Advanced Field Artillery Tactical Data System
AFB	Air Force Base
AFOTEC	Air Force Operational Test & Evaluation Center
AFPD	Air Force Policy Directive
AI	Area of Interest
Analyst's Handbook	Analyst's Handbook for Testing in a Joint Environment
ANOVA	Analysis of Variance
AO	Action Officer; Area of Interest
AO's Handbook	Action Officer's Handbook for Testing in a Joint Environment
AoA	Analysis of Alternatives
AOI	Area of Influence
AP	Analysis Plan
API	Application Programming Interface
ARSM	Advanced Response-Surface Methodology
ASD(NII)	Assistant Secretary of Defense for Networks and Information Integration
AT&L	Acquisition, Technology and Logistics
ATCCS	Army Tactical Command and Control System
AUTL	Army Universal Task List
AV	All View
AW	Air Warfare
AWACS	Airborne Warning and Control System
BCT	Brigade Combat Team
BOV	Blue Operational View
BSV	Blue Systems and Services View
C2	Command and Control
C4I	Command, Control, Communications, Computers, and Intelligence
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CAB	Combat Action Brigade
CADM	Core DoD Architecture Data Model
CAP	Capability Analysis Plan
CART	Classification and Regression Tree

Acronym/Abbreviation	Meaning
CAS	Close Air Support
CBA	Capabilities-Based Assessment
CBP	Capability-Based Planning
CCA	Close Combat Attack
CCD	Central Composite Design
CCI	Critical Capability Issue
CCJO	Capstone Concept for Joint Operations
CDD	Capability Development Document
CDR	Critical Design Review
CEM	Capability Evaluation Metamodel
CFF	Call for Fire
CGF	Computer Generated Forces
CIO	Chief Information Officer
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Manual
CLE	Nomenclature designation for a Continuous Learning Module
CM	Capability Manager
CMU	Connectivity Matrix Utility
COCOM	Combatant Command
COI	Critical Operational Issue
COIN	Counterinsurgency
COMBAT^{XXI}	Combined Arms Analysis Tool for the XXIst Century
CONOPS	Concept of Operations
COTS	Commercial Off-the-Shelf
CPD	Capability Production Document
CPM	Capability Portfolio Manager
CRN	Common Random Number
CSB	Controlled Sequential Bifurcation
CTA	Capstone Threat Assessment
CTM	Capability Test Methodology
CTM 1	CTM Step 1
CTM 2	CTM Step 2
CTM 3	CTM Step 3
CTM 4	CTM Step 4
CTM 5	CTM Step 5
CTM 6	CTM Step 6
CTO	Combine Test Organization
CTP	Critical Technical Parameter
d.f.	Degree of Freedom
DAB	Defense Acquisition Board
DAP	Data Analysis Plan
DARS	DoD Architecture Registry System
DAU	Defense Acquisition University

Acronym/Abbreviation	Meaning
DAUVS	Digital Army USMTF VMF Stimulator
DCARS	Digital Collection, Analysis, and Review System
DCIT	Distributed Capabilities Integration Toolbox
DCM	Data Collection Matrix
DCP	Data Collection Plan
DCR	DOTMLPF Change Recommendation
DD	Deputy Director
DD,AW	Deputy Director, Air Warfare
DE	Distributed Environment
DecSecDef	Deputy Secretary of Defense
DELT	Data Elements List Table
DIA	Defense Intelligence Agency
DIACAP	DoD Information Assurance Certification and Accreditation Process
DIS	Distributed Interactive Simulation
DMAP	Data Management and Analysis Plan
DMP	Data Management Plan
DoD	Department of Defense
DoDAF	DoD Architecture Framework
DoDI	DoD Instruction
DOE	Design of Experiment
DOT&E	Director, Operational Test and Evaluation
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities
DP	Decision Point; Design Point
DPG	Defense Planning Guidance
DPS	Defense Planning Scenario
DRCM	Distributed Range Capabilities Matrix
DRCT	Distributed Range Coordination Team
DSB	Defense Science Board
DSIG	Domain Special Interest Group
DT	Development Test
DT&E	Developmental Test and Evaluation
DWS	Data Warehouse System
EA	Enterprise Architecture
EM	Event Manager
EMP	Event Management Plan
EPG	Electronic Proving Ground
ES	Executive Summary
EV	Evaluation View
EW	Electronic Warfare
FAA	Functional Area Analysis
FARA	Federal Acquisition Reform Act
FBCT	Force Brigade Combat Team
FCS	Future Combat System

Acronym/Abbreviation	Meaning
FDD	Federation Object Model Document Data
FED	Federation Execution Data
FFBD	Functional Flow Block Diagram
FID	Foreign Internal Defense
FNA	Functional Needs Analysis
FO	Forward Observer
FOM	Federation Object Model
FoS	Family of Systems
FOT&E	Follow-on Test and Evaluation
FPC	Final Planning Conference
FSA	Functional Solutions Analysis
FSE	Fire Support Element
FY	Fiscal Year
FYAB	Fiscal Year Analytical Baseline
GCCS-M	Global Command and Control System - Maritime
GIG	Global Information Grid
GIS	Geographic Information System
GL	Glossary
GOSC	General Officer(s) Steering Committee
GPS	Global Positioning System
GRSM	Generalized Response-Surface Methodology
HIMARS	High Mobility Artillery Rocket System
HITL	Human-in-the-Loop
HLA	High Level Architecture
HPCC	High Performance Computing Cluster
HSD	Honestly Significant Difference
HSLT	High Speed LAN TAP
ICD	Initial Capabilities Document
ICP	Integrated Capability Portfolio
IDEF	Integrated Definition for Data Modeling
IDFW	International Data Farming Workshop
IDRL	Integrated Data Requirements List
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IER	Information Exchange Requirement
IF	Indirect Fires
INC	Interface Network Controller
IOT&E	Initial Operational Test and Evaluation
IPC	Initial Planning Conference
IPL	Integrated Priority List
IPT	Integrated Product Team
ISR	Intelligence, Surveillance, and Reconnaissance
IT	Information Technology
ITWA	Initial Threat Warning Assessment
JAGS	Joint Air-to-Ground System

Acronym/Abbreviation	Meaning
JBD2	Joint Battlespace Dynamic Deconfliction
JCA	Joint Capability Area
JCAS	Joint Close Air Support
JCD	Joint Capabilities Document
JCE	Joint Capability Evaluation
JCER	Joint Capability Evaluation Report
JCIDS	Joint Capabilities Integration and Development System
JCS	Joint Chiefs of Staff
JDS	Joint Data Support
JE	Joint Environment
JFC	Joint Functional Concept
JFEO	Joint Forcible Entry Operation
JFIRES	Joint Fires
JFM	Joint Mission Environment (JME) Foundation Model
JIC	Joint Integrating Concept
JM	Joint Mission
JMe	Joint Mission Effectiveness
JME	Joint Mission Environment
JMET	Joint Mission Essential Task
JMETC	Joint Mission Environment Test Capability
JMETL	Joint Mission Essential Task List
JOA	Joint Operational Area
JOC	Joint Operating Concept
JOC-T	Joint Operational Context for Test
JOpsC	Joint Operations Concepts
JP	Joint Publication
JPD	Joint Potential Designator
JPME	Joint Professional Military Education
JROC	Joint Requirements Oversight Council
JS	Joint Staff
JSTARS	Joint Surveillance Target Attack Radar System
JT&E	Joint Test and Evaluation
JTAC	Joint Terminal Attack Controller
JTEM	Joint Test and Evaluation Methodology
JVMF	Joint Variable Message Format
KPP	Key Performance Parameter
KSA	Key System Attribute
LCIM	Level of Conceptual Interoperability Model
LDM	Logical Design Model
LF	Live Fire
LFT&E	Live Fire Test and Evaluation
LH	Latin Hypercube
LRIP	Low Rate Initial Production
LS	Launch System

Acronym/Abbreviation	Meaning
LVC	Live, Virtual, Constructive
LVC-DE	Live, Virtual, Constructive Distributed Environment
M&P	Methods and Processes
M&S	Modeling and Simulation
MADM	Multi-Attribute Decision Making
MANA	Map Aware Non-Uniform Automata
MARS	Multivariate Adaptive Regression Spline
MCO	Major Combat Operation
MDA	Milestone Decision Authority
METOC	Meteorological and Oceanographic
MFMEA	Matrix Failure Modes and Effects Analysis
MHS	Message Handling System
MIL-STD	Military Standard
Mission MOE	Mission Measure of Effectiveness
MMOE	Mission Measure of Effectiveness
MODAF	Ministry of Defence Architecture Framework (UK)
MOE	Measure of Effectiveness
MOP	Measure of Performance
MOS	Measure of Suitability
MOSA	Measure of System/SoS Attribute
MPC	Mid-Planning Conference
MRSM	Modified Response-Surface Methodology
MSCO	Modeling and Simulation Coordination Office
MSEL	Master Scenario Events List
MSFD	Multi-Service Force Deployment
MSRR	Modeling and Simulation Resource Repository
MTBF	Mean Time Between Failure
MTM	Metamodel-Test-Metamodel
MTTR	Mean Time to Repair
MVR	Maneuver
NASA	National Aeronautics and Space Administration
NAVSTAR	Navigation Satellite Timing and Ranging
NBC	Nuclear, Biological, Chemical
NCE	Net-Centric Environment
NEW	Network Enabled Weapon
NLOS	Non-Line of Sight
NLOS-LS	Non-Line of Sight Launch System
NMS	National Military Strategy
NOLH	Nearly Orthogonal Latin Hypercube
NPS	Naval Postgraduate School
NSS	Naval Simulation System
ODUSD(A&T)SSE/DTE	Office of the Deputy Under Secretary of Defense for Acquisition and Technology, Systems and Software Engineering, Development Test and Evaluation

Acronym/Abbreviation	Meaning
OMB	Office of Management and Budget
OneSAF	One Semi-Automated Forces
OOS	OneSAF Objective System
OPLAN	Operational Plan
OPORD	Operation Order
ORSA	Operation Research Systems Analyst
OSD	Office of the Secretary of Defense
OSD (PA&E)	Office of the Secretary of Defense Program Analysis and Evaluation
OT	Operational Test
OT&E	Operational Test and Evaluation
OTA	Operational Test Agency
OTG	Over-the-Horizon Gold
OUSD(AT&L)	Office of the Under Secretary of Defense for Acquisition, Technology and Logistics
OUSD(P&R)	Office of the Under Secretary of Defense for Personnel and Readiness
OUSD(P)	Office of the Under Secretary of Defense for Policy
OV	Operational View
PA&E	Program Analysis and Evaluation
PAID	Process, Application, Infrastructure, Data
PDM	Physical Design Model
PDR	Preliminary Design Review
PI	Program Introduction
PID	Program Introduction Document
PM	Program Manager
PM's Handbook	Program Manager's Handbook for Testing in a Joint Environment
PMJ	Professional Military Judgment
PPBE	Planning, Programming, Budgeting, and Execution
PPBS	Planning, Programming, and Budgeting System
PTP	Program Test Plan
RCS	Restricted Cubic Spline
RCT	Regimental Combat Team
RGS	Requirements Generation System
ROE	Rules of Engagement
ROMO	Range of Military Operations
ROZ	Restricted Operating Zone
RPG	Recommended Practices Guide
RSM	Response-Surface Methodology
RTI	Runtime Infrastructure
RTO	Responsible Test Organization
SC	Statement of Capability
SCS	Simulation Collection System
SDD	System Design Document

Acronym/Abbreviation	Meaning
SEED	Simulation Experiments and Efficient Design
SIPRNET	Secret Internet Protocol Router Network
SME	Subject Matter Expert
SOA	Service Oriented Architecture
SOC	Statement of Capability
SoS	System of Systems; Systems of Systems
SPG	Strategic Planning Guidance
SQL	Standard Query Language
SSAA	System Security Authorization Agreement
STAR	System Threat Assessment Report
SUT	System under Test
SV	Systems and Services View
T&E	Test and Evaluation
TADIL	Tactical Digital Information Link
Task MOP	Task Measure of Performance
TBMCS	Theater Battle Management Core Systems
TCR	Test Concept Review
TD	Test Director
TEMP	Test and Evaluation Master Plan
TENA	Test and Training Enabling Architecture
TES	Test and Evaluation Strategy
TGOA	Test Goal, Objectives, and Approach
TIJE Roadmap	Testing in a Joint Environment Roadmap
TMOP	Task Measure of Performance
TOE	Table of Organization and Equipment
TOEL	Time Ordered Event List
TOV	Threat Operational View
TP	Test Plan
TPR	Test Plan Review
TRAC-MTRY	US Army Training and Doctrine Command Analysis Center in Monterey
TRR	Test Readiness Review
TSSG	Testing in a Joint Environment Roadmap Senior Steering Group
TTP	Tactics, Techniques, and Procedures
TV	Technical Standards View
UAS	Unmanned Aircraft System
UCP	Unified Command Plan
UJTL	Universal Joint Task List
UML	Unified Modeling Language
US	United States
USA	United States Army
USAF	United States Air Force
USC	United States Code

Acronym/Abbreviation	Meaning
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
USD(P)	Under Secretary of Defense for Policy
USJFCOM	US Joint Forces Command
USMC	United States Marine Corps
USMTF	US Message Text Format
USN	United States Navy
V&V	Verification and Validation
VCJCS	Vice Chairman of the Joint Chiefs of Staff
VCNO	Vice Chief of Naval Operations
VCSA	Vice Chiefs of Staff of the US Army
VCSAF	Vice Chiefs of Staff of the US Air Force
VMF	Variable Message Format
VRT	Variance-Reduction Technique
VV&A	Verification, Validation, and Accreditation
WAN	Wide Area Network
WIPT	Working-level Integrated Product Team
XML	eXtensible Markup Language
XSD	XML Schema Definition

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ANNEX C
CTM LEXICON

In order to provide conceptual consistency and an underlying business rule structure for the Capability Test Methodology (CTM), Joint Test and Evaluation Methodology (JTEM) is employing an ontology approach. An ontology can be defined as "an explicit formal specification of how to represent the objects, concepts, and other entities that are assumed to exist in some area of interest and the relationships that hold among them." In keeping with this definition, the ontology supporting the CTM evaluation thread incorporates a *CTM Lexicon* to provide underlying conceptual definitions for the CTM. The *CTM Lexicon* is a cross-domain dictionary of CTM-relevant DoD terminology and definitions. Authoritative DoD sources are used, where possible, for JTEM terms and definitions. Modifications to current terminology or additional terms not currently defined in authoritative sources are noted as CTM version 3.0. This lexicon is one of the test products developed during the course of JTEM.

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Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Abstraction			
	▪ The act of identifying the essential characteristics of a thing that distinguish it from all other kinds of things. Abstraction involves looking for similarities across sets of things by focusing on their essential common characteristics. An abstraction always involves the perspective and purpose of the viewer; different purposes result in different abstractions for the same things. All modeling involves abstraction, often at many levels for various purposes.	DoDAF 1.5, Volume II Annex C C-1	04/2007
	▪ A kind of dependency that relates two elements that represent the same concept at different abstraction levels.	DoDAF 1.5, Volume II Annex C C-1	04/2007
Accreditation			
	▪ The official certification that a model or simulation is acceptable for use for a specific purpose.	DOD 5000.59-M Definitions P.2.1.7. 87	01/1998
Accuracy			
	▪ The degree to which a parameter or variable or set of parameters or variables within a model or simulation conform exactly to reality or to some chosen standard or referent. See resolution, fidelity, precision.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
Adaptable/Tailorable			
	▪ An adaptable/tailorable joint force is versatile in handling threat missions with equal success; scalable in applying appropriate mass and weight of effort; agile in shifting between different types of missions without loss of momentum; responsive to changing conditions and environments; and whose leaders are intellectually empowered by a background of experience and education. Adaptability ensures that the joint force can rapidly shift from one operation to another across the range of military operations, and adjust operations based on changing conditions. An adaptive mindset and flexible force capabilities are essential for success in countering the full spectrum of anticipated threats and challenges and enhance the joint force ability to respond with unmatched speed of decision and action. (See Joint Force Characteristics)	CCJO 2.0 4. Solution 4.E.5. 22	08/2005
Agile			
	▪ An agile joint force has the ability to move quickly and seamlessly to defuse (or help defuse) a crisis situation or effectively operate inside the decision loop of even the most capable adversary. Agility is about timeliness--thinking, planning, communicating, and acting in a manner that allows effective and efficient adaptation to an unfolding situation. Agility permits JFCs to exploit fleeting opportunities, protect friendly vulnerabilities, and adapt rapidly to changes in the operational environment--a characteristic essential to a force that is expected to succeed across the range of military operations. (See Joint Force Characteristics)	CCJO 2.0 4. Solution 4.E.10. 23	08/2005

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
All View (AV)			
	▪ There are some overarching aspects of an architecture that relate to all three views. These overarching aspects are captured in the AV products. The AV products provide information pertinent to the entire architecture but do not represent a distinct view of the architecture. AV products set the scope and context of the architecture. The scope includes the subject area and time frame for the architecture. The setting in which the architecture exists comprises the interrelated conditions that compose the context for the architecture. These conditions include doctrine; tactics, techniques, and procedures; relevant goals and vision statements; Concepts of Operations (CONOPS); scenarios; and environmental conditions. – AV-1 -- Overview and Summary Information: Scope, purpose, intended users, environment depicted, analytical findings. – AV-2 -- Integrated Dictionary: Architecture data repository with definitions of all terms used in all products.	DoDAF 1.5, Volume I 1 1.4.5 1-9	04/2007
Analysis			
	▪ An examination of a concept using quantitative and qualitative measures to assess potential capabilities. It produces metrics that are applied to assumptions and risks and to formulate recommendations and support decisions.	CJCSI 3010.02B Glossary GL GL-3	01/2006
Analysis of Alternatives (AoA)			
	▪ AoA are an important element of the defense acquisition process. An AoA is an analytical comparison of the operational effectiveness, suitability, and Life-Cycle cost of alternatives that satisfy established capability needs. Initially, the AoA process typically explores numerous conceptual solutions with the goal of identifying the most promising options, thereby guiding the Materiel Solution Analysis phase [previously, "Concept Refinement phase"] (see section 3.3.3). Subsequently, at Milestone B (which usually represents the first major funding commitment to the acquisition program), the AoA is used to justify the rationale for formal initiation of the acquisition program. An AoA normally is not required at Milestone C unless significant changes to threats, costs, or technology have occurred, or the analysis is otherwise deemed necessary by the Milestone Decision Authority. For a joint program, the lead DOD Component normally is responsible for the preparation of a single comprehensive analysis.	Defense Acquisition University Guidebook 3 3.3 ---	12/2008
	▪ The evaluation of the performance, operational effectiveness, operational suitability, and estimated costs of alternative systems to meet a mission capability. The AoA assesses the advantages and disadvantages of alternatives being considered to satisfy capabilities, including the sensitivity of each alternative to possible changes in key assumptions or variables. The AoA is one of the key inputs to defining the system capabilities in the capability development document.	CJCSM 3170.01C Definitions GL GL-5	05/2007
Analysis of Alternatives Plan (AoAP)			
	▪ Approved by the Milestone Decision Authority in conjunction with the Concept Decision. It details the approach to be followed in conducting the AoA during the Materiel Solution Analysis phase [previously, "Concept Refinement phase"]. See Analysis of Alternatives.	DAU Glossary of Defense Acquisition Acronyms and Terms, 12th Edition Glossary Appendix B B-9	12/2008
Analysis Plan (AP)			
	▪ A capability level plan that denotes a detailed examination and application of disciplined techniques to evaluate joint mission effectiveness, system of systems performance, and joint task accomplishments.	CTM v3.0 --- --- ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Analytic Agenda					
	▪ A timeline for the development of defense planning scenarios, multi-Service force deployment documents, and analytical baselines for use in strategic analyses; based upon scenario priorities identified by the Under Secretary of Defense for Policy.	CJCSI 3010.02B Glossary	 GL	 GL-3	01/2006
	▪ The Analytic Agenda is a Department-wide cooperative agreement to make major, joint analysis efforts more effective, and responsive. It seeks to align analytical efforts with strategic decision milestones and the budget process. The Analytic Agenda includes, but is not limited to, Defense Planning Scenarios (DPS), Multi-service Force Deployment (MSFD) documents, and Analytical Baselines (AB).	J8 Force Structure Resources and Assessment; http://www.jcs.mil/j8/ddfm.html Studies and Analysis Management Division	 ---	 ---	02/2008
Analytical Baseline					
	▪ Referred to as "baseline" in the text of this Instruction. A package comprising a scenario, concept of operations, and integrated data used by the DOD Components as a foundation for strategic analyses. Analytical baselines shall be produced and reviewed in an open, collaborative, and transparent environment.	DODI 8260.01 Definitions	 E1.1.	 6	01/2007
Assumption					
	▪ A supposition on the current situation or a presupposition on the future course of events, either or both assumed to be true in the absence of positive proof, necessary to enable the commander in the process of planning to complete an estimate of the situation and make a decision on the course of action.	JP 1-02 Appendix	 A-1	 49	03/2007
Attribute					
	▪ A quantitative or qualitative characteristic of a system of systems that is expressed in terms of joint Doctrine, Organization, Training, Material, Leadership and Education, Personnel, and Facilities (DOTMLPF).	CTM v3.0 ---	 ---	 ---	04/2009
Capability					
	▪ The ability to execute a specified course of action. (A capability may or may not be accompanied by an intention.)	JP 1-02 Appendix	 A-1	 77	03/2007
	▪ The ability to achieve a desired effect under specified standards and conditions through combinations of means and ways across the doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) to perform a set of tasks to execute a specified course of action. It is defined by an operational user and expressed in broad operational terms in the format of an initial capabilities document or a joint DOTMLPF change recommendation. In the case of materiel proposals/documents, the definition will progressively evolve to DOTMLPF performance attributes identified in the capability development document and the capability production document.	CJCSI 3170.01G Part II -- Definitions	 Glossary	 GL-3	03/2009

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Capability Development Document (CDD)					
	▪ A document that captures the information necessary to develop a proposed program(s), normally using an evolutionary acquisition strategy. The CDD outlines an affordable increment of militarily useful, logistically supportable, and technically mature capability. The CDD may define multiple increments if there is sufficient definition of the performance attributes (key performance parameters, key system attributes, and other attributes) to allow approval of multiple increments.	CJCSI 3170.01F Glossary	 GL	 GL-5	05/2007
Capability Evaluation Metamodel (CEM)					
	▪ A conceptual model to relate key capability test and evaluation concepts. The CEM provides the "rules" for conducting Joint Mission effectiveness (JMe) assessments of capability relational structures defined in a Joint Operational Context for Test (JOC-T) and are approximated by a Joint Mission Environment (JME). – Capability Test Methodology (CTM) process steps produce the following CEM structures: JOC-T; Capability Evaluation Strategy; Capability Test Design; Joint Mission Environment (JME); Test Event; and Joint Capability Evaluation (JCE). – The Joint Operational Context for Test (JOC-T) is the joint operational context for the Capability Evaluation Strategy. This Capability Evaluation Strategy contains design of experiment (DOE) factors and measures which are filtered to produce various Capability Test Designs focused on one or more Critical Capability Issues (CCI). – The Capability Test Design is instantiated in a test event using a JME, built from live, virtual, constructive (LVC) test technologies. Testers use the JME to execute the Capability Test Design in a test event, which provides response data for a joint capability evaluation (JCE). – JCEs are conducted based on analysis structures in the Capability Test Design. Such JCEs provide SoS recommendations for DOD acquisition and other capability development managers. The CEM is based on the definition of capability and its relationships from the Joint Capabilities Integration and Development System (JCIDS) in CJCSI 3170.01F.	CTM v3.0 ---	 ---	 ---	04/2009
Capability Gap					
	▪ The inability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks. The gap may be the result of no existing capability, lack of proficiency or sufficiency in existing capability, or the need to recapitalize an existing capability.	CJCSI 3170.01F Glossary	 GL	 GL-5	05/2007
Capability Lifecycle					
	▪ Capability generation lifecycle including business practice, information flow, and their associated attributes, directed toward the efficient, synchronized delivery of required system of systems capabilities.	CTM v3.0 ---	 ---	 ---	04/2009
Capability Manager/Capability Portfolio Manager (CM/CPM)					
	▪ Manages selected groupings of capabilities using integrated strategic planning, integrated architectures, measures of performance, risk management techniques, transition plans, and portfolio investment strategies. Portfolio management influences the Joint Capability Integration and Development System (JCIDS), the Planning Programming, Budgeting, and Execution process (PPBE), and the Defense Acquisition System, through the appropriate policy instructions. It delivers integrated capabilities, improves interoperability, identifies and captures efficiencies, reduces capability redundancies and gaps, and increases joint operational effectiveness.	CTM v3.0 ---	 ---	 ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Capability Production Document (CPD)			
	▪ A document that addresses the production elements specific to a single increment of an acquisition program.	CJCSM 3170.01C Glossary GL GL-7	05/2007
Capability Test Methodology (CTM)			
	▪ The Capability Test Methodology (CTM) is an integral part of the Defense Acquisition System, providing methods and processes that guide the design and execution of system-of-systems tests in the joint mission environment to produce high quality capability assessments and evaluations supporting Department of Defense development and investment decisions. CTM can involve developmental or operational testing during multiple phases of the acquisition lifecycle, including Materiel Solution Analysis, Technology Development, and Engineering and Manufacturing Development phases.	CTM v3.0 --- --- ---	04/2009
Capacity			
	▪ The number of instances of an object or detail that are simultaneously represented by a model or simulation; cardinality.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
Capstone Concept for Joint Operations (CCJO)			
	▪ The Capstone Concept for Joint Operations describes in broad terms [the CJS's] vision for how the joint force circa 2016-2028 will operate in response to a wide variety of security challenges. It proposes that future joint force commanders will combine and subsequently adapt some combination of four basic categories of military activity -- combat, security, engagement, and relief and reconstruction -- in accordance with the unique requirements of each operational situation. The concept is informed by current strategic guidance, but because it looks to the future, it is intended to be adaptable, as it must be, to changes in that guidance.	CCJO 3.0 Foreword FW iii	01/2009
Characteristic			
	▪ A desirable trait, quality, or property that distinguishes how the future joint force should conduct military operations.	CJCSI 3010.02B Glossary GL GL-3	01/2006
Command-linked Tasks			
	▪ Discrete activities or actions designated by a joint force commander or identified by the lead federal agency that must be performed by commands and combat support agencies outside the command or directive authority of the joint force, if the joint force is to successfully perform its missions. Command-linked tasks are selected by the supported command or lead federal agency and are normally scheduled for training, evaluated, and assessed by the organization providing the support.	CJCSM 3500.04E Glossary GL-4 61	08/2008
Component			
	▪ A modular, deployable, and replaceable part of a system that encapsulates implementation and exposes a set of interfaces. A component is typically specified by one or more classifiers (e.g. implementation classes) that reside on it, and may be implemented by one or more artifacts (e.g., binary, executable, or script files).	DoDAF 1.5, Volume II Annex C C-2	04/2007

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Concept of Operations (CONOPS)			
	▪ A verbal or graphic statement that clearly and concisely expresses what the joint force commander intends to accomplish and how it will be done using available resources. The concept is designed to give an overall picture of the operation. Also called commander's concept or CONOPS.	JP 1-02 Appendix A-1 112	03/2007
Condition			
	▪ Those variables of an operational environment or situation in which a unit, system, or individual is expected to operate and may affect performance. (See Joint Mission-Essential Task)	JP 1-02 Appendix A-1 112	03/2007
	▪ Variable of the operational environment, including a scenario that affects task performance.	CJCSM 3500.04E Glossary GL GL-4	08/2008
Constructive Model or Simulation			
	▪ Models and simulations that involve simulated people operating simulated systems. Real people stimulate (make inputs) to such simulations, but are not involved in determining the outcomes.	DOD 5000.59-P Definitions 36c A-6	10/1995
Credibility			
	▪ The criteria that the model, simulation, or federation of models and simulations needs to meet to be acceptable for its intended use.	IEEE Std 1516.4-2007 Definitions 3.1 4	12/2007
Criterion			
	▪ The minimum acceptable level of performance associated with a particular measure of task performance. It is often expressed as hours, days, percent, occurrences, minutes, miles, or some other command stated measure.	CJCSI 3500.01D Glossary GL GL-4	05/2007
Critical Capability Issue (CCI)			
	▪ A Critical Capability Issue is an analytical statement used to assess performance pertaining to capabilities which support joint missions. The essential elements of a CCI include a capability's essential tasks, mission desired effects, blue system of systems (SoS) across DOTMLPF, and conditions involving threat and environmental factors. These essential elements are contained in the Capability Crosswalk. – It is important to state how the test issue contributes to achieving the mission end state outcomes in terms of mission desired effects. The CCIs should address the SoS capability to perform joint operational tasks and/or the SoS, system, or service attribute performance. CCIs are of primary importance to the decision authority in reaching a decision to allow the system of systems to advance into the next phase of development. An example CCI format which captures the essential elements would be: Assess the ability to perform Task X under Conditions A by SoS Configuration Y to achieve Desired Effects Z.	CTM v3.0 --- --- ---	04/2009
Critical Operational Issue (COI)			
	▪ Critical Operational Issues are the operational effectiveness and operational suitability issues (not parameters, objectives, or thresholds) that must be examined in operational test and evaluation to evaluate/assess the system's capability to perform its mission.	Memorandum of Agreement on Multi-Service Operational Test And Evaluation Introduction Purpose 1	08/2004

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Critical Technical Parameter (CTP)			
	▪ The critical technical parameters of the system (including software maturity and performance measures) that will be evaluated (or reconfirmed if previously evaluated) during the remaining phases of developmental testing. Critical technical parameters are measurable critical system characteristics that, when achieved, allow the attainment of desired operational performance capabilities. They are not user requirements. Rather, they are technical measures derived from desired user capabilities. Failure to achieve a critical technical parameter should be considered a reliable indicator that the system is behind in the planned development schedule or will likely not achieve an operational requirement. Limit the list of critical technical parameters to those that support critical capability issues. The system specification is usually a good reference for the identification of critical technical parameters.	Defense Acquisition University Guidebook 9 9.10.1 ---	12/2008
Data Analysis Plan (DAP)			
	▪ The Data Analysis Plan (DAP) is a document that provides detailed procedures for the collection, reduction, collation, and analysis of data gathered to support determination of a system's/SoS's operational effectiveness and suitability. The DAP aligns with the test plan in terms of contribution to a successful test and is a planning tool to ensure procedures are in place for assessing data collection upon completion of test execution. The DAP is designed to provide the specifics for the analysis of operational effectiveness and suitability of an SoS. The DAP should be completed before the test event begins to ensure the needs of various system/SoS customers and that the resources are available to complete the capability analysis. The DAP should include the purpose of the data analysis, data sources (including a description and any limitations), key variables to be used, and the capability analysis methods. The capability manager should review the plan to ensure that the proposed capability analysis will answer relevant questions. Data analysis experts should review the plan to ensure that appropriate data and methods will be used, and the DAP should be approved by the capability manager.	CTM v3.0 --- --- ---	04/2009
Data Elements List Table (DELT)			
	▪ The data elements list table (DELT) begins the correlation between the issues and sub-issues to the measures, and data elements. The DELT will be refined and transformed into the IDRL once the units of measurement, sample size needed, data source, data media, data format, data structure, instrumentation, test variables, and individual test event have been specified. The DELT also forms the foundation for the Data Analysis Plan (DAP).	CTM v3.0 --- --- ---	04/2009
Data Management Plan (DMP)			
	▪ The purpose of the Data Management Plan (DMP) is to provide detailed procedures for the collection, reduction, collation, storage, and disposition of data gathered to support determination of a system's operational effectiveness and suitability. The DMP is both a planning tool to ensure procedures are in place for data collection, and a data management tool for tracking and assessing data collection during test execution.	CTM v3.0 --- --- ---	04/2009
Defense Planning Scenario (DPS)			
	▪ DPSs, written 8-20 years into the future, are used in CBA. These scenarios have classified CONOPS that provide a high level of specificity and defined parameters to aid in robust analysis of capabilities and a comparison of alternate solutions.	CJCSI 3010.02B Enclosure A 7.b.1.a. A-5	01/2006

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Department of Defense Architecture Framework (DoDAF)			
	▪ The DoDAF is a three-volume set that inclusively covers the concept of the architecture framework, development of architecture descriptions, and management of architecture data. – Volume I introduces the DoDAF framework and addresses the development, use, governance, and maintenance of architecture data. – Volume II outlines the essential aspects of architecture development and applies the net-centric concepts to the DoDAF products. – Volume III introduces the architecture data management strategy and describes the pre-release CADM v1.5, which includes the data elements and business rules for the relationships that enable consistent data representation across architectures.	DoDAF 1.5, Volume I Executive Summary ES ES-2	04/2007
Developmental Test and Evaluation (DT&E)			
	▪ Test and evaluation conducted to evaluate design approaches, validate analytical models, quantify contract technical performance and manufacturing quality measure progress in system engineering design and development, minimize design risks, predict integrated system operational performance (effectiveness and suitability) in the intended environment, and identify system problems (or deficiencies) to allow for early and timely resolution or correction. Decision-makers use DT&E results to minimize design risk, whereas OT&E evaluates military utility, and system effectiveness and suitability. DT&E usually includes contractor testing (AFPD 99-1).	AFOTEC OT&E Guide, 5th edition. Glossary Attch B B-9	06/2007
Distributed Range Coordination Team (DRCT)			
	▪ Team representing required additions to each development and operational test organization to provide expertise for tests in joint environments and to absorb the increased scope of such testing (reference: Testing in a Joint Environment Roadmap, paragraph 2.2.9). Roles and responsibilities for team members may include providing single points of contact for program managers and lead ranges to work with multiple distributed test organizations; providing top-level facilitation for activities spanning various functional and organizational elements across distributed test organizations; and making sure distributed planning, integration, execution, and analysis activities are regularly and frequently coordinated with all participants.	CTM v3.0 --- --- ---	04/2009
DOTMLPF			
	▪ Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities. (See Joint Doctrine, Joint Organization, Joint Training, Joint Materiel, Joint Leadership and Education, Joint Personnel, and Joint Facilities).	CJCSI 3170.01F Glossary GL GL-11	05/2007
Effect			
	▪ The physical or behavioral state of a system that results from an action, a set of actions, or another effect.	JP 1-02 Appendix A-1 176	03/2007
	▪ A change to a condition, behavior, or degree of freedom.	JP 1-02 Appendix A-1 176	03/2007

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
	▪ The result, outcome, or consequence of an action.	JP 1-02 Appendix	A-1	176	03/2007
Element					
	▪ An atomic constituent of a model.	DoDAF 1.5, Volume II Annex	C	C-3	04/2007
End State					
	▪ The set of required conditions that defines achievement of the commander's objectives.	JP 1-02 Appendix	A-1	183	03/2007
	▪ The set of conditions, behaviors, and freedoms that defines achievement of the commander's mission.	CJCSI 3010.02B Glossary	GL	GL-4	01/2006
Enduring/Persistent					
	▪ This has both a mental and physical aspect. The mental aspect can be expressed as will, while the physical aspect can be expressed as the staying power of the joint force--in both cases, sustaining ours while breaking the adversaries. This characteristic is especially important given the interaction between the anticipated environment, joint force Operations, and unanticipated events in any complex and adaptive system. It demands that the joint force possess the depth and capacity to sustain operations over time, regardless of the situation or adversary. (See Joint Force Characteristics)	CCJO 2.0 4. Solution	4.E.6.	22	08/2005
Engineering and Manufacturing Development (EMD)					
	▪ The purpose of the EMD Phase is to develop a system or an increment of capability; complete full system integration (technology risk reduction occurs during Technology Development); develop an affordable and executable manufacturing process; ensure operational supportability with particular attention to minimizing the logistics footprint; implement human systems integration (HSI); design for producibility; ensure affordability; protect CPI by implementing appropriate techniques such as anti-tamper; and demonstrate system integration, interoperability, safety, and utility. The CDD, Acquisition Strategy, SEP, and Test and Evaluation Master Plan (TEMP) shall guide this effort.	DODI 5000.2 Enclosure 2	Procedures	20	12/2008
Environment					
	▪ Includes the air, water, land, plants, animals, and other living organisms, man-made structures, historical and cultural resources, and the interrelationships that exist among them and with people.	DAU Glossary of Defense Acquisition Acronyms and Terms, 12th Edition Glossary	GL	B-56	12/2008
	▪ The aggregate of all external and internal conditions (such as temperature, humidity, radiation, magnetic and electric fields, shock vibration, etc.) either natural or man - made, or self - induced, that influences the form, performance, reliability or survival of an item.	DAU Glossary of Defense Acquisition Acronyms and Terms, 12th Edition Glossary	GL	B-56	12/2008

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Environmental Condition			
	▪ Those physical environment (land, sea, air, and space) condition variables of an operational environment or situation in which a unit, system, or individual is expected to operate. Those civil environment (political, cultural, and economic) condition variables of an operational environment or situation in which a unit, system, or individual is expected to operate and may affect performance.	CTM v3.0 --- --- ---	04/2009
Error			
	▪ The difference between an observed, measured, or calculated value and a correct value.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
Essential Task			
	▪ In the context of joint operation planning, a specified or implied task that an organization must perform to accomplish the mission. An essential task is typically included in the mission statement. (See Task)	JP 1-02 Appendix A-1 187	03/2007
	▪ Tasks based on mission analysis and approved by the commander that are absolutely necessary, indispensable, or critical to the success of a mission.	CJCSM 3500.04E Glossary GL 61	08/2008
Evaluation Strategy			
	▪ The evaluation strategy serves as the blueprint to assess a capability's joint mission effectiveness (JMe). Key elements of the evaluation strategy are Critical Capability Issues (CCI), evaluation independent factors, and evaluation dependent response measures. – Evaluation independent factors include: joint mission(s) and task(s); threat and environmental conditions; and system of systems (SoS) configuration options across doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) resources. – Evaluation dependent response measures are structured in three levels: mission measures of effectiveness (MMOEs), task measures of performance (TMOPs), and system/SoS attributes. These measures should be described in terms of their nature (e.g., qualitative and quantitative), measurement units, and desired fidelity. – Evaluation strategy elements can be refined and related using the Capability Crosswalk structure. Using the elements of the Joint Operational Context for Test (JOC-T), the evaluation strategy is created and refined to support Joint Mission Effectiveness (JME) evaluation of a capability's joint task performance by a system of systems configuration (across DOTMLPF) under threat and environmental condition sets to achieve mission desired effects in a realistic joint environment.	CTM v3.0 --- --- ---	04/2009
Evaluation View (EV)			
	▪ A proposed view in the Department of Defense Architecture Framework (DoDAF) designed to capture the evaluation framework for assessing joint mission effectiveness, joint task performance, and system of systems performance. The Evaluation View(s) would include mission desired effects, mission measures of effectiveness, task measures of performance, system of systems attributes, and performance measures, and all associated data.	CTM v3.0 --- --- ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Event Management Plan (EMP)					
	▪ The Event Management Plan includes three sections. These three sections are the event schedule, the data management plan, and the coordinated event support. These sections are generally done by the test range facility in coordination with the customer and are specific to a test event and its iterations. The three sections outlined are the minimum items that should be included in the plan and coordinated before an event is run.	CTM v3.0 ---	 ---	 ---	04/2009
Event Manager (EM)					
	▪ Responsible for planning, coordinating, and executing an LVC-DE event supporting Capability Manager and Program Manager(s) requirements for Capability Test & Evaluation. In addition to coordination of event support, the EM develops and manages an integrated schedule and a data management plan, both addressing requirements from the CM(s) and PM(s). The EM function is generally done by the lead test range facility for a specific test event and its iterations.	CTM v3.0 ---	 ---	 ---	04/2009
Expeditionary					
	▪ An expeditionary joint force is organized, postured and capable of rapid and simultaneous deployment, employment, and sustainment. Implicit in this is a joint force that converges mission-tailored capabilities at the desired point of action from dispersed locations around the globe, regardless of anti-access or area-denial environments. As elusive and adaptive adversaries seek refuge in remote and inaccessible areas, the norm will be short-notice operations, austere operational environments, incomplete information and the requirement to fight on arrival throughout the battlespace and to dominate potential adversaries for the duration of a campaign. The future joint force will be immediately employable even in austere conditions and largely independent of existing infrastructure. As a situation evolves, these elements will be readily capable of transitioning to sustained operations, blending into new capability packages to execute follow-on or different operations, or dispersing until otherwise required. The term "expeditionary" also describes the joint force mindset that inculcates an expeditionary perspective into all aspects of force planning, training, and education. The future joint force will increasingly require a mechanism to enable global sourcing of military forces and capabilities; in order to leverage the most responsive, best positioned forces at the time of need. (See Joint Force Characteristics)	CCJO 2.0 4. Solution	 4.E.4.	 21	08/2005
Fast					
	▪ Key to effectively controlling tempo is the ability to be faster than the adversary or situational events. The speed at which forces maneuver and engage, or decisions are made, or relief is provided, will largely determine operational successes or failures. Successfully overcoming future challenges may require speed of action across all domains. Acting fast is in itself a force multiplier and often a requisite for the effective application of military capabilities. (See Joint Force Characteristics)	CCJO 2.0 4. Solution	 4.E.8.	 23	08/2005
Federate					
	▪ An application that may be or is currently coupled with other software applications under a Federation Object Model Document Data/Federation Execution Data (FDD/FED) and a runtime infrastructure (RTI). This may include federation managers, data collectors, real world ("live") systems (e.g., C4I systems, instrumented ranges, sensors), simulations, passive viewers, and other utilities.	IEEE Std 1516.4-2007 Definitions	 3.1	 4	12/2007
Federation					
	▪ A named set of federate applications and a common Federation Object Model (FOM) that are used as a whole to achieve some specific objective.	IEEE Std 1516.4-2007 Definitions	 3.1	 4	12/2007

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Fidelity			
	▪ The description of a model, simulation, or federation of models and simulations and its associated data representational capabilities (e.g. resolution, error, precision, and sensitivity).	IEEE Std 1516.4-2007 Special Terms 3.2 5	12/2007
Fitness			
	▪ Providing the capabilities needed or being suitable for some purpose, function, situation or application.	Recommended Practices Guide Fidelity RPG --- 8 Special Topic	09/2000
Implied Task			
	▪ A task that is not stated but necessary to do the mission.	CJCSM 3500.04E Glossary GL 61	08/2008
Increment			
	▪ A militarily useful and supportable operational capability that can be effectively developed, produced or acquired, deployed, and sustained. Each increment of capability will have its own set of threshold and objective values set by the user. Spiral development is an instance of an incremental development strategy where the end state is unknown. Technology is developed to a desired maturity and injected into the delivery of an increment of capability.	CJCSM 3170.01C Glossary GL GL-9	05/2007
Initial Capabilities Document (ICD)			
	▪ Documents the requirement for a materiel or non-materiel approach, or an approach that is a combination of materiel and non-materiel, to satisfy specific capability gap(s). It defines the capability gap(s) in terms of the functional area, the relevant range of military operations, desired effects, time and doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) and policy implications and constraints. The ICD summarizes the results of the DOTMLPF and policy analysis and the DOTMLPF approaches (materiel and non-materiel) that may deliver the required capability. The outcome of an ICD could be one or more joint DCRs or capability development documents.	CJCSM 3170.01C Glossary GL GL-10	05/2007
Integrated Capability Portfolio (ICP)			
	▪ Executive Level Management of capability groupings that cover the entire DOD budget authority.	Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment; http://www.dtic.mil/futurejointwarfare/strategic/jca_tor9apr07.doc Definitions --- 9	04/2007
Integrated Data Requirements List (IDRL)			
	▪ Serving as the foundation for the Data Analysis Plan (DAP), the IDRL correlates the issues to the sub-issues, measures, data elements, units of measurement, sample size, data source, data media, data format, data structure, instrumentation, test variables, and test event.	CTM v3.0 --- --- ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Integrated Priority List (IPL)			
	▪ A list of a combatant commander's highest priority requirements, prioritized across Service and functional lines, defining shortfalls in key programs that in the judgment of the combatant commander, adversely affect the capability of the combatant commander's forces to accomplish their assigned mission. The integrated priority list provides the combatant commanders' recommendations for programming funds in the planning, programming, and budgeting system process.	JP 1-02 Definitions --- 266	03/2007
Interaction			
	▪ A specification of how stimuli are sent between instances to perform a specific task. The interaction is defined in the context of a collaboration.	DoDAF 1.5, Volume II Annex C C-3	04/2007
Interagency Coordination			
	▪ Within the context of Department of Defense involvement, the coordination that occurs between elements of the Department of Defense and engaged US government agencies, for the purpose of achieving an objective.	CJCSM 3500.04E Glossary GL 62	08/2008
Interoperable			
	▪ Interoperability is a necessary prerequisite to integrated and interdependent joint operations. The future joint force will be able to share and exchange knowledge and services between units and commands at all levels. The interoperable joint force can act in an integrated and ultimately an interdependent way among joint force components and capabilities, facilitating more effective interoperability with interagency and multinational partners. Interoperability implies systems, capabilities and organizations working in harmony across all joint force elements; however, it involves more than systems and equipment. Interoperability includes a cultural change at all levels that extends through DOTMLPF. (See Joint Force Characteristics)	CCJO 2.0 4. Solution 4.E.3. 21	08/2005
JCA Decomposition			
	▪ JCAs are logically broken down from higher capability categories to further scope, bound, and clarify capability categories by providing greater granularity to facilitate detailed analysis or allow better mapping of resources to capabilities. The number of tiers/levels required to decompose a JCA down to its component capabilities is not a constant across the JCAs. This decomposition enhances JCA usefulness in DOD processes, (e.g., Integrated Priority List (IPL) submissions, Universal Joint Task List (UJTL) integration, roadmaps, and program and budget databases).	Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment; http://www.dtic.mil/futurejointwarfare/strategic/jca_tor9apr07.doc Definitions --- 9	04/2007
JCA Lexicon			
	▪ A collection of joint capability definitions that provide a common capabilities language for DOD in order to facilitate capabilities-based planning, analysis, and decision-making. (Modified from Joint Capability Area Management Plan).	Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment; http://www.dtic.mil/futurejointwarfare/strategic/jca_tor9apr07.doc Definitions --- 9	04/2007

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
JCA Taxonomy			
	▪ The structure or framework of joint capabilities, used in conjunction with the JCA lexicon, to facilitate capabilities-based planning, analysis, and decision-making.	Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment; http://www.dtic.mil/futurejointwarfare/strategic/jca_tor9apr07.doc Definitions --- 9	04/2007
JFM Element			
	▪ A member of a component. Elements contain the base attribute or operations, and provide the basis for instantiated entities in the JME. [Model Driven Architecture (MDA) References].	CTM v3.0 --- --- ---	04/2009
Joint			
	▪ Connotes activities, operations, organizations, etc., in which elements of two or more Military Departments participate.	JP 1-02 Appendix A-1 281	03/2007
Joint Capabilities Document (JCD)			
	▪ The JCD identifies a set of capabilities that support a defined mission area utilizing associated Joint Operations Concepts (JOpsC), concept of operations (CONOPs), or Unified Command Plan or other assigned missions. The capabilities are identified by analyzing what is required across all functional areas to accomplish the mission. The gaps or redundancies are then identified by comparing the capability needs to the capabilities provided by existing or planned systems. The JCD will be used as a baseline for one or more functional solution analyses leading to the appropriate initial capabilities documents or doctrine, organization, training, materiel, leadership and education, personnel, and facilities change recommendation documents, but cannot be used for the development of capability development or capability production documents. The JCD will be updated as changes are made to the supported JOpsC, CONOPs, or assigned missions.	CJCSM 3170.01C Glossary GL GL-12	05/2007
Joint Capabilities Evaluation (JCE)			
	▪ The documented analysis of one or more capability test events used to support milestone A, B, or C acquisition decisions.	CTM v3.0 --- --- ---	04/2009
Joint Capabilities Integration and Development System (JCIDS)			
	▪ The Joint Capabilities Integration and Development System (JCIDS) is a joint-concepts-centric capabilities identification process that allows joint forces to meet future military challenges. The Joint Capabilities Integration and Development System process assesses existing and proposed capabilities in light of their contribution to future joint concepts. Joint Capabilities Integration and Development System, supported by robust analytic processes, identifies capability gaps and potential solutions.	Defense Acquisition University Guidebook 1 1.3 ---	12/2008

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Joint Capability Area (JCA)			
	▪ Collections of like DOD activities functionally grouped to support capability analysis, strategy development, investment decision making, capability portfolio management, and capabilities-based force development and operational planning.	Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment; http://www.dtic.mil/futurejointwarfare/strategic/jca_tor9apr07.doc --- --- ---	04/2007
Joint Doctrine			
	▪ Joint doctrine consists of fundamental principles that guide the employment of US military forces in coordinated action toward a common objective. Joint doctrine contained in joint publications also includes terms, tactics, techniques, and procedures. (See DOTMLPF)	CJCSI 5120.02 Enclosure A 1.a A.1	11/2004
Joint DOTMLPF Change Recommendation (DCR)			
	▪ A recommendation for changes to existing joint resources when such changes are not associated with a new defense acquisition program.	CJCSI 3170.01F Glossary GL GL-11	05/2007
Joint Environment (JE)			
	▪ Realistic test environment comprised of friendly forces and equipment, threats, and geophysical environments that are required to assess military capabilities that are 'born joint' as identified in JCIDS capability documents.	CTM v3.0; derived from "Testing in a Joint Environment (TIJE) Roadmap" 2.0 2.2.3 10	11/2004
Joint Exercise			
	▪ A joint military maneuver, simulated wartime operation, or other CJCS- or combatant commander-designated event involving planning, preparation, execution, and evaluation. A joint exercise involves forces of two or more Military Departments interacting with a combatant commander or subordinate joint force commander, involves joint forces and/or joint staffs, and is conducted using joint doctrine or joint tactics, techniques, and procedures.	CJCSM 3500.04E Glossary GL-5 62	08/2008
Joint Facilities			
	▪ Real property consisting of one or more of the following: a building, a structure, a utility system, pavement, and underlying land. Key facilities are selected command installations and industrial facilities of primary importance to the support of military operations or military production programs. A key facilities list is prepared under the policy direction of the Joint Chiefs of Staff. (See DOTMLPF)	CJCSM 3170.01C Glossary GL GL-13	05/2007

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Joint Force Characteristics					
	▪ The joint force must have certain key characteristics. These particular characteristics are considered important because they will guide how the joint force is developed, organized, trained and equipped and must be reflected in all subordinate concepts in the JOpsC family. Such a force is designed to be a dominant national asset, compelling in all situations, and lethal when required. – Joint Force Characteristics include: Knowledge Empowered, Networked, Interoperable, Expeditionary, Adaptable/Tailorable, Enduring/Persistent, Precise, Fast, Resilient, Agile, and Lethal.	CCJO 2.0 4. Solution	 4.E.	 20	08/2005
Joint Functional Concept (JFC)					
	▪ Addresses broad enduring functions across the range of military operations (e.g., force application and battlespace awareness).	CCJO 2.0 2. Scope	 2.B.	 3	08/2005
Joint Functions					
	▪ Related capabilities and activities grouped together to help joint force commanders synchronize, integrate, and direct joint operations. Functions that are common to joint operations at all levels of war fall into six basic groups—command and control, intelligence, fires, movement and maneuver, protection, and sustainment.	JP3-0 Glossary	 GL	 GL-20	09/2006
Joint Integrating Concept (JIC)					
	▪ A JIC is an operational-level description of how a joint force commander, 8-20 years into the future, will perform a specific operation or function derived from a JOC and/or a JFC. JICs are narrowly scoped to identify, describe, and apply specific military capabilities, decomposing them into fundamental tasks, conditions, and standards. Further analysis and expansion of tasks, conditions, and standards is accomplished after JIC completion in order to effectively execute CBA. Additionally, a JIC contains illustrative vignettes to facilitate understanding of the concept.	CJCSI 3010.02B Enclosure A	 A-3	 13	01/2006
Joint Leadership and Education					
	▪ Professional development of the joint commander is the product of a learning continuum that comprises training, experience, education, and self-improvement. The role of Professional Military Education and Joint Professional Military Education is to provide the education needed to complement training, experience, and self-improvement to produce the most professionally competent individual possible. (See DOTMLPF)	CJCSM 3170.01C Glossary	 GL	 GL-13	05/2007
Joint Materiel					
	▪ All items (including ships, tanks, self-propelled weapons, aircraft, etc., and related spares, repair parts, and support equipment, but excluding real property, installations, and utilities) necessary to equip, operate, maintain, and support [joint] military activities without distinction as to its application for administrative or combat purposes. (See DOTMLPF)	CJCSM 3170.01C Glossary	 GL	 GL-13	05/2007

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Joint Mission Effectiveness (JMe)					
	▪ Joint Mission Effectiveness (JMe) is the evaluation of a capability's joint task performance by a system of systems configuration (across DOTMLPF) under threat and environmental condition sets to achieve mission desired effects in a joint operational context for test (JOC-T). – Critical Capability Issues (CCI) are used to capture essential JMe elements in terms of an evaluation question (e.g., Can the Capability perform Task X by SoS Configuration Y under Condition Set A to achieve Mission Desired Effect Z? – JMe follows a traditional scientific methodology of empirical-inductive reasoning to evaluate causal relationships between capabilities and increased warfighting effectiveness. The scientific method employs a basic experimental design process to determine if a proposed capability A causes the anticipated military effect B. This can be stated in terms of an experimental hypothesis, "If the proposed capability, then an improved mission effectiveness". These relational concepts are reflected in a Capability Evaluation Metamodel (CEM), an underlying conceptual model that supports the Capability Test Methodology to frame the evaluation of Joint Mission Effectiveness (JMe). – A design of experiment (DOE) approach is used in the CEM to frame capability test designs in terms of independent variables (IVs), the causal condition A, and dependent variables (DVs), the effect B. CEM IVs are manipulated factors in the test whose presence or degree affects change in dependent variables. – There are three IV treatment dimensions in a CEM test design: joint mission(s) and task(s); threat and environmental conditions; and system of systems (SoS) configuration options across doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) resources. CEM DVs are response measures, whose changes are caused by the presence, or degree of IVs in the test. DVs are measured for increases and decreases in mission effectiveness across a set of test trials. – There are three levels of response measures: mission measures of effectiveness (mission MOE), task measure of performance (task MOP), and system or SoS attribute performance (system/SoS attribute).	CTM v3.0 ---	--- ---	--- ---	04/2009
Joint Mission Environment (JME)					
	▪ A subset of the joint operational environment composed of force and non-force entities; conditions, circumstances and influences within which forces employ capabilities to execute joint tasks to meet a specific mission objective.	TSSG Approved ---	--- ---	--- ---	06/2008
Joint Mission Environment Foundation Model (JFM)					
	▪ The purpose of the JME Foundation Model (JFM) is to provide an authoritative framework for applying a logical capabilities-based process that can be robustly applied for reasoning among Stakeholders in a wide range of situations and test capability applications. The JFM is a design template for the CTM system engineering M&P that can be used to guide the reuse and development of LVC-DE systems. The JFM is a theoretical construct that represents physical processes, with a set of logical and quantitative relationships between those components, and component interactions. The goal of the JFM is to provide a frame of reference for LVC-DE configuration design.	CTM v3.0 ---	--- ---	--- ---	04/2009
Joint Mission Essential Task (JMET)					
	▪ A mission task selected by a joint force commander deemed essential to mission accomplishment and defined using the common language of the universal joint task list in terms of task, condition, and standard. Also called JMET.	CJCSI 3500.01D Glossary	 GL	 GL-6	05/2007

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Joint Mission Essential Task List (JMETL)					
	▪ A mission task selected by a joint force commander deemed essential to mission accomplishment and defined using the common language of the universal joint task list in terms of task, condition, and standard. Also called JMET.	CJCSM 3500.04E Glossary	 GL	 GL-5	08/2008
Joint Operating Concept (JOC)					
	▪ Individual joint operating concepts will address the joint contribution to dealing with each of these [five] challenges [1. win the Nation's wars; 2. deter potential adversaries; 3. develop cooperative security; 4. defend the homeland; and 5. respond to civil crises] in greater detail.	CCJO 3.0 3. National Security Challenges	 ---	 7	01/2009
Joint Operating Environment					
	▪ The joint operating environment is the environment of land, sea, and/or airspace within which a joint force commander employs capabilities to execute assigned missions. It is the broad area of operations and key features of that area where a joint force commander is expected to operate.	CTM v3.0 ---	 ---	 ---	04/2009
Joint Operational Context for Test (JOC-T)					
	▪ The JOC-T is the appropriate combination of representative systems, forces, threats, and environmental conditions assembled for test in a Joint Mission Environment.	CTM v3.0 ---	 ---	 ---	04/2009
	▪ Alternately, it is the comprehensive description of the mission, forces, environment, and TTPs – and the dependencies among these – that must be addressed in the test environment. It includes a description of the resources, live, virtual, or constructive, that will be employed to create this environment for the purposes of testing.	CTM v3.0 ---	 ---	 ---	04/2009
	▪ The JOC-T describes capability concepts and relationships, as defined in JCIDS, including mission, task, condition, and system of systems (SoS). JOC-T mission aspects include the mission statement, mission desired effects, and mission end state. JOC-T task aspects include mission concept of operations (CONOPs), Blue force UJTL-based JMETs, Service tasks, and tactics, techniques, and procedures (TTP). JOC-T condition aspects include threat conditions (e.g., threat actions, threat order of battle, threat command and control structure, threat systems, threat force laydown), and environmental conditions (e.g., physical and civil environment). JOC-T Blue SoS aspects include joint capability area (JCA) operational functions and DOTMLPF materiel and non-materiel resource descriptions across DOTMLPF.	CTM v3.0 ---	 ---	 ---	04/2009
Joint Operational Environment					
	▪ Joint operational environment is defined as a composite of the conditions, circumstances and influences that affect the employment of capabilities and bear on the decisions of the commander. It includes: – Physical areas and factors (of the air, land, sea, and space domains). – The information environment. – Adversary, friendly, and neutral systems relevant to a specific joint operation.	CTM v3.0 ---	 ---	 ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Joint Operations Concepts (JOpsC)			
	▪ JOpsC is a family of joint future concepts consisting of a Capstone Concept for Joint Operations, Joint Operating Concepts, Joint Functional Concepts, and Joint Integrating Concepts. They are a visualization of future operations and describe how a commander, using military art and science, might employ capabilities necessary to meet successfully challenges 8 to 20 years in the future. Ideally, they will produce military capabilities that render previous ways of warfighting obsolete and may significantly change the measures of success in military operations overall. JOpsC presents a detailed description of "how" future operations may be conducted and provides the conceptual basis for joint experimentation and capabilities-based assessments (CBAs). The outcomes of experimentation and CBA will underpin investment decisions leading to the development of new military capabilities beyond the Future Years Defense Program.	CJCSM 3170.01C Glossary GL GL-13	05/2007
Joint Organization			
	▪ A joint unit or element with varied functions enabled by a structure through which individuals cooperate systematically to accomplish a common mission and directly provide or support [joint] warfighting capabilities. Subordinate units/elements coordinate with other units/elements and, as a whole, enable the higher-level joint unit/element to accomplish its mission. This includes the joint manpower (military, civilian, and contractor support) required to operate, sustain, and reconstitute joint warfighting capabilities. (See DOTMLPF)	CJCSM 3170.01C Enclosure H (2) H-2	05/2007
Joint Personnel			
	▪ The personnel component primarily ensures that qualified personnel exist to support joint capabilities. This is accomplished through synchronized efforts of joint force commanders and Service components to optimize personnel support to the joint force to ensure success of ongoing peacetime, contingency, and wartime operations. (See DOTMLPF)	CJCSM 3170.01C Enclosure (6) H-3	05/2007
Joint Professional Military Education (JPME)			
	▪ A CJCS-approved body of objectives, outcomes, policies, procedures, and standards supporting educational requirements of joint officer management.	CJCSM 3500.04E Glossary GL-5 62	08/2008
Joint Training			
	▪ Training, including mission rehearsals, of individuals, units, and staffs using joint doctrine or joint tactics, techniques, and procedures to prepare joint forces or joint staffs to respond to strategic, operational, or tactical requirements considered necessary by the combatant commanders to execute their assigned or anticipated missions. (See DOTMLPF)	CJCSM 3170.01C Glossary GL GL-12	05/2007
Key Performance Parameter (KPP)			
	▪ Those attributes or characteristics of a system that are considered critical or essential to the development of an effective military capability and those attributes that make a significant contribution to the characteristics of the future joint force as defined in the Capstone Concept for Joint Operations. KPPs must be testable to enable feedback from test and evaluation efforts to the requirements process. KPPs are validated by the Joint Requirement Oversight Council (JROC) for JROC Interest documents, and by the DOD Component for Joint Integration, Joint Information, or Independent documents. Capability development and capability production document KPPs are included verbatim in the acquisition program baseline.	CJCSM 3170.01C Glossary GL GL-16	05/2007

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Key System Attribute (KSA)					
	▪ An attribute or characteristic considered crucial in support of achieving a balanced solution/approach to a key performance parameter (KPP) or some other key performance attribute deemed necessary by the sponsor. KSAs provide decision makers with an additional level of capability performance characteristics below the KPP level and require a sponsor 4-star, Defense agency commander, or Principal Staff Assistant to change.	CJCSM 3170.01C Glossary	 GL	 GL-16	05/2007
Knowledge Empowered					
	▪ The future joint force will emphasize better decisions made faster throughout all levels of command. The fundamentals of this knowledge empowerment are experienced and empowered decision makers benefiting from an enhanced understanding of the environment, potential adversaries and cultures, as well as enhanced collaborative decision-making processes. Although we will never eliminate the fog of war, an increased level of understanding should empower leaders throughout the joint force. This will enable them to anticipate and act as opportunities are presented, apply innovative solutions, mitigate risk, and increase the pace, coherence, and effectiveness of operations even in complex environments. A knowledge empowered force, capable of effective information sharing across all agencies and partners, will be able to make better decisions quicker, increasing joint force effectiveness. (See Joint Force Characteristics)	CCJO 2.0 4. Solution	 4.E.1.	 21	08/2005
Lethal					
	▪ This is the ability to destroy an adversary and/or his systems in all conditions and environments when required. It includes the use of kinetic and/or non-kinetic means, while leveraging technological advances in greater precision and more devastating target effects at both longer-ranges and in close combat. (See Joint Force Characteristics)	CCJO 2.0 4. Solution	 4.E.11.	 23	08/2005
Live, Virtual, Constructive Distributed Environment (LVC-DE)					
	▪ The enterprise capability necessary to accurately and realistically test systems and systems of systems, and/or train individuals, units, and organizations, performing tasks in a Joint Operational Context. It is achieved when all required joint systems, personnel, and equipment to execute the task in real-world operations are present or accurately replicated, realistically exercised or tested, and evaluated. The LVC-DE is defined using non-materiel aspects and materiel aspects across the enterprise's Doctrine (business practice), Organization, Training, Materiel, Leadership & Education, Personnel, and Facilities (DOTMLPF).	CTM v3.0 ---	 ---	 ---	04/2009
Logical Design					
	▪ The logical design provides a system-level viewpoint of the LVC system component types, descriptions of the roles these components serve, and how they are intended to work together.	CTM v3.0 ---	 ---	 ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
M&P Effectiveness			
	▪ Within the context of the JTEM JT&E, effectiveness is how well JTEM-developed Capability Test Methodology (CTM) overall outputs satisfy end customer requirements, how well the outputs of every CTM process meet the input requirements of internal customers, and how well the inputs from CTM suppliers meet the requirements of the methodology. JTEM effectiveness specifically addresses (1) the extent to which the goals of the method and processes are attained for designing and executing system-of-systems tests in the JME; and (2) the extent to which the goals of the methods and processes are achieved for assessing performance pertaining to capabilities supporting joint missions. JTEM JT&E effectiveness metrics assess the following criteria areas: – Usability (product template and instruction/guidebook usefulness, helpfulness, and simplicity). – Consistency (alignment of product and processes structures within the M&P, and between relevant external DOD/service M&P). – Workflow (leanness of process sequencing, product input/output mappings). – Completeness (the sufficiency of JTEM M&P input/output products and processes to address customer needs). – Adaptability (how well M&P adapts to different enterprises, changing environments, compressed deliverable timelines, etc.). – Repeatability (the degree to which different groups of JTEM M&P users demonstrate similar actions and produce similar output products). – Timeliness (the latency of performing JTEM processes or the amount of processes performed in a work period).	CTM v3.0 --- --- ---	04/2009
M&P Suitability			
	▪ Within the context of JTEM JT&E, suitability is the degree to which JTEM M&P can be efficiently implemented and sustained in a Live, Virtual, Constructive (LVC) distributed range enterprise tasked with designing and executing system-of-systems tests in a JME. JTEM M&P suitability evaluation includes resource utilization, minimization, interoperability, and reuse across non-materiel and materiel criteria areas including: – Doctrine translates to M&P and policy related to JTEM (relates to issues concerning compatibility with current T&E M&P/policy, interoperability with external DOD domain M&P/policy including acquisition, JCIDS, training, and experimentation). – Organization (relates to migration/extensions from current T&E organizations and organization-policy change requirement issues). – Training (relates to M&P and external DOD business practice training issues). – Materiel (relates to M&P supporting materiel (hardware, software) and LVC distributed range materiel issues). – Leadership and education (relates to M&P leadership/governance change requirement issues, M&P personnel educational foundation issues).	CTM v3.0 --- --- ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
	– Personnel (relates to M&P personnel availability issues and personnel-organization change issues). – Facilities (relates to M&P supporting facility and LVC distributed range facility issues).				
Materiel Solution					
	▪ Correction of a deficiency, satisfaction of a capability gap, or incorporation of new technology that results in the development, acquisition, procurement, or fielding of a new item (including ships, tanks, self-propelled weapons, aircraft, etc., and related software, spares, repair parts, and support equipment, but excluding real property, installations, and utilities) necessary to equip, operate, maintain, and support military activities without disruption as to its application for administrative or combat purposes. In the case of family of systems and system of systems approaches, an individual materiel solution may not fully satisfy a necessary capability gap on its own.	CJCSI 3170.01F Glossary	GL	GL-15	05/2007
Materiel Solution Analysis Phase (MSAP)					
	▪ The purpose of this phase is to assess potential materiel solutions and to satisfy the phase-specific entrance criteria for the next program milestone designated by the MDA.	DODI 5000.2 Enclosure 2	Procedures	14	12/2008
Means					
	▪ Forces, units, equipment, and resources.	Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment; http://www.dtic.mil/futurejointwarfare/strategic/jca_tor9apr07.doc ---	---	---	04/2007
	▪ Applied to Testing in a Joint Environment, Means are Organization, Materiel, and Facility Resources required to instantiate a Joint Mission Environment (JME) System of Systems (SoS).	CTM v3.0 ---	---	---	04/2009
Measure					
	▪ A parameter that provides the basis for describing varying levels of task accomplishment.	CJCSM 3500.04E Glossary	GL-5	62	08/2008
Measure of Effectiveness (MOE)					
	▪ Measures designed to correspond to accomplishment of mission objectives and achievement of desired effects.	CJCSI 3170.01F Glossary	GL	GL-15	05/2007
	▪ A criterion used to assess changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect.	JP 1-02 Appendix	A-1	333	03/2007

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Measure of Performance (MOP)					
	▪ A criterion used to assess friendly actions that is tied to measuring task accomplishment. Also called MOP.	JP 1-02			03/2007
		Appendix	A-1	333	
Meteorological and Oceanographic (METOC)					
	▪ A term used to convey all meteorological (weather) and oceanographic (physical oceanography) factors as provided by Service components. These factors include the whole range of atmospheric and oceanographic phenomena, from the sub-bottom of the earth's oceans up to the space environment (space weather).	JP 1-02			03/2007
		Appendix	A-1	336	
Methods and Processes (M&P)					
	▪ Within the context of JTEM JT&E, methods and processes involve defining the DOD Capability Test Methodology (CTM) business practice doctrine, including guidance on processes, information products, and their associated dynamics.	CTM v3.0			04/2009
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Military Training					
	▪ The instruction of personnel to enhance their capacity to perform specific military functions and tasks.	CJCSM 3500.04E			08/2008
		Glossary	GL-6	63	
	▪ The exercise of one or more military units conducted to enhance combat readiness.	CJCSM 3500.04E			08/2008
		Glossary	GL-6	63	
Mission					
	▪ The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore.	JP 1-02			03/2007
		Appendix	A-1	349	
	▪ In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task.	JP 1-02			03/2007
		Appendix	A-1	349	
	▪ The dispatching of one or more aircraft to accomplish one particular task.	JP 1-02			03/2007
		Appendix	A-1	349	
Mission Measures of Effectiveness (MMOE)					
	▪ Those measures that evaluate achievement of desired mission end state outcomes in terms of mission desired effects.	CTM v3.0			04/2009
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Model					
	▪ A semantically complete abstraction of a system.	DoDAF 1.5, Volume II			04/2007
		Annex	C	C-4	

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Multi-Service Force Deployment (MSFD)					
	▪ Multi-Service Force Deployment (MSFD) products are DOD-approved theater campaign sets of ally and threat scenario data describing the full spectrum of conflict for future postulated scenarios outlined in the Defense Planning Scenarios. MSFDs consist of joint service coordinated, D-Day, H-Hour scenario depictions of forecasted and mobilized opposing air, land, sea and space forces in total battlespace environments. – They will provide standard threat baselines used by the acquisition, operational test and evaluation, war gaming, and joint modeling communities to accomplish studies and analysis under simulated combat conditions and are also used for DoD policy studies (e.g., the Quadrennial Defense Review). The MSFD products consist of a CONOPS, a 200-page description of how the postulated conflict unfolds to include 1) database, and 2) Orders of Battle, strategy/tactics at the operational level, axes of attack, defensive dispositions, TOEs, force allocation to missions, optempo/sortie rates, readiness factors, munitions, and sustainment.	CTM v3.0 ---	--- ---	--- ---	04/2009
Networked					
	▪ All joint force elements will be connected and synchronized in time and purpose to facilitate integrated and interdependent operations across the global battlespace. A networked joint force can extend the benefits of decentralization--initiative, adaptability, and increased tempo--without sacrificing the coordination or unity of effort emblematic of centralization. The joint force will capitalize on being networked by making user-defined information and expertise available anywhere within the network, and will exploit network connectivity among dispersed joint force elements to improve information sharing, collaboration, coordinated maneuver, and integrated situational awareness. Networks should extend to interagency and multinational partners, where possible, to support and enhance unified action. (See Joint Force Characteristics)	CCJO 2.0 4. Solution	 4.E.2.	 21	08/2005
Node					
	▪ A representation of an element of architecture that produces, consumes, or processes data.	DoDAF 1.5, Volume II Annex B	 ---	 B-5	04/2007
Non-Materiel Solution					
	▪ Changes in doctrine, organization, training, materiel, leadership and education, personnel, facilities, or policy (including all human systems integration domains) to satisfy identified functional capabilities. The materiel portion is restricted to commercial or non-developmental items, which may be purchased commercially or by purchasing more systems from an existing materiel program.	CJCSM 3170.01C Glossary	 GL	 GL-18	05/2007
Objective					
	▪ The clearly defined, decisive, and attainable goal toward which every operation is directed.	JP 1-02 Appendix	 A-1	 385	03/2007
	▪ The specific target of the action taken (for example, a definite terrain feature, the seizure or holding of which is essential to the commander's plan, or, an enemy force or capability without regard to terrain features).	JP 1-02 Appendix	 A-1	 385	03/2007

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Objective Value			
	▪ The desired operational goal associated with a performance attribute beyond which any gain in utility does not warrant additional expenditure. The objective value is an operationally significant increment above the threshold. An objective value may be the same as the threshold when an operationally significant increment above the threshold is not significant or useful.	CJCSM 3170.01C Glossary GL GL-19	05/2007
Operation			
	▪ A military action or the carrying out of a strategic, operational, tactical, service, training, or administrative military mission.	JP 1-02 Appendix A-1 390	03/2007
	▪ The process of carrying on combat, including movement, supply, attack, defense, and maneuvers needed to gain the objectives of any battle or campaign.	JP 1-02 Appendix A-1 390	03/2007
Operational Effectiveness			
	▪ Measure of the overall ability to accomplish a mission when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, supportability, survivability, vulnerability, and threat.	CJCSI 3170.01F Glossary GL GL-17	05/2007
Operational Test and Evaluation (OT&E)			
	▪ The field test, under realistic combat conditions, of any item of (or key component of) weapons, equipment, or munitions for the purpose of determining the effectiveness and suitability of the weapons, equipment or munitions for use in combat by typical military users, and the evaluation of the results of such test.	AFOTEC OT&E Guide, 5th edition. Glossary Attch B B-26	06/2007
Operational Threat Environment			
	▪ A generalized overview of the operational, physical and technological environment in which the system will have to function during its lifetime. Developments and trends that can be expected to affect mission capability during the system's life span should be included. Areas to be covered should include all generations of threat as outlined by US Strategic Command. – Threats, first generation: Common hacker tools and techniques used in a non-sophisticated manner. Lone or possibly small groups of amateurs without large resources. – Threats, second generation: Non state-sponsored computer network attack, espionage or data theft. Common tools used in a sophisticated manner. Individuals or small groups supported by resources of a business, criminal syndicate or other trans-national group, including terrorists. – Threats, third generation: State-sponsored computer network attack or espionage. More sophisticated threat (than first and second) supported by institutional processes and significant resources.	CJCSI 6510.01E Glossary GL GL-13	08/2007
Operational View (OV)			
	▪ The OV captures the operational nodes, the tasks or activities performed, and the information that must be exchanged to accomplish DOD missions. It conveys the types of information exchanged, the frequency of exchange, which tasks and activities are supported by the information exchanges, and the nature of information exchanges. – OV-1 -- Operational Level Operational Concept Graphic: High-level graphical/textual description of operational concept.	DoDAF 1.5, Volume I 1 1.4.2 1-8	04/2007

	– OV-2 -- Operational Node Connectivity Description: Operational nodes, connectivity, and information exchange need lines between nodes. – OV-3 -- Operational Information Exchange Matrix: Information exchanged between nodes and the relevant attributes of that exchange. – OV-4 -- Organizational Relationships Chart: Organizational, role, or other relationships among organizations. – OV-5 -- Operational Activity Model: Capabilities, operational activities, relationships among activities, inputs, and outputs; overlays can show cost, performing nodes, or other pertinent information. – OV-6a -- Operational Rules Model: One of three products used to describe operational activity—identifies business rules that constrain operation. – OV-6b -- Operational State Transition Description: One of three products used to describe operational activity—identifies business process responses to events. – OV-6c -- Operational Event-Trace Description: One of three products used to describe operational activity—traces actions in a scenario or sequence of events. – OV-7 -- Logical Data Model: Documentation of the system data requirements and structural business process rules of the Operational View.		
Physical Design			
	▪ The physical design identifies all of the services or components necessary to implement the logical design.	CTM v3.0 --- --- ---	04/2009
Precise			
	▪ The ability to act directly upon key elements and processes demands precisely executed joint actions. Precision extends beyond surgical strikes to the exact application of all joint force capabilities to achieve greater success at less risk. Knowledge gained in all dimensions will enhance the capability of the JFC to understand a situation, determine the effects desired, select a course of action and the forces to execute it, accurately assess the effects of that action and reengage as necessary. Regardless of its application in combat or noncombat operations, the capability to engage precisely allows commanders to shape situations or battlespace in order to generate the desired effects while minimizing unintended effects and contributing to the most effective use of resources. The overall effect of precision is far-reaching with considerable payoff in terms of combat effectiveness. (See Joint Force Characteristics)	CCJO 2.0 4. Solution 4.E.7. 22	08/2005
Precision			
	▪ The quality or state of being clearly depicted, definite, measured or calculated.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
	▪ A quality associated with the spread of data obtained in repetitions of an experiment as measured by variance; the lower the variance, the higher the precision.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
	▪ A measure of how meticulously or rigorously computational processes are described or performed by a model or simulation.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
Program Introduction (PI)			
	▪ The Program Introduction (PI) is the test customer's initial requirements document to the lead support agency. Within the context of the capabilities test methodology, the PI should include the test concept, the test evaluation strategy, and the joint operational context for test. The PI is also referred to as the program introduction document or PID.	CTM v3.0 --- --- ---	04/2009
	▪ The PI is the initial planning document submitted by a user to the support agency immediately on identification of the scope and duration of a program activity. The user should submit the PI using the best available information, enabling the support agency to initiate resource and technical planning. This information, while sometimes fragmentary and incomplete, is of substantial value to the support agency in determining the scope of the program. For many programs, the PI will eliminate further documentation except for conducting specific operations.	Universal Documentation System Handbook 501-97 https://wsmrc2vger.wsmr.army.mil/rcc/manuals/uds/501chaps.htm --- --- ---	11/1997
Program Manager (PM)			
	▪ The individual designated by the implementing command as having single-point management responsibility for an acquisition program. The program director may delegate specific program authority to system program office staff members as long as the authority is documented in management instructions or official correspondence.	AFOTEC OT&E Guide, 5th edition. Glossary Attch B B-28	06/2007
Referent			
	▪ The best or most appropriate codified body of information available that describes characteristics and behavior of the reality represented in the simulation from the perspective of validation assessment for intended use of the simulation.	The Referent Study Final Source (by D.K. Pace) Executive Summary --- ES-1	06/2004
Resilient			
	▪ To operate successfully, the future joint force must be able to protect and sustain its capabilities from the effects of adversaries or adverse conditions. It must also be able to withstand pressure or absorb punishment without permanently losing its focus, structure, momentum, or integrity. Resilience provides joint forces with the ability to sustain performance at high levels, despite losses, setbacks, or similar developments. The future joint force must be resilient to meet the demands of being successful across the ROMO [Range of Military Operations] in an uncertain future security environment. (See Joint Force Characteristics)	CCJO 2.0 4. Solution 4.E.9. 23	08/2005
Resolution			
	▪ The degree of detail used to represent aspects of the real world or a specified standard or referent by a model or simulation.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
	▪ Separation or reduction of something into its constituent parts; granularity.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Risk			
	▪ Probability and severity of loss linked to hazards.	JP 1-02 Appendix A-1 465	03/2007
Scenario			
	▪ An account or synopsis of a projected course of action or events. For the purpose of this Instruction, the focus of scenarios is on strategic and operational levels of warfare. Scenarios include information such as threat and friendly politicomilitary contexts and/or backgrounds, assumptions, operational objectives, and other planning considerations.	DODI 8260.01 Definitions E1.3. 6	01/2007
Sensitivity			
	▪ The ability of a component, model or simulation to respond to a low level stimulus.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
Service			
	▪ A distinct part of the functionality that is provided by a system on one side of an interface to a system on the other side of an interface.	DoDAF 1.5, Volume II 2. Architecture Basics 2-5 2-14	04/2007
Specified Task			
	▪ In the context of joint operation planning, a task that is specifically assigned to an organization by its higher headquarters.	CJCSM 3500.04E Glossary GL-6 63	08/2008
Standard			
	▪ Quantitative or qualitative measures for specifying the levels of performance of a task.	CJCSM 3500.04E Glossary GL-6 63	08/2008
Statement of Capability (SC)			
	▪ The SC is the support agency's response to the PI. The SC is a basic agreement between the user and the support agency. Within the context of the capabilities test methodology, the SC should incorporate the test concept, the test evaluation strategy, and the joint operational context for test. The SC is also referred to as the statement of capabilities or SOC.	CTM v3.0 --- --- ---	04/2009
	▪ The SC is the support agency's response to the PI. When properly signed, the SC is evidence that a program has been accepted for support by the support agency. Support conditions, qualifications, and resources, or other considerations are initially identified in this document which serves as a baseline reference for subsequent acceptance and commitment by the support agency.	Universal Documentation System Handbook 501-97 https://wsmrc2vger.wsmr.army.mil/rcc/manuals/uds/501chaps.htm --- --- ---	11/1997

Term	Definition	Source (Chapter, Paragraph, Page #)			Source Date
Strategic Analysis					
	▪ An analysis of force sufficiency and effectiveness conducted by the DOD Components to support the development and evaluation of the defense strategy. Such analyses address both forces and enablers (e.g., intertheater and intratheater lift capability, required language skill, and regional expertise capabilities).	DODI 8260.01 Definitions	 E1.4.	 6	01/2007
Supporting Task					
	▪ Specific activities that contribute to accomplishment of a joint mission-essential task. Supporting tasks associated with a command or agency's mission-essential task list are accomplished by the joint staff or subordinate commands or agencies.	CJCSM 3500.04E Glossary	 GL-6	 63	08/2008
System					
	▪ A functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements; that group of elements forming a unified whole.	JP 1-02 Appendix	 A-1	 523	03/2007
System Design Document (SDD)					
	▪ The System Design Document (SDD) is created during the CTM. The SDD Implement LVC-DE phase describes the Live/Virtual/Constructive Distributed Environment (LVC-DE) configuration for the JME and is a unique configuration of the LVC-DE baseline system that supports a particular capability test. The SDD will support the JME physical design specifications (Joint Mission Environment System Design Document Template).	CTM v3.0 ---	 ---	 ---	04/2009
System of Systems (SoS)					
	▪ A set or arrangement of interdependent systems that are related or connected to provide a given capability. The loss of any part of the system could significantly degrade the performance or capabilities of the whole. The development of an SoS solution will involve trade space between the systems as well as within an individual system performance.	CJCSM 3170.01C Glossary	 GL	 GL-21	05/2007
	▪ Systems that include hardware, software, data, personnel, procedures, and facilities (DOTMLPF & MOD Lines of Development).	Dandashi, SE DSIG-OMB UML Profile for DoDAF/MODAF; http://www.acq.osd.mil/osjtf/SOS/7_UML%20Profile%20for%20DODAF-MODAF_20050922.ppt ---	 ---	 Slide 4	06/2005
System Threat Assessment Report (STAR)					
	▪ The basic authoritative threat assessment, tailored for and focused on, a particular (i.e., single) U.S. major defense system. It describes the threat to be countered in the projected threat environment. The threat information should reference DIA-validated documents.	DoD 5200.1-M Definitions	 DL	 DL1.1. 30.	03/1994
System Under Test (SUT)					
	▪ An implemented capability increment during an acquisition program, which is the focus of evaluation during a capability test.	CTM v3.0 ---	 ---	 ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
System/System of Systems Attribute			
	▪ A quantitative or qualitative performance characteristic of a system or system of systems that make a significant contribution to the characteristics of the future joint force as defined in the Capstone Concept for Joint Operations or to other characteristics deemed necessary by the sponsor (e.g., suitability, survivability) across doctrine, organization, training, materiel, leadership & education, personnel, and facilities. System/System of Systems Attributes can include Key Performance Parameters (KPPs); Key System Attributes (KSAs); Critical Technical Parameters (CTPs); and system-level measures of performance (MOPs), measures of effectiveness (MOEs), or measures of suitability (MOS).	CTM v3.0 --- --- ---	04/2009
Systems and Services View (SV)			
	▪ The SV captures system, service, and interconnection functionality providing for, or supporting, operational activities. DOD processes include warfighting, business, intelligence, and infrastructure functions. The SV system functions and services resources and components may be linked to the architecture artifacts in the OV. These system functions and service resources support the operational activities and facilitate the exchange of information among operational nodes. – SV-1 -- Systems/Services Interface Description: Identification of systems nodes, systems, system items, services, and service items and their interconnections, within and between nodes. – SV-2 -- Systems/Services Communications Description: Systems nodes, systems, system items, services, and service items and their related communications laydowns. – SV-3 -- Systems-Systems/Services-Systems/Services-Services Matrix: Relationships among systems and services in a given architecture; can be designed to show relationships of interest, e.g., system-type interfaces, planned vs. existing interfaces, etc. – SV-4a -- Systems Functionality Description: Functions performed by systems and the system data flows among system functions. – SV-4b -- Services Functionality Description: Functions performed by services and the service data flow among service functions. – SV-5a -- Operational Activity to Systems Function Traceability Matrix: Mapping of system functions back to operational activities. – SV-5b -- Operational Activity to Systems Traceability Matrix: Mapping of systems back to capabilities or operational activities. – SV-5c -- Operational Activity to Services Traceability Matrix: Mapping of services back to operational activities. – SV-6 -- Systems/Services Data Exchange Matrix: Provides details of system or service data elements being exchanged between systems or services and the attributes of that exchange. – SV-7 -- Systems/Services Performance Parameters Matrix: Performance characteristics of Systems and Services View elements for the appropriate time frame(s). – SV-8 -- Systems/Services Evolution Description: Planned incremental steps toward migrating a suite of systems or services to a more efficient suite, or toward evolving a current system to a future implementation.	DoDAF 1.5, Volume I 1 1.4.3 1-8	04/2007

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
	– SV-9 -- Systems/Services Technology Forecast: Emerging technologies and software/hardware products that are expected to be available in a given set of time frames and that will affect future development of the architecture. – SV-10a -- Systems/Services Rules Model: One of three products used to describe system and service functionality—identifies constraints that are imposed on systems/services functionality due to some aspect of systems design or implementation. – SV-10b -- Systems/Services State Transition Description: One of three products used to describe system and service functionality—identifies responses of a system/service to events. – SV-10c -- Systems/Services Event-Trace Description: One of three products used to describe system or service functionality—identifies system/service-specific refinements of critical sequences of events described in the Operational View. – SV-11 -- Physical Schema: Physical implementation of the Logical Data Model entities, e.g., message formats, file structures, physical schema.		
Tactics, Techniques, and Procedures (TTP)			
	▪ Tactics -- The employment and ordered arrangement of forces in relation to each other.	JP 1-02 Appendix A-1 530	03/2007
	▪ Techniques -- Non-prescriptive ways or methods used to perform missions, functions, or tasks.	JP 1-02 Appendix A-1 537	03/2007
	▪ Procedures -- Standard, detailed steps that prescribe how to perform specific tasks.	JP 1-02 Appendix A-1 428	03/2007
Task			
	▪ An action or activity (derived from an analysis of the mission and concept of operations) assigned to an individual or organization to provide a capability. (See Essential Task)	CJCSM 3500.04E Glossary GL-6 63	08/2008
Task Measures of Performance (TMOP)			
	▪ Task Measures of Performance (TMOPs) are used to quantify mission task accomplishment. TMOPs are defined using the Universal Joint Task List (UJTL) structure of task, condition, and standard and are based on joint force commander mission tasks deemed essential to mission accomplishment using specified conditions and standards.	CTM v3.0 --- --- ---	04/2009
Technical Assessment			
	▪ Technical Assessment activities measure technical progress and the effectiveness of plans and requirements. Activities within Technical Assessment include the activities associated with Technical Performance Measurement and the conduct of technical reviews. A structured review process should demonstrate and confirm completion of required accomplishments and exit criteria as defined in program and system planning. Technical reviews are discussed in detail in section 4.3. Technical assessment activities discover deficiencies or anomalies that often result in the application of corrective action.	Defense Acquisition University Guidebook 4 4.2.3.3 ---	12/2008

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Technical Standards View (TV)			
	▪ The TV is the minimal set of rules governing the arrangement, interaction, and interdependence of system parts or elements. Its purpose is to ensure that a system satisfies a specified set of operational requirements. The TV provides the technical systems implementation guidelines upon which engineering specifications are based, common building blocks are established, and product lines are developed. It includes a collection of the technical standards, implementation conventions, standards options, rules, and criteria that can be organized into profile(s) that govern systems and system or service elements for a given architecture. – TV-1 -- Technical Standards Profile: Listing of standards that apply to Systems and Services View elements in a given architecture. – TV-2 -- Technical Standards Forecast: Description of emerging standards and potential impact on current Systems and Services View elements, within a set of time frames.	DoDAF 1.5, Volume I 1 1.4.4 1-9	04/2007
Test and Evaluation Master Plan (TEMP)			
	▪ All programs on the OSD T&E Oversight List are required to submit for OSD approval a master plan that describes the total T&E planning from component development through operational T&E into production and acceptance. The program manager, with T&E WIPT providing support, is responsible for producing the TEMP. It is an important document in that it contains the required type and amount of test and evaluation events, along with their resource requirements. The TEMP is considered a contract among the program manager, OSD, and the T&E activities. The program manager must follow the approved TEMP to budget for T&E resources and schedules, which is why it is imperative that all T&E stakeholders participate early in the T&E Strategy development and make timely updates when events or resource requirements change. Stakeholders should include representatives from USD(AT&L) (e.g., SE/AS) and DOT&E, as those offices ultimately will approve the TEMP.	Defense Acquisition University Guidebook 9 9.10 ---	12/2008
Test and Evaluation Strategy (TES)			
	▪ The TES is an early T&E planning document that describes the T&E activities starting with Technology Development and continuing through System Development and Demonstration into Production and Deployment. Over time, the scope of this document will expand, the TES will evolve into the TEMP due at Milestone B. The TES describes, in as much detail as possible, the risk reduction efforts across the range of activities (e.g., M&S, DT&E, OT&E, etc.) that will ultimately produce a valid evaluation of operational effectiveness, suitability, and survivability before full-rate production and deployment. It is a living document and should be updated as determined by the T&E WIPT during the Technology Development Phase.	Defense Acquisition University Guidebook 9 9.6.1.1 ---	12/2008
Test Approach			
	▪ A description of the overall scope of the live, virtual, and constructive test including estimated number and size of events, and estimated test schedule. Live operations are highlighted and locations identified, such as a DOD range or contractor facilities. Detailed planning for live operations is normally conducted at individual ranges or facilities using local procedures.	CTM v3.0 --- --- ---	04/2009
Test Concept			
	▪ The Test Goal, Objectives, and Approach (TGOA) necessary for a System Under Test (SUT) program manager to initially characterize a test to the organization orchestrating the LVC Distributed Environment.	CTM v3.0 --- --- ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Test Data			
	▪ Quantitative or qualitative information collected during one or more test events. Data to be collected during a test are identified in the integrated data requirements list contained in the test plan.	CTM v3.0 --- --- ---	04/2009
Test Event			
	▪ A collective term used to describe an event executed in consonance with an approved scenario. A test event occurs in a scheduled test venue using a combination of LVC components, with Service provided test resources, in a realistic joint mission environment for the purpose of generating and collecting SoS data. A test event is supported by a detailed test plan and typically consists of numerous test trials.	CTM v3.0 --- --- ---	04/2009
Test Goal			
	▪ The Test Goal provides a high-level understanding of the Joint Capability under test and its contribution to achieving the Joint Mission. These goals should include the following definitions: – The Joint Mission and statement for test, to include any key materiel and non-materiel system of systems information relevant to the test. – The relevant portion of the Family of Joint Future Concepts, CONOPS, or UCP-assigned mission to which Joint Capability contributes, and the desired end state (operational outcome). – The Joint system capabilities (key performance characteristics) that are to be tested to provide scope for the overall test. – The enabling capabilities that may be required to achieve the desired mission outcomes. – The traceability to relevant Defense Planning Scenarios (DPS) and Multi-Service Force Deployment (MSFD) documentation.	CTM v3.0 --- --- ---	04/2009
Test Objective			
	▪ Test Objectives focus the test goal on a specific capability subset defined by a Critical Capability Issue (CCI) to capability crosswalk mission desired effects, tasks, conditions (e.g., threat and environment), and system/SoS elements to set the stage for developing a capability test design. The test objective should reference a critical joint issue; a focused subset of the capability crosswalk; and a test scenario, derived from the Joint Operational Context for Test (JOC-T).	CTM v3.0 --- --- ---	04/2009
Test Plan			
	▪ The test plan will provide sufficient detail to identify data and resource requirements to support the assessment/evaluation. It will list CCIs, Task MOPs, and attribute measures as well as describe test limitations, safety and security issues, specific test events, scenarios, schedule, measures, data collection (who, what, when, where, why, and how), reduction, and analysis. – It will show linkages between data to be collected, information to be obtained, and conclusions needed. It will also show differences between LVC-DE scenarios versus operational scenarios and the tested system/SoS versus the planned operational system/SoS and describe how these differences (limitations) will be addressed. It can include a Data Analysis Plan (DAP).	CTM v3.0 --- --- ---	04/2009

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Test Run			
	▪ A Test Run is one instantiation of a test on a system or system of systems under a Joint Operational Context for Test (JOC-T). Multiple iterations of a test run with the same set of independent variables held at the same values would make a test trial.	CTM v3.0 --- --- ---	04/2009
Test Scenario			
	▪ An overarching narrative reflecting a realistic LVC joint mission environment containing necessary elements from the Joint Operational Context for Test as required by the Test Concept and Evaluation Strategy. The test scenario describes proposed test events in joint operational terms, generally without regard to how the joint test scenario will be implemented (except identify any live, virtual, or constructive requirements or constraints). The test scenario describes relevant operational organizations, resources, missions, and threats that will interact with the client system under test. The test scenario provides insight into what operational entities are required and how they interact as test events are executed. Any operational constraints imposed by requirements should be specified, such as organization behaviors and rules of engagement.	CTM v3.0 --- --- ---	04/2009
Test Trial			
	▪ A Test Trial is one or more test runs where a set of independent variables (joint mission vignettes, system of system material and non-material configurations, threat and environmental conditions) is held constant.	CTM v3.0 --- --- ---	04/2009
Test Vignette			
	▪ Test vignettes are subsets of the overall Test Scenario. Each vignette is focused on one or more test objectives from the Test Concept. Using an analogy, a vignette is a scene and the scenario is the movie or play. Each vignette will be comprised of sets of system of systems combinations and test conditions, i.e., controlled variables (or factors) under which the test systems and participants will be subjected for a test trial or set of test trials to measure system of systems performance and joint mission effectiveness (JMe).	CTM v3.0 --- --- ---	04/2009
Threat Condition			
	▪ Those threat (e.g., threat actions, threat order of battle, threat command and control structure, threat systems, threat force laydown) condition variables of an operational environment or situation in which a unit, system, or individual is expected to operate.	CTM v3.0 --- --- ---	04/2009
Threshold Value			
	▪ A minimum acceptable operational value below which the utility of the system becomes questionable.	CJCSM 3170.01C Glossary GL GL-21	05/2007
Tolerance			
	▪ The maximum permissible error or the difference between the maximum and minimum allowable values in the properties of any component, device, model, simulation or system relative to a standard or referent. Tolerance may be expressed as a percent of nominal value, plus and minus so many units of a measurement, or parts per million.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
	▪ The character, state or quality of not interfering with some thing or action.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
Universal Joint Task List (UJTL)			
	▪ A menu of capabilities (mission-derived tasks with associated conditions and standards, i.e., the tools) that may be selected by a joint force commander to accomplish the assigned mission. Once identified as essential to mission accomplishment, the tasks are reflected within the command joint mission essential task list.	JP 1-02 Appendix A-1 568	03/2007
Use Case [Class]			
	▪ The specification of a sequence of actions, including variants, that a system (or other entity) can perform, interacting with actors of the system.	DoDAF 1.5, Volume II Annex C C-5	04/2007
Validation			
	▪ For the purpose of this Directive, the process of determining the degree to which a model is an accurate representation of the real-world from the perspective of the intended uses of the model.	DOD 5000.59 Definitions E2.17. 7	08/2006
Validity			
	▪ The quality of being inferred, deduced, or calculated correctly enough to suit a specific application.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
	▪ The quality of maintained data that is found on an adequate system of classification (e.g., data model) and is rigorous enough to compel acceptance for a specific use.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
	▪ The logical truth of a derivation or statement, based on a given set of propositions.	Recommended Practices Guide Fidelity RPG Special Topic --- 8	09/2000
Verification			
	▪ For the purpose of this Directive, the process of determining that a model implementation accurately represents the developer's conceptual description and specifications.	DOD 5000.59 Definitions E2.18. 7	08/2006
Vignette			
	▪ A concise narrative description that illustrates and summarizes pertinent circumstances and events from a scenario.	CJCSI 3010.02B Glossary GL GL-4	01/2006
Virtual Simulation			
	▪ A simulation involving real people operating simulated systems. Virtual simulations inject human-in-the-loop (HITL) in a central role by exercising motor control skills (e.g., flying an airplane), decision skills (e.g., committing fire control resources to action), or communication skills (e.g., as members of a C4I team).	DOD 5000.59 Definitions 36b A-6	08/2006

Term	Definition	Source (Chapter, Paragraph, Page #)	Source Date
Ways			
	▪ Doctrine, tactics, techniques, and procedures, competencies, and concepts.	Terms of Reference for Conducting a Joint Capability Area Baseline Reassessment; http://www.dtic.mil/futurejointwarfare/strategic/jca_tor9apr07.doc --- --- ---	04/2007
	▪ Applied to Testing in a Joint Environment, Ways are methods and processes, including the Capability Test Methodology (CTM), Capability Evaluation Metamodel (CEM), and the Joint Mission Environment Foundation Model (JFM) required to define and operate an instantiated Joint Mission Environment (JME) System of Systems (SoS).	CTM v3.0 --- --- ---	04/2009