William J. Hughes Technical Center

Verification Requirements Traceability Matrix (VRTM) Content and Format Guidance

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1 INTRODUCTION

1.1 DEFINITION AND PURPOSE

The Federal Aviation Administration (FAA) Systems Engineering Manual defines Verification Requirements Traceability Matrix (VRTM) as a "matrix correlating requirements and the associated verification method(s). The VRTM defines how each requirement (functional, performance, and design) is to be verified, the stage in which verification is to occur, and the applicable verification method levels." The VRTM provides the ability to trace a lower-level requirement back to its source, or "parent requirement," and to maintain status of requirement verification.

1.2 BACKGROUND

The Program Requirements Document (PRD) contains all requirements for a program, whether they will be satisfied by a product development, by procedure changes, or by changes to external systems that may be in control of stakeholders other than the FAA. The PRD has each program's set of Critical Operational Issues (COIs), as well as the uniquely identified requirements which trace to the National Airspace System (NAS)-Requirements Document (RD), some of which are identified as Critical Performance Requirements (CPRs). The traceability matrix in the PRD is required to trace each requirement from the PRD back to "one or more enterprise level requirements listed in the NAS-RD," and "to a function in the Functional Analysis Document." (See *Program Requirements Template for AMS Acquisitions* for further detail). *Please note this process will not be applicable for mission support programs.*

The Test and Evaluation (T&E) Handbook, included as Guidance in the Acquisition Management System (AMS) for test teams, stipulates three types of VRTMs: The Test and Evaluation Master Plan (TEMP) VRTM, the Development Test (DT) VRTM and the Operational Test (OT) VRTM.

1.3 SCOPE

The scope of this guidance is limited to the following VRTM templates:

a) TEMP VRTM
b) DT VRTM
c) OT VRTM

This guidance will discuss the relationships of the three VRTMs above to other traceability matrices that are required to be in the following documents:

a) PRD
b) System Specification Document (SSD), provided by FAA to developer.
c) System/Subsystem Specification (SSS), provided by developer.

Details of requirements for the PRD, SSD and SSS may be found in the references cited in section 1.8.

1.4 OVERVIEW OF THE TEMP VRTM

The TEMP VRTM shows coverage of all PRD requirements within the scope of the test program. The TEMP VRTM is used to manage and plan the test program, allocating requirements to either the DT phase, the OT phase, or both. (See the *TEMP Template for New Investments*).

The TEMP provides the initial decomposition of COIs. COIs are decomposed in the TEMP by:

a) **Decomposing COIs into Measures of Effectiveness (MOEs) and Measures of Suitability (MOSs):**

MOEs and MOSs are qualitative decompositions of the COI which must be measured to fully determine whether a COI has been satisfied.

b) **Further decomposing MOEs and MOSs into Measures of Performance (MOPs):**

MOPs are measurable, quantitative/qualitative values that characterize and support the evaluation of the COIs, MOEs and MOSs. Decomposition is preliminary during TEMP development, with final decomposition occurring in the OT Plan.

c) **Mapping MOEs and MOSs to PRD requirements in the VRTM:**

As MOPs are developed by a test team, they must not conflict with the PRD or SSD. PRD requirements, including CPRs, and the SSD requirements may serve as MOPs. If a conflict is discovered between the PRD and any MOEs, MOSs or MOPs the conflict must be resolved.

Further information on the COI Decomposition process can be found in the COI Decomposition Guide located on the Verification & Validations (V&V) Repository in the ANG-E T&E Portal. The COI decomposition is documented in Appendix A of the test program's TEMP.

The TEMP VRTM is documented in Appendix B of the test program's TEMP. This VRTM is indexed by the numbered requirements of the PRD. The VRTM associates each numbered requirement MOEs, MOSs and MOPs under specific COIs as documented in Appendix A. The TEMP VRTM also provide a cross reference of program requirements and CPRs to the respective test phase(s) and test activities in which the MOEs/MOSs/MOPs are addressed.

1.5 OVERVIEW OF THE DT VRTM

The developer is responsible for creating and maintaining the DT VRTM, which is used as a framework for DT testing. For those requirements in the PRD that will be addressed by a system development, FAA creates an SSD describing what must be developed to meet PRD requirements. The SSD traces requirements back to the PRD (see *FAA-STD-067, Preparation of Specifications*).

Developers, (usually after a contract award), deliver a more detailed functional specification, the SSS, to meet the SSD requirements. The DT VRTM uses the requirement identifiers in the developer's SSS, which provides traceability back to the SSD in accordance with the Data Item Description (DID) in the contract. The unique identifiers used by the developer in the SSS for requirements, or their child requirements, usually serve as the primary index for traceability in the SSS. The DT VRTM must be included in the Contractor's Master Test Plan (CMTP), lower-level DT plans, procedures documents, and reports, with additional columns completed to trace program requirements to specific documented test procedures, and to test results.

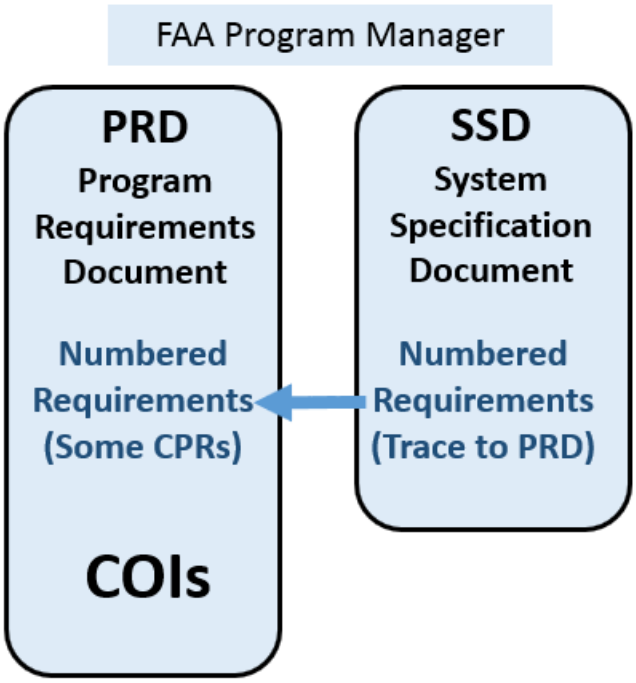
The developer might go through a process of requirement definition and an interpretation of the SSD requirements to develop and deliver the SSS while is developing a DT VRTM. As a result, there is a possibility that the developer will revise the DT VRTM multiple times.

1.6 OVERVIEW OF THE OT VRTM

The OT VRTM traces COIs, and their constituent MOEs, MOSs, and MOPs to the test activities and test cases. It also identifies requirements from the PRD (including CPRs), and the SSD that relate to each COI/MOE/MOS/MOP. The OT VRTM may be revised as OT matures through procedure development and test conduct. During OT reporting, the test case information such as run dates and results, will be entered into the VRTM. The completed VRTM will be contained in the OT test reports.

1.7 RELATIONSHIPS AMONG THE VRTMS

The following diagrams indicate the traceability of requirements from the lowest level for a program, the DT and OT VRTMs, up to the highest level for a program, the PRD.



The first step in program traceability development is to link the requirements in the SSD to the PRD, as illustrated in Figure 1-1. This is the responsibility of the FAA Program Manager, and is required before Final Investment Decision (FID).

Figure 1-1 – Traceability Between PRD and SSD

The Program's Test Director (or Test Directors if there are more than one), develops the TEMP which traces the PRD requirements applicable to the test program to a phase of testing (usually DT or OT). The TEMP also includes the initial decomposition of COIs into MOEs, MOSs and MOPs, as illustrated in Figure 1-2.

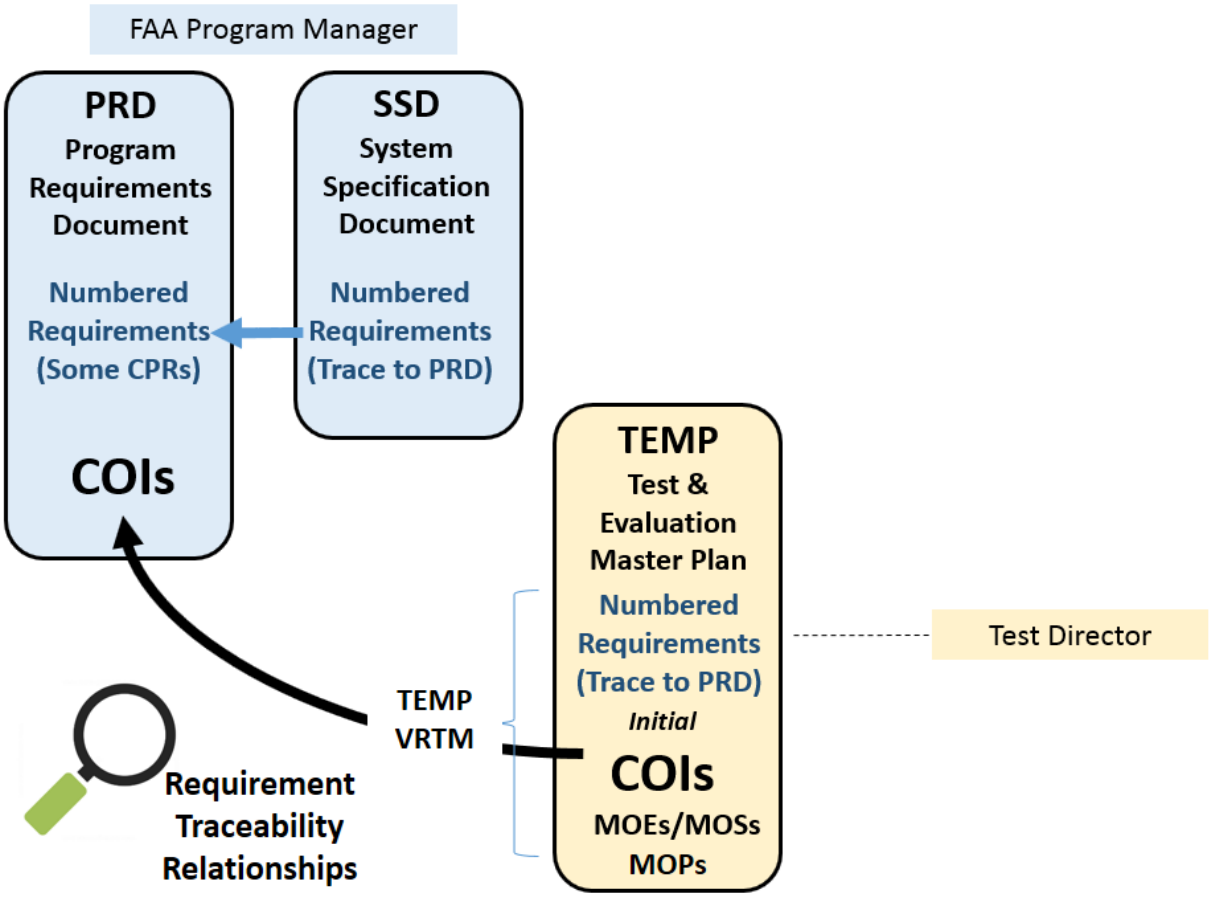


Figure 1-2 – Traceability Between PRD and TEMP

The developer is responsible for preparing the SSS, which is the basis for the development of the new system. The DT VRTM in the CMTP maps the SSS requirements to Test Activities and Test Cases, as illustrated in Figure 1-3. The SSS shows traceability back to the SSD. This traceability supports mapping from low-level activities during DT back to the PRD and the CPRs.

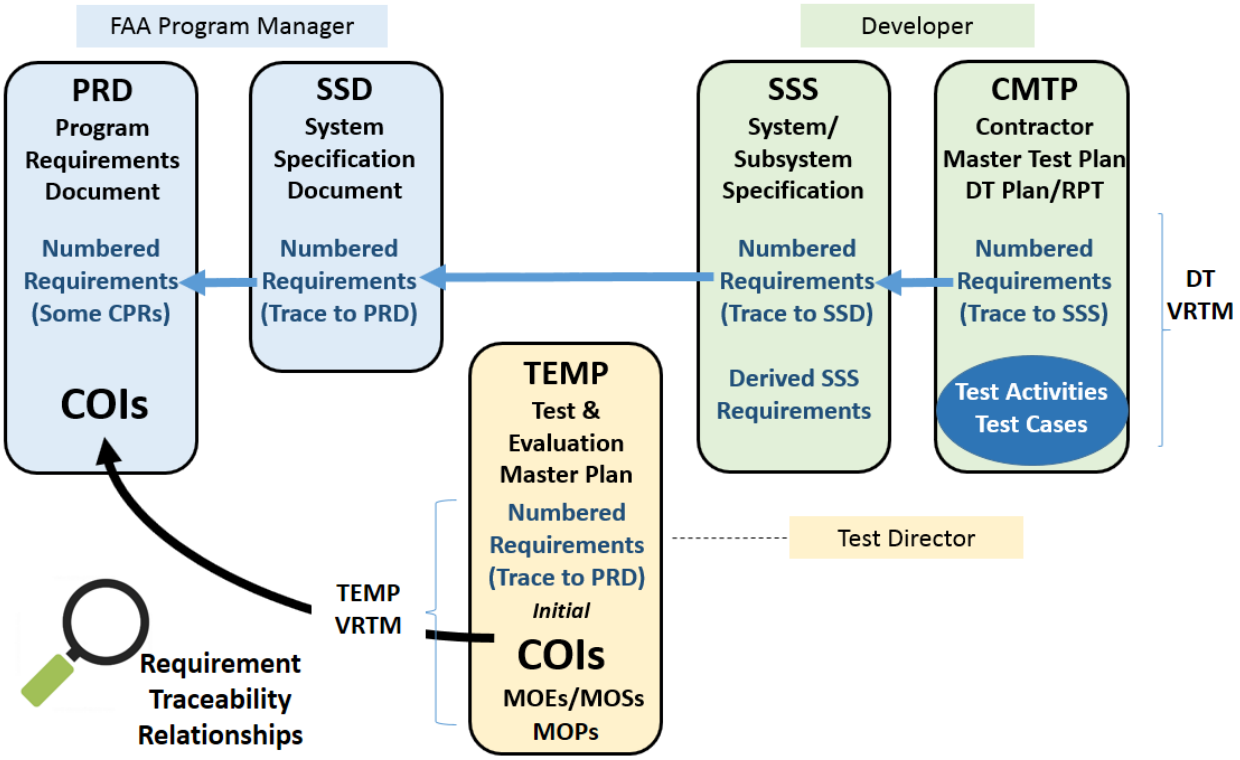


Figure 1-3 – Traceability Between PRD and DT Documents

OT planning further refines and matures the original decomposition of the COIs, MOEs, MOSs and MOPs documented in the TEMP and associates test activities and test cases back to the COIs in the OT VRTM. As illustrated in Figure 1-4, the OT VRTM also maintains traceability back to the SSD and PRD requirements. This diagram therefore illustrates the full traceability of all test activities back to the PRD, from both DT and OT.

It's recommended that Test Directors have a forward looking prospective on the traceability of the PRD and the SSD requirements such that traceability to the SSS is achieved as the process through development into DT and OT.

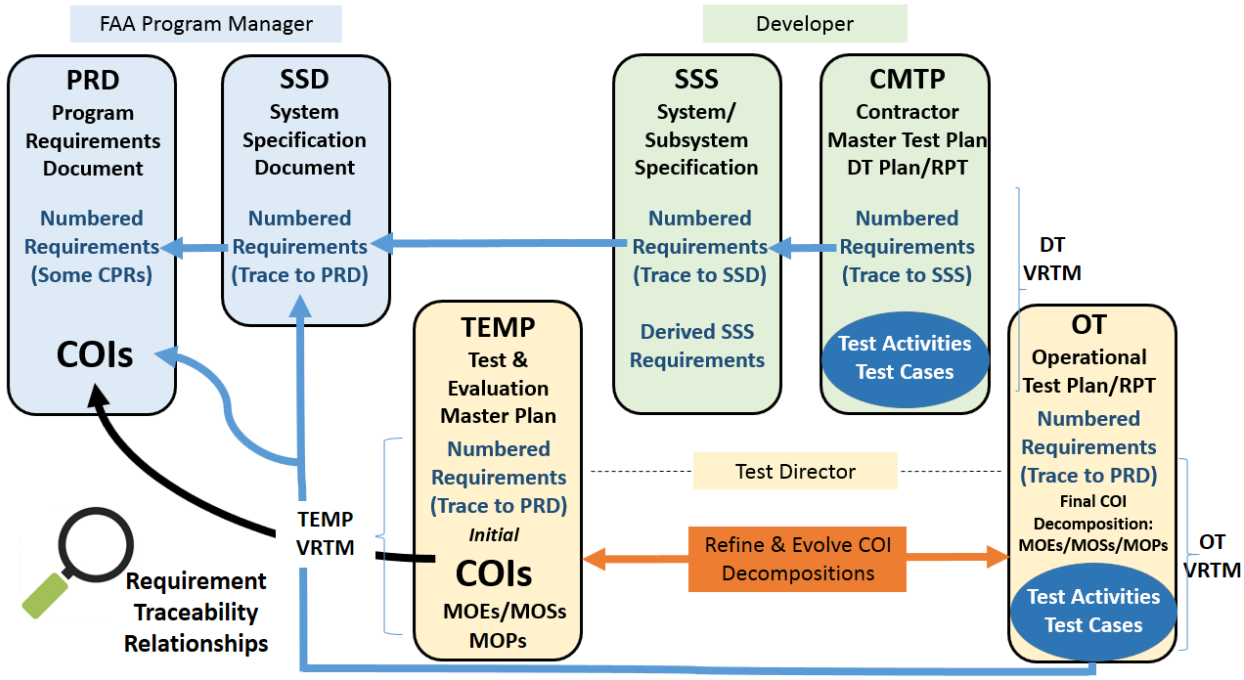


Figure 1-4 – Traceability Among Requirements Documents, Test Activities and Test Cases

1.8 REFERENCE DOCUMENTS

a) *COI Decomposition Guide, version 1*, FAA Air Traffic Organization NextGen and Operations Planning Services, TSPAT-D3-GDE-001, November 2008

b) *DI-IPSC-81431A, System/Subsystem Specification (SSS), Data Item Description*, (Sample), FAA AMS, January 10, 2000. http://fast.faa.gov/docs/sowgen_docs/dids/DI-IPSC-81431A.doc

c) *FAA System Engineering Manual, v1.1*, Air Traffic Organization Operations Planning, Washington, DC, September 11, 2015. https://sep.faa.gov/file/get/2974

d) *FAA-STD-067, Preparation of Specifications*, FAA, December 4, 2009. https://f10011.eos-intl.net/F10011/OPAC/Details/Record.aspx?BibCode=30738591

e) *Program Requirements Template for AMS Acquisitions*, Version 2.2, July 2017, FAA Offices: ANG-B, ANG-B1, ADE-200. http://fast.faa.gov/docs/programreq.docx

f) *Test and Evaluation Handbook,* Version 4.0, FAA William J. Hughes Technical Center, VVSPT-A2-PDD-013, May 2017.

g) *Test and Evaluation Master Plan Template for New Investments*, Version 5.0, FAA William J. Hughes Technical Center, VVSPT-D4-TEM-012, July 2015.

h) *Test and Evaluation OT Test Plan Template*, FAA William J. Hughes Technical Center, Version 3.0, VVSPT-D4-TEM-017, October 2011

1.9 FAA DATABASE CONSIDERATIONS

For full traceability, the FAA Dynamic Object Oriented Requirements System (DOORS) database should make use of all fields in the TEMP, DT, and OT VRTMs. With this full traceability, System Engineering would have insight into the test program on requirement status. The test program would be able to use the FAA DOORS database to generate and manage the VRTMs.

2 DETAILED TEMP VRTM CONTENT AND FORMAT

2.1 CONTENT OF THE TEMP VRTM

Table 2-1 briefly describes the content for each column of the TEMP VRTM. Table 2-3 provides an example of the TEMP VRTM. Detailed format for each column is provided in the next section. Each VRTM reflects modification date information in the title.

Each VRTM reflects preparation and modification date information.

Table 2-1 – Brief Description of TEMP VRTM Columns

Column Title	Content
PRD ID	A unique identifier from the PRD.
REQ TEXT	The text of the requirement from the PRD.
CPR (N/A or #)	Whether the requirement has been identified as a CPR, which may be referenced by its additional CPR number in Appendix 1 of the PRD.
TEST PHASE	Identification of the T&E Phases, which will verify the requirement.
VERIF METH	Identification of the Verification Method to be used for in each phase.
MOE /MOS #*	Identification of any measures under a related COI for this requirement.
MOE / MOS TEXT*	The text of the measure identified in the sixth column.
MOP #*	The ID of related MOPs for the requirement.

The TEMP VRTM can optionally contain additional columns such as the named T&E Activity within the phase and the Success Criteria, but these may not be known, until the later phases of planning.

**Note: Programs might use a separate spreadsheet to decompose COIs to MOEs, MOSs and MOPs*

2.2 FORMAT OF THE TEMP VRTM

For each column in the TEMP VRTM, Table 2-2, below has a row, which describes the format for the column's entry.

Table 2-2 – Format of TEMP VRTM Columns

Field/Column / Attribute	Description	Example Values
PRD ID	The requirement identifier from the PRD	PRD-515 PRD-2112
REQ TEXT	The full text of the requirement from the source document.	The system shall be designed using … --- Does the SYSTEM provide the ability to…?
CPR (N/A or #)	If this TEMP item is a CPR, or child requirement of a CPR, the number from the CPR table in the PRD goes here, otherwise, put "N/A."	N/A 4
TEST PHASE	The T&E phase in which the requirement will be verified.	DT, OT
VERIF METH	The method that will be used for verification of the requirement. Usually either Analysis, Demonstration, Inspection, or Test.	A, D, I, T
MOE /MOS #	Measures under related COIs in which the requirement will be verified.	MOE 1.3 MOS 9.1
MOE / MOS TEXT	The text of the related MOE, or MOS.	SYSX automatically provides Terminal data received from…
MOP #	ID of related MOP.	MOP 1.3.2

Table 2-3 – Example of TEMP VRTM

TEMP VRTM FOR [*PROGRAM*] – modified *[Date]*

PRD ID	REQ TEXT	CPR (N/A or #)	TEST PHASE	VERIF METH	MOE / MOS #	MOE / MOS TEXT	MOP #
PRD-0128	SYSX shall provide the latest Terminal data automatically in accordance with registered parameters.	3	DT	D	N/A	N/A	N/A
		3	OT	T	MOE 1.3	SYSX automatically provides Terminal data received from RVR to NEMS in accordance with the NEMS Asynchronous Messaging ICD.	MOP 1.3.1 MOP 1.3.2 MOP 1.3.3
		3	OT	D	MOS 1.4	SYSX automatically provides Terminal data received from ASDE-X to NEMS in accordance with the NEMS Asynchronous Messaging ICD.	N/A
PRD-0154	Data communications training systems must simulate data communications operator position functionality at operator positions.	N/A	OT	D	MOS 9.1	Training enables Tech Ops personnel to maintain Data Comm operations.	MOP 9.1.1 MOP 9.1.2
PRD-0201	The system shall have a response time from user input to system output in accordance with the NAS-RD-2013.	5	DT	T, A	N/A	N/A	N/A
		5	OT	D	MOE 4.1	The system allows the sending user to designate the type of response required	MOP 4.1.1 MOP 4.1.2
		5	OT	T	MOS 4.2	The system displays user response to an electronic message.	N/A

3 DETAILED DT VRTM CONTENT AND FORMAT

The DT VRTM lists all of the requirements that must be met by the system to satisfy the functional and performance requirements in the program's SSS. As described in the DT overview (Section 1.5) the SSS requirements must trace to the SSD.

The following table describes the required fields/columns of the DT VRTM. The DT VRTM is under the control of the developer. The government stipulates required content and format to a prime contractor in the DIDs for deliverables that include DT VRTMs.

3.1 CONTENT OF THE DT VRTM

Table 3-1 briefly describes the content for each column of the DT VRTM. Table 3-3 provides an example of the DT VRTM. Detailed format for each column is provided in the next section. Each VRTM reflects modification date information in the title.

Table 3-1 – Brief Description of the DT VRTM Columns

Column Title	Content
SSS ID	A unique identifier that will allow unambiguous reference to the requirement in each row of this DT VRTM. The developer may use a proprietary format from the SSS.
REQ TEXT	The text of the requirement, including section number.
REQ/PARENT TRACE	The immediate source of the requirement ("Parent Requirement"), which would usually be from the SSD, but sometimes comes from the SSS for a "child" or derived requirement.
PRD TRACE	The requirement identifier from the PRD that the requirement traces to, usually indirectly through the SSS, and SSD.
CPR (N/A OR #)	Whether the requirement has been identified as a CPR, which may be referenced by its CPR number from Appendix 1 of the PRD.
ACTIVITY ID	Identification of the DT Activity, or Activities in which the requirement will be verified. This column may have multiple entries, in "sub-rows," for multiple Activities that verify the requirement, such as FAT, SAT, etc.
TEST CASE ID	The identifier for the specific test case(s) associated with the activity, which will verify the requirement.
VERIF METHOD	Identification of the Verification Method for each DT test case identified.
RUN DATE	Either the planned or the actual date for the test case execution.
TEST RESULT	The result of the test case. Pass, Fail, Partial

The Test Case ID column of the DT VRTM can optionally be expanded into multiple columns, such as those described in the *T&E Handbook* (i.e., Test Case Group, Test Case, Step), but DT test case structure would be defined by the developer. As development matures, columns such as Success Criteria may be added.

3.2 FORMAT OF THE DT VRTM

For each column of the DT VRTM, Table 3-2 below has a row which describes the format for the column's entry.

Table 3-2 – Format of DT VRTM Columns

Column (or Attribute)	Type	Description	Example Values	Target Document
SSS ID	Text	The requirement number from the System/Segment Specification (SSS, or "B-level Spec"), usually provided by the developer	Proprietary format SSS-736 SSS-12953	DT Plan
REQ TEXT	Text	The full text of the requirement from the source document.	The SYSTEM must enable all SYSTEM Services identified in Table 3-1 …	DT Plan
REQ/PARENT TRACE	Text	The requirement number of the System Specification Document (SSD, or "A-level Spec"), that this requirement traces back to, and if there is an applicable parent SSS ID #	SSD-10864 SSS-3 [new child]	DT Plan
PRD TRACE	Text	The parent PRD requirement that was the indirect source for this DT VRTM item. This information should be carried forward in the System Specification Document (SSD), to the System/Segment Specification (SSS)	PRD-380	DT Plan
CPR (N/A OR #)	Text	If this DT VRTM item is a CPR, or child requirement of a CPR, the number from the CPR table in the PRD goes here, otherwise, put "N/A."	N/A 4	DT Plan

Column (or Attribute)	Type	Description	Example Values	Target Document
ACTIVITY ID	Text	The name of the test series in the DT program where the requirement will be tested. This column may have multiple entries, in "sub-rows," for multiple Activities that verify the requirement, such as FAT, SAT, etc. The remaining columns would likewise need to have multiple corresponding entries.	Factory Acceptance Testing, Site Acceptance Testing	DT Plan
TEST CASE ID	Text	The developer's identifier for the procedures that will be executed to verify the requirement.	Proprietary format.	DT Procedures
VERIF METHOD	Text	The method(s) that will be used for verification of the requirement. Usually either Analysis, Demonstration, Inspection, or Test.	A I T D A/D T/A	DT Plan
RUN DATE	Date	The proposed or actual date the test case was executed	Any common date formats.	DT Report
TEST RESULT	Text	The result of test case execution.	Unverified, Pass, Fail, Partial, Deferred	DT Report

Table 3-3 – Example of DT VRTM

DT VRTM FOR [*PROGRAM*] – modified *[Date]*

SSS ID	REQ TEXT	REQ/PARENT TRACE	PRD TRACE	CPR (N/A OR #)	ACTIVITY ID	TEST CASE ID	VERIF METHOD	RUN DATE	TEST RESULT
SSS-11	3.1 The SYSTEM must enable all SYSTEM Services identified in Table 3-1 …	SSD-111	PRD-379	7 7 7	FAT I & I SAT	4.5.6 4.5.7 4.5.8	T T D, A	01/19/2018 03/20/2018 05/20/2018	Pass Pass Pass
SSS-12	3.2 The SYSTEM must disable individual SYSTEM Services …	SSD-112	PRD-380	N/A	FAT	2.2.1	D	01/22/2018	Fail
SSS-34	4.1 The system shall provide a subset of the SYSB services to …	SSD-7	PRD-997	2	*	*	*	*	Partial
SSS-841	4.2.1 The AI Service Engine shall provide access to web services only to consumers on-ramped to SYSTEM2.	SSD-7/ SSS-34	PRD-997	2 2	FAT SAT	3.4.1 3.4.2	T, A D	01/20/2018 05/20/2018	Fail Pass

* Indicates a Parent where verification occurs at the Child level

4 DETAILED OT VRTM CONTENT AND FORMAT

The OT VRTM contains the final decomposition of the COIs from the TEMP allocated to OT Activities.

The following table describes the required fields/columns of the OT VRTM. The OT VRTM is under the control of the government Test Director.

4.1 CONTENT OF THE OT VRTM

Table 4-1 briefly describes the content for each column of the OT VRTM. Table 4-3 provides an example of the OT VRTM. Detailed format for each column is provided in the next section. Each VRTM reflects modification date information in the title.

Table 4-1 – Brief Description of the OT VRTM Column

Column Title	Content
COI/MOE/MOS/MOP ID	A unique identifier that will allow unambiguous reference to the entry in each row of this OT VRTM.
COI/MOE/MOS/MOP TEXT	The text of the COI/MOE/MOS/MOP.
RELATED PRD REQS	Indication of which requirements in the PRD, are related to this COI, MOE, MOS, or MOP.
PRD TEXT	The full text of the requirement from the PRD document.
RELATED SSD REQS	Indication of which requirements in the SSD, are related to this COI, MOE, MOS, or MOP.
CPR (N/A OR #)	Whether any of the related requirements have been identified as CPRs, which may be referenced by the CPR numbers from Appendix 1 of the PRD.
ACTIVITY ID	The OT Activity, or Activities in which the MOE/MOS/MOP will be verified. This column may have multiple entries, in "sub-rows," for multiple Activities that verify the item, such as Integration Testing, Operational Effectiveness and Operational Suitability Testing (OE/OS), etc.
TEST CASE ID	The identifier for the specific test case(s) associated with the Test activity.
VERIF METHOD	The Verification Method for each OT test case identified.
RUN DATE	Either the planned or actual date for the test case execution.
TEST RESULT	The result of the test case’s execution. Pass, Fail, Partial, Limited

As the program matures, additional OT VRTM columns, such as Success Criteria, maybe added.

The Test Case ID column of the OT VRTM can optionally be expanded into multiple columns, such as those described in the *T&E Handbook and the T&E OT Test Plan Template* (i.e., Test Case Group, Test Case and Step).

4.2 FORMAT OF THE OT VRTM

For each column in the OT VRTM, Table 4-2 below has a row, which describes the format for the column's entry.

Table 4-2 – Format of OT VRTM with Example Entries

Field/Column/Attribute	Type	Description	Example Values	Target Document
COI/MOE/MOS/MOP TEXT	Text	The full text of the COI, MOE, MOS or MOP	Does the SYSTEM provide the ability to capture and process NAS data?	OT Plan
COI/MOE/MOS/MOP ID	Text	The COI number from the TEMP or a decomposed MOE, MOS or MOP number	COI_1	OT Plan
RELATED PRD REQS	Text	Any related PRD requirements.	PRD221, PRD124, PRD514, PRD515	OT Plan
RELATED PRD TEXT	Text	The full text of the applicable PRD Requirement	The System must have the ability to receive, process and maintain flight data.	OT Plan
RELATED SSD REQS	Text	Any related SSD requirements.	SSD6, SSD7, SSD10, SSD27, SSD458	OT Plan
CPR (N/A OR #)	Text	If this OT VRTM item relates to a CPR, or child requirement of a CPR, the number from the CPR table in the PRD goes here, otherwise, put "N/A."	N/A 4	OT Plan

Field/Column/Attribute	Type	Description	Example Values	Target Document
ACTIVITY ID	Text	The name of the Activity or Activities, in the OT program where the MOE/MOS/MOP will be tested. This column may have multiple entries, in "sub-rows," for multiple Activities that verify the MOE/MOS/MOP, such as Integration Testing, Operational Effectiveness and Operational Suitability Testing (OE/OS), etc. The remaining columns would likewise need to have multiple corresponding entries.	NAS Integration Testing Stability Testing Op. Effectiveness Testing	OT Plan
TEST CASE ID	Text	The identifier for the procedures section and steps that will include this MOE/MOS/MOP. This column may be broken out into multiple columns, to include Case Group, or Step, as per the templates for OT plans and procedures.	1.5.4.1	OT Procedures
VERIF METHOD	Text	The method(s) that will be used for verification of the MOE/MOS/MOP Usually either	A, D, I, T	OT Plan

Field/Column/Attribute	Type	Description	Example Values	Target Document
		Analysis, Demonstration, Inspection, or Test.		
RUN DATE	Date	The proposed or actual date the test case was executed	Any common date format.	OT Report
TEST RESULT	Text	The result of test case execution.	COIs: Yes, No, Limited MOEs, MOSs, MOPs: Untested, Pass, Fail, Partial, Deferred	OT Report

Table 4-3 – Example of OT VRTM

OT VRTM FOR [*PROGRAM*] – modified *[Date]*

COI/MOE/ MOS/MOP ID	COI/MOE/MOS/MOP TEXT	RELATED PRD REQS	PRD TEXT	RELATED SSD REQS	CPR (N/A OR #)	ACTIV-ITY ID	TEST CASE ID	VERIF METHOD	RUN DATE	TEST RESULT
COI-01	Does the SYSTEM provide the ability to capture and process NAS data?	*	*	*	*	*	*	*	*	Limited
MOS-01.1	SYSTEM provides the ability to receive, process, and maintain flight data.	PRD-221	The System must have the ability to capture….	*	3, 5	*	*	*	*	Partial
MOP-01.1.1	Receive flight data messages….	PRD-2211	The System must have the ability to Receive….	SSD4, SSD458	3	Stability Test	3.5.4.1	D	9/9/2018	Pass
MOP-01.1.2	Perform format, logic, and range checks…	PRD-2212	The System must have the ability to perform….	SSD6, SSD10, SSD27, SSD458	5	Failure Mode	3.5.4.2	T	9/9/2018	Fail
MOS-01.1.2	Provide service volume Service Prediction Report updates on a periodic basis, configurable to between 1 to 10 minutes.	PRD-124	The System must provide Service Volume report….	SSD28	5	ATC Ops	3.5.4	I	9/9/2018	Fail
MOE-01.2	Does the SYSTEM provides flight data to subscribers on demand?	PRD-514	The System must provide flight data..	SSD12	N/A	ATC Ops	3.5.5	D	10/15/2018	Pass
MOE-01.3	SYSTEM provides NOTAM data to subscribers on demand.	PRD-515	The System must provide NOTAM data….	SSD15	5	*	*	*	*	Pass
MOP-01.3.1	Provide NOTAM updates on a periodic basis, configurable to between 1 to 10 minutes	PRD-515	NATAM Data must be provided on a periodic….	SSSD15	5	ATC Ops	3.5.6	I	9/16/2018	Pass
							3.5.7	T	9/16/2018	Pass

* Test Activities usually occur at the lowest level of decomposition. COIs must be reassessed at conclusion of T&E.

5 GLOSSARY

Analysis (A): Verification that is accomplished through use of one or more of the following analysis techniques to prove that an item meets specified requirements:

1) Mathematical representation such as math models, algorithms, and equations
2) Charts
3) Graphs
4) Circuit diagrams
5) Data reduction/recording
6) Representative data (may include data collected from previous or other equipment and system verifications)

Critical Operational Issue (COI): A key operational effectiveness or operational suitability issue that must be examined during operational test to determine the system's capability to perform its mission.

Critical Performance Requirements (CPRs): Primary requirements of a solution representing attributes or characteristics considered essential to meeting the mission need that the investment program is seeking to satisfy. Critical performance requirements and associated values are specified in the program requirements document.

Demonstration (D): Verification that is accomplished by operation, adjustment, or reconfiguration of items performing their designed functions under specific scenarios. The items may be instrumented and quantitative limits of performance monitored, but only observational data rather than actual performance data is required to be recorded for verification. Demonstration is often used to verify compliance with requirements in servicing, reliability, maintainability, transportability, and human factors engineering.

Note: Demonstration does not require any actions beyond those identified in the Test Steps section of the associated test procedures.

Inspection (I): Verification that is accomplished by a visual examination of the item, reviewing descriptive documentation, and comparing the appropriate characteristics with predetermined standards to determine conformance to requirements without the use of laboratory equipment or procedures. Examples of verification by inspection are:

1) Visual analysis of the item under test, such as displays, cables, and processors.
2) Reviewing descriptive documentation such as Contract Data Requirements List (CDRL) items, vendor data, and engineering drawings.
3) Comparing the appropriate characteristics with a predetermined or reference standard such as FAA and industry standards.

Measure of Effectiveness (MOE): First-level, qualitative decomposition of an operational effectiveness component associated with a COI. [AMS] MOEs are qualitative decompositions of the COI which must be measured to fully determine whether a COI has been satisfied. [Derived from T&E Handbook]

Measure of Performance (MOP): Quantitative values that characterize MOEs or MOSs. These values are measurable by a test process. [AMS] MOPs are measurable, quantitative/qualitative values that characterize and support the evaluation of the COIs, MOEs and MOSs. Decomposition must be considered preliminary for the pTEMP and iTEMP. [T&E Handbook]

Measure of Suitability (MOS): First-level, qualitative decomposition of an operational suitability component associated with a COI. [AMS] MOSs are qualitative decompositions of the COI, which must be measured to fully determine whether a COI has been satisfied. [derived from T&E Handbook]

Test (T): Verification that is accomplished, with or without instrumentation, through systematic exercising of the application item under appropriate conditions with the collection, analysis, and evaluation of quantitative data.

Note: Acceptability of the item is determined by comparison of the data with pre-established quantitative criteria, requirements, and occurrences.

Test Activity: A category of test hierarchy between Test Phase and Test Case Group, with an identifiable title and reporting requirements.

Test Case: A subset of test procedures that specify a) a set of product requirements to be verified and validated; b) the resources required to execute the test case; c) the specific steps that must be taken to perform the test case. A test case is identified by paragraph number in a Test Procedures document.

6 ACRONYM LISTING

AMS	Acquisition Management System
ASDE	Airport Surface Detection Equipment
CDRL	Contract Data Requirements List
CMTP	Contractor Master Test Plan
COI	Critical Operational Issue
CPR	Critical Performance Requirement
DID	Data Item Description
DT	Development Test
FAA	Federal Aviation Administration
FAT	Factory Acceptance Test
FID	Final Investment Decision
ICD	Interface Control Document
MOE	Measures of Effectiveness
MOP	Measures of Performance
MOS	Measures of Suitability
NAS	National Airspace System
NEMS	Network Management System
OS	Operating System
OT	Operational Test
PRD	Performance Requirements Document
RD	Requirement Document
RVR	Runway Visual Range
SAT	Site Acceptance Test
SSD	System Specification Document
SSS	System/Subsystem Specification
SYSX	System Data and Infrastructure
T&E	Test and Evaluation
TEMP	Test Evaluation Master Plan
V&V	Verification and Validation
VRTM	Verification Requirements Traceability Matrix