

DATA ITEM DESCRIPTION

1. **DID NUMBER: DID-V&V-DEF-VCRM-V2.3**
2. **TITLE: VERIFICATION CROSS REFERENCE MATRIX**
3. **DESCRIPTION AND INTENDED USE**
 - 3.1 The Verification Cross-Reference Matrix (VCRM) is used to plan, and record the results of, the Contractor's Verification activities.
 - 3.2 The Contractor and the Commonwealth use the VCRM as the basis for common understanding and status of the Verification of requirements for each Mission System and the Support System.
4. **INTER-RELATIONSHIPS**
 - 4.1 The VCRM is subordinate to the following data items, where these data items are required under the Contract:
 - a. Verification & Validation Plan (V&VP); and
 - b. Systems Engineering Management Plan (SEMP).
 - 4.2 The VCRM inter-relates with the following data items, where these data items are required under the Contract:
 - a. System Specification (SS) for each Mission System;
 - b. Support System Specification (SSSPEC); and
 - c. Requirements Traceability Matrix (RTM).
5. **APPLICABLE DOCUMENTS**
 - 5.1 The following documents form a part of this DID to the extent specified herein:

Nil.
6. **PREPARATION INSTRUCTIONS**
 - 6.1 **Generic Format and Content**

 - 6.1.1 The data item shall comply with the general format, content and preparation instructions contained in the CDRL clause entitled "General Requirements for Data Items".
 - 6.2 **Specific Content**

 - 6.2.1 **General**
 - 6.2.1.1 The VCRM is expected to be an evolving document, which is used during the analysis and design phases of the program to capture agreement on the Verification program, and during the Verification phases to capture the ongoing status of the system with respect to Verification and Validation (V&V).
 - 6.2.1.2 The VCRM is likely to be based in electronic form (e.g. database or spreadsheet), but when printed, shall consist of a table with an entry for every requirement in the Functional Baseline(s).
 - 6.2.1.3 The Commonwealth only requires the VCRM in order to manage Verification against the Functional Baseline(s); however, the Contractor may choose to include other levels of specification within the same document. In this case, the Contractor shall clearly identify which entries pertain to the Verification of the Functional Baseline(s).

6.2.2 Part 1 Requirements

6.2.2.1 For delivery of the Part 1 VCRM requirements, each entry in the VCRM table shall contain at least:

- a. a unique reference to the corresponding requirement in the Functional Baseline(s);
- b. the requirement words or a brief precis of the requirement to provide context;
- c. the proposed Verification method(s) (i.e. one or more of Inspection, Demonstration, Analysis, Test, Simulation, Modelling, Experiment, Trial, Walk-through, Comparison, System Review, Audit, Historical Data and Conformance Certificate);
- d. the phase during which the requirements will be Verified and the associated Verification method to be applied at this phase; noting that, where Verification across multiple phases may be proposed, the scope and aims of the activities at each phase must be clearly described;
- e. a brief description of the proposed Verification method, intended as a vehicle for early agreement by both parties to define the scope of the Verification activities; and
- f. other comments as required.

6.2.3 Part 2 Requirements

6.2.3.1 For delivery of the Part 2 VCRM requirements, each entry in the VCRM table shall contain at least:

- a. the Part 1 requirements specified at clause 6.2.2 of this DID;
- b. a reference to the specific Verification / test procedure(s) and relevant documentation, including unique version identifiers;
- c. a reference to the report which contains the pertinent Verification results and, as required, data analysis (including any red-line mark-ups and signatures of witnesses to those results);
- d. the progressive status of each phase of the Verification program with respect to the requirement;
- e. a result summary (i.e. PASS/FAIL or Verification incomplete if all of the Verification activities associated with the requirement have not been completed); and
- f. other comments as required.

DATA ITEM DESCRIPTION

1. **DID NUMBER: DID-V&V-MGT-V&VP-V2.3**
2. **TITLE: VERIFICATION AND VALIDATION PLAN**
3. **DESCRIPTION AND INTENDED USE**
 - 3.1 The Verification and Validation Plan (V&VP) documents the Verification and Validation (V&V) program to be implemented by the Contractor to meet the V&V requirements of the Contract.
 - 3.2 The V&VP is used by the Contractor to implement its V&V program.
 - 3.3 The V&VP is used by the Commonwealth Representative to assess the adequacy and to monitor the progress of the Contractor's V&V program, and to identify the Commonwealth's involvement in the program.
4. **INTER-RELATIONSHIPS**
 - 4.1 The V&VP is subordinate to the following data items, where these data items are required under the Contract:
 - a. Systems Engineering Management Plan (SEMP); and
 - b. Integrated Support Plan (ISP).
 - 4.2 The V&VP inter-relates with the following data items, where these data items are required under the Contract:
 - a. Verification Cross-Reference Matrix (VCRM); and
 - b. Contract Master Schedule (CMS).
5. **APPLICABLE DOCUMENTS**
 - 5.1 The following documents form a part of this DID to the extent specified herein:

Nil.
6. **PREPARATION INSTRUCTIONS**
 - 6.1 **Generic Format and Content**

 - 6.1.1 The data item shall comply with the general format, content and preparation instructions contained in the CDRL clause entitled "General Requirements for Data Items".
 - 6.1.2 The data item shall include a traceability matrix that defines how each specific content requirement, as contained in this DID, is addressed by sections within the data item.
 - 6.2 **Specific Content**

 - 6.2.1 **Plan Overview**
 - 6.2.1.1 The V&VP shall describe the Contractor's V&V strategy, methodology, processes, and sequence of activities for both the Mission System and Support System to meet the following objectives:
 - a. that the design yields the specified performance;
 - b. that fabrication defects, marginal design, marginal parts, and marginal components (if any exist) are detected early in a test sequence;
 - c. that activities are sequenced to manage and control the risk that the program's next major V&V activity fails to detect significant design inadequacies before the design is too advanced, and significant resources are needed to solve the problem;

- d. that the elements of the system can survive the environments predicted to be encountered during transportation, handling and field operation;
- e. that the system and all of its sub-elements, as built and assembled, are compatible with each other and are capable of performing the required mission functions;
- f. that the system is characterised by establishing the operating signature of performance through calibration and combination of sub-element performance data; and
- g. to define the basis for acceptance and delivery of the system.

6.2.2 Organisation and Management

6.2.2.1 The V&VP shall include:

- a. the Contractor's organisation for its V&V program, and the inter-relationships between the V&V organisation and the other parts of the Contractor's organisation for the project;
- b. the Contractor's procedures for coordinating its V&V program with its system engineering and logistic engineering efforts to ensure that its Mission System design has due regard for through life support;
- c. the Contractor's procedures for coordinating its V&V program with its Integrated Logistic Support (ILS) efforts to ensure an effective Support System design;
- d. a discussion of how the unique skills and experience of the various groups involved in the V&V program are arranged to provide continuity of V&V effort;
- e. the Contractor's V&V program work breakdown structure and schedule, describing how the schedule supports the achievement of the Contract Master Schedule (CMS);
- f. the Contractor's procedures for monitoring, evaluating, and controlling the status of V&V tasks and achievement of the V&V schedules; and
- g. the Contractor and Commonwealth Representative resources (eg. human, machine, and platforms) anticipated being required at the various stages of the V&V program.

6.2.2.2 The V&VP shall refer to the Verification Cross-Reference Matrix (VCRM) for both the Mission System and Support System that, for each requirement of each system's Functional Baseline, identifies the method and stage of the V&V program at which compliance will be verified.

6.2.3 Flow Diagram

6.2.3.1 The V&VP shall include an overall flow diagram of the V&V and deployment program for both the Mission System and the Support System. This flow shall be sequentially arranged to include:

- a. all significant V&V milestones and efforts in the development phase associated with each class of V&V;
- b. hardware and software integration schedules;
- c. requirements for V&V concurrency;
- d. the contractor or group responsible for each V&V event; and
- e. any additional information that clarifies the description of the V&V program.

6.2.3.2 The flow diagram shall reflect predicted dates for significant milestones.

6.2.4 V&V Objectives

6.2.4.1 The V&VP shall specify the broad objective for each V&V phase for both the Mission System and the Support System. Objectives shall be specified in terms of verifying part or all of system or lower level specifications (eg, subsystem specifications). It is important that the V&VP support a unified set of objectives for the entire V&V program so that

redundant activities are eliminated and the program can evolve smoothly through each succeeding phase.

6.2.5 V&V Support Requirements

6.2.5.1 The V&VP shall identify and describe all significant technical and logistic support required to implement each V&V phase for both the Mission System and the Support System. These requirements should be expressed in sufficient detail to permit a determination of whether the Commonwealth has the capability to support the phase. In addition, the V&VP shall identify the following major requirements for each V&V phase:

- a. any special test equipment and equipment requiring long lead times to develop or procure;
- b. logistics requirements, including supply, maintenance and transportation;
- c. the major and special facilities required to support the V&V effort, including simulation requirements, Commonwealth facilities, environmental test facilities, and plans for validating that facility interfaces and support documentation are both realistic and compliant with design documentation;
- d. requirements for supporting computer equipment for data reduction, analysis or conduct of V&V; and
- e. the proposed method and any activities required for Validation of the test environment and test equipment.

6.2.6 Special Testing

6.2.6.1 The V&VP shall provide details of any special or unusual tests or examinations necessary as part of the V&V program.

6.2.7 Developmental V&V

6.2.7.1 The V&VP shall define the conduct of lower-level developmental V&V activities for both the Mission System and Support System to be conducted by the Contractor but not used as part of formal Acceptance V&V.

6.2.8 Documentation

6.2.8.1 The V&VP shall identify documentation requirements for each phase of the V&V program for both the Mission System and the Support System. It shall describe generation and approval processes, document change and revision control, and the interdependence between the engineering and V&V documentation.

6.2.8.2 The V&VP shall define the scope and purpose of subordinate plans and their interrelationship with each other and the V&VP.

6.2.9 V&V Configurations

6.2.9.1 The V&VP shall provide details of the expected configurations of the system or system components for both the Mission System and the Support System during the V&V program. The V&VP shall also show how the system configuration will be managed through the V&V phases to ensure that Acceptance V&V will be conducted on equipment that is of the same hardware and software configuration as will be offered for Acceptance.

6.2.10 Failure and Corrective Action Management

6.2.10.1 The V&VP shall describe the Problem Resolution System used for the collection of failure data for both the Mission System and the Support System (including that of Subcontractors) and shall identify when it will be established.

6.2.10.2 The V&VP shall identify the process used to track the corrective action taken as a result of a failure, and the interaction with the engineering development groups, logistic organisation, Subcontractors and the Commonwealth.

6.2.10.3 The V&VP shall identify how regression testing for both the Mission System and the Support System will be managed following test failure or design change throughout the V&V program.

DATA ITEM DESCRIPTION

1. DID NUMBER: DID-V&V-TST-ATPLAN-V2.3

2. TITLE: ACCEPTANCE TEST PLAN

3. DESCRIPTION AND INTENDED USE

3.1 An Acceptance Test Plan (ATP) describes the organisation, schedules including sequence and interdependence, responsibility, procedures and other details that are necessary for the conduct of a set of Acceptance Test Procedures (ATProcs) for specific segments or phases of the overall test program.

3.2 The Contractor uses the ATP to:

- a. define, manage and monitor the plans for conducting specific segments or phases of the overall test program; and
- b. ensure that those parties (including Subcontractors) who are undertaking Acceptance testing activities understand their respective responsibilities, the processes to be used, and the time-frames involved.

3.3 The Commonwealth uses the ATP to:

- a. understand and evaluate the Contractor's approach to meeting the Acceptance testing requirements of the Contract;
- b. assist with monitoring the Acceptance testing activities; and
- c. provide input to the Commonwealth Representative's own planning for Acceptance testing.

4. INTER-RELATIONSHIPS

4.1 The ATP is subordinate to the following data items, where these data items are required under the Contract:

- a. Verification & Validation Plan (V&VP).

4.2 The ATP inter-relates with the following data items, where these data items are required under the Contract:

- a. Verification Cross-Reference Matrix (VCRM);
- b. Acceptance Test Procedures (ATProcs); and
- c. Acceptance Test Reports (ATRs).

5. APPLICABLE DOCUMENTS

5.1 The following documents form a part of this DID to the extent specified herein:

Nil.

6. PREPARATION INSTRUCTIONS

6.1 Generic Format and Content

6.1.1 The data item shall comply with the general format, content and preparation instructions contained in the CDRL clause entitled "General Requirements For Data Items".

6.1.2 The data item shall include a traceability matrix that defines how each specific content requirement, as contained in this DID, is addressed by sections within the data item.

6.2 Specific Content

6.2.1 General

6.2.1.1 The ATP shall be consistent with the V&VP.

6.2.2 Detailed Requirements

6.2.2.1 The ATP shall separately identify each requirement, and in respect to each requirement:

- a. describe the scope of the test;
- b. provide a summary description of the test, including the organisation(s) involved in the test and the responsibilities of key individuals;
- c. reference the VCRM entries that detail which requirements are being tested, and whether Verification of a requirement or Validation will be established by test, demonstration, inspection, analysis, simulation, modelling, experiment, audit, walk-through, system review, comparison, historical data or compliance certificate or other means;
- d. describe a list of all test cases including the sequence of these test cases;
- e. provide a description of the test article, including test configuration identification;
- f. detail system configuration and initial conditions for test;
- g. identify any limitations, assumptions and constraints associated with the V&V activity, including any measurements that need to be taken at the time of the V&V activity to record uncontrollable conditions (eg, ambient temperature)
- h. identify any location or environmental considerations for the conduct of the V&V activities;
- i. state the means, or combination of means, which will be used to verify compliance with the requirement, for example, stand alone system, integration test;
- j. identify, with respect to the means stated in subclause i. above, whether the Verification of the requirement will be fully established by either a discrete test, as part of a test of the complete functioning system, or both;
- k. identify the precursor test activities, if any, and the immediate successor test activities covered by a separate ATP (if applicable);
- l. identify the subordinate test procedures that describe the test steps for each test case listed in the ATP;
- m. include a list of parameters to be tested or measured and the means by which the system will be measured with respect to these parameters (including, if applicable, any data analysis processes required for evaluation); and
- n. detail test equipment and documentation required for the conduct of the V&V activity, including details of whether the test organisations, facilities and equipment are appropriately certified (eg. by NATA) and appropriately calibrated.

6.2.2.2 The ATP shall define procedures to be adopted when a test result indicates the test has failed, to provide traceability of any investigation or technical follow-up, corrective actions, and retest, to maintain the integrity of the final results and reports.

6.2.2.3 The ATP shall list those ATPProcs and Acceptance Test Reports (ATRs) that are generated by the ATP.

6.2.2.4 The ATP shall define the test resources necessary to support the conduct of the test activities within the scope of the ATP.

6.2.2.5 The ATP shall reference the VCRM that provides traceability of each requirement to test item and test procedures that will verify and validate satisfactory compliance.

DATA ITEM DESCRIPTION

1. **DID NUMBER: DID-V&V-TST-ATPROC-V2.3**

2. **TITLE: ACCEPTANCE TEST PROCEDURE**

3. **DESCRIPTION AND INTENDED USE**

3.1 Acceptance Test Procedures (ATProcs) are produced for each test activity, or group of activities to detail the procedures, developed by the Contractor, which are to be used in confirming that the complete system requirements for the Mission System and Support System have been met.

3.2 The Contractor uses the ATProc to:

- a. define, manage and monitor the procedures for conducting specific elements of the test program; and
- b. ensure that those parties (including Subcontractors), who are undertaking Acceptance testing activities, understand their respective responsibilities, the processes to be used, and the time-frames involved.

3.3 The Commonwealth uses the ATProc to:

- a. understand and evaluate the Contractor's approach to meeting the Acceptance testing requirements of the Contract; and
- b. assist with monitoring the Acceptance testing activities.

4. **INTER-RELATIONSHIPS**

4.1 The ATProc is subordinate to the following data items, where these data items are required under the Contract:

- a. Acceptance Test Plan (ATP).

4.2 The ATProc inter-relates with the following data items, where these data items are required under the Contract:

- a. Verification Cross-Reference Matrix (VCRM); and
- b. Acceptance Test Report (ATR).

5. **APPLICABLE DOCUMENTS**

5.1 The following documents form a part of this DID to the extent specified herein:

Nil.

6. **PREPARATION INSTRUCTIONS**

6.1 **Generic Format and Content**

6.1.1 The data item shall comply with the general format, content and preparation instructions contained in the CDRL clause entitled "General Requirements For Data Items".

6.1.2 The data item shall include a traceability matrix that defines how each specific content requirement, as contained in this DID, is addressed by sections within the data item.

6.2 **Specific Content**

6.2.1 The ATProc shall include:

- a. a description of the scope of the test, including a test method, which shall provide a general description of the test activity;

- b. a description of the configuration of the system under test and initial conditions for test, including any preparatory requirements or other pre-test activities;
- c. a description of the test equipment (including the configuration of test equipment), documentation (including details of calibration and certification of test equipment if required), venue and personnel required for the conduct of the test; and
- d. all safety precautions necessary for the performance of the test procedure,
- e. a description of any data inputs or data files required for the conduct of the test,
- f. step by step procedures for the performance of the test in sufficient detail to identify every action necessary for the conduct of the test, including:
 - (i) pre-test actions;
 - (ii) any notes, cautions or warnings that are necessary at each stage of the test procedure;
 - (iii) required operator test input;
 - (iv) expected outcomes or results;
 - (v) space for recording actual results;
 - (vi) space for comments;
 - (vii) a block for sign off signatures for all parties present at the test;
 - (viii) a space for recording the configuration of the item(s) under test including all major hardware and software configuration items;
 - (ix) a space for recording all test equipment utilised and the calibration date of the equipment;
 - (x) if applicable, a space for recording details of test-recording media that will support test analysis; and
 - (xi) a space for recording any post-test actions.

6.2.2 Ideally, test procedures should be modular, to permit a failed test activity to be repeated, where possible, without repeating other parts of the test.

6.2.3 In conjunction with each test step, the test procedure shall define what measurements, readings, or observations are required for a correct response. As part of the test assessment data, PASS/FAIL criteria or the expected qualitative or quantitative result shall also be defined. Where a quantitative result is declared, this shall include the allowable tolerance. Where a qualitative result is declared, this shall include a description of the expected results of the test.

DATA ITEM DESCRIPTION

1. **DID NUMBER: DID-V&V-TST-ATREP-V2.3**
2. **TITLE: ACCEPTANCE TEST REPORT**
3. **DESCRIPTION AND INTENDED USE**
 - 3.1 Acceptance Test Reports (ATRs) are be used to document the results of the system test activity. In particular, ATRs formally document the results, conclusions and recommendations of testing conducted according to the V&VP, associated Acceptance Test Plans (ATPs), and associated Acceptance Test Procedures (ATProcs).
 - 3.2 The Contractor uses the ATR to:
 - a. record the outcome of V&V activities, and to determine any corrective action required, and
 - b. inform the Commonwealth of the outcome of the relevant V&V activities in support of offering Supplies for Acceptance.
 - 3.3 The Commonwealth uses the ATR to:
 - a. support considerations on the suitability of Supplies offered for Acceptance, and
 - b. assist with monitoring the performance of the Contractor under the Contract.
4. **INTER-RELATIONSHIPS**
 - 4.1 The ATR is subordinate to the following data items, where these data items are required under the Contract:
 - a. Verification & Validation Plan (V&VP).
 - 4.2 The ATR inter-relates with the following data items, where these data items are required under the Contract:
 - a. Acceptance Test Plan (ATP); and
 - b. Acceptance Test Procedure (ATProc).
5. **APPLICABLE DOCUMENTS**
 - 5.1 The following documents form a part of this DID to the extent specified herein:

Nil.
6. **PREPARATION INSTRUCTIONS**
 - 6.1 **Generic Format and Content**

 - 6.1.1 The data item shall comply with the general format, content and preparation instructions contained in the CDRL clause entitled "General Requirements For Data Items".
 - 6.1.2 The data item shall include a traceability matrix that defines how each specific content requirement, as contained in this DID, is addressed by sections within the data item.
 - 6.2 **Specific Content**

 - 6.2.1 The ATR shall identify the component, equipment or system that was tested and briefly describe the tests conducted making reference to applicable documents, including ATPs and ATProcs, as required. Terms, abbreviations, symbols and documents referenced in the ATR shall be defined.
 - 6.2.2 The ATR shall define the general conditions under which the test was conducted including:

- a. Test Personnel. The ATR shall identify, by name and position, all personnel involved in the conduct and supervision of the Acceptance Test. Where applicable, the role of each participant should be identified;
- b. Description of the Item Under Test. The ATR shall uniquely identify (by serial number or similar) the component, equipment or system subject to Acceptance Testing, including a description of its configuration status (modification/revision status);
- c. Description of Test Equipment. The ATR shall uniquely identify all test equipment used including equipment serial numbers. Where applicable, this description shall state where and when the equipment was last calibrated;
- d. Data Reduction/Post Processing. The ATR shall describe any additional equipment and software used to process data collected during the test including unique serial number / version information; and
- e. General Conditions. The ATR shall describe any other general conditions that are considered to have had an influence on the conduct or results of the test.

- 6.2.3** The ATR shall detail the test set-up and method by reference to the applicable ATProc. Any departures from the test set-up or method of the ATProc shall be detailed and justified.
- 6.2.4** The ATR shall incorporate all relevant information concerning the test including the procedure or reference thereto. The ATR shall incorporate a copy, or reference to, the 'as-run' test procedure, the original of which shall remain in a record file along with the test log.
- 6.2.5** The ATR shall include the names of Commonwealth representative(s) who witnessed the Verification activities, or reference to the authority to conduct Verification without Commonwealth presence;
- 6.2.6** The ATR shall discuss the test results obtained and document the results of the test in tabular form. Where appropriate results may also be represented in graphical or diagrammatical form in the ATR. All tables and graphs shall be numbered, titled and dimensioned (with units). Raw results/measurements shall be recorded on the data sheets provided in the ATProc, signed by Commonwealth Representative and Contractor participants to the tests, and should be provided as attachments to the ATR.
- 6.2.7** Data generated by data reduction/post processing techniques shall also be presented in the ATR as attachments.
- 6.2.8** All anomalies, failures and out-of-tolerance conditions shall be recorded and explained.
- 6.2.9** Where calculations are applied to test measurements, these equations are to be shown.
- 6.2.10** The ATR shall detail conclusions and provide a summary of the test results. The conclusions shall include an assessment of the success, or otherwise, of the test in substantiating the associated requirements.
- 6.2.11** When a test fails to fully verify compliance with the associated requirement, the ATR shall recommend further action, such as redesign and retest.
- 6.2.12** The ATR shall include certification that the test results and any attachments, including data sheets, computer printouts, photographs, etc. are authentic, accurate, current, and in accordance with the associated ATP and ATProc.