DISMOUNTED JOINT FIRES INTEGRATOR (D-JFI) VERIFICATION AND VALIDATION (V&V) STRATEGY AND MANAGEMENT

DJFI V&V Activities Overview

1. Verification and Validation (V&V) consists of a range of evidence gathering activities that will progressively assure the system is being developed appropriately and meets the System and ultimately the User requirements.

2. The project V&V activities will be aligned with the GEAR lifecycle (see D-JFI PEMP Annex A for details of all engineering activities to be conducted for this project).

Validation

3. On this project, validation is divided into three distinct activities:

   a. Validation of the requirements

   b. Validation of the design

   c. Validation of the delivered capability

4. Validation of Requirements. Requirements validation will be conducted in two areas: DE&S and the Supplier. DE&S Requirement set Validation will ensure the SRD:

   a. Fully traces to the URD

   b. Fully satisfies the requirements of the URD

   c. Captures all enabling requirements needed to ensure the delivered capability meets the stakeholder needs

   d. Identifies all interfaces and the data exchanges across them

5. Supplier Requirement set Validation will ensure the supplier requirements:

   a. Fully trace from the DE&S SRD through all Supplier requirement documents: Expected to be System / Sub-System, Software, Electronic Hardware, Mechanical

   b. Fully satisfy the next highest level in the requirements chain

   c. Capture all enabling requirements needed to ensure the delivered capability meets the stakeholder needs

   d. Are captured in a configuration managed environment

   e. Are reviewed and endorsed by all relevant stakeholders

   f. Identify all interfaces and the data exchanges across them

6. Validation Criteria for use in Requirements set Validation:

a. Is the Parent document endorsed and issued prior to validation of child document?

b. Does every parent requirement have a ‘satisfies’ link to one or more child requirement(s)?

c. Do the collective linked child requirements fully satisfy the intent of the parent requirements?

d. Is each Requirement:

(1) Uniquely identified as a requirement?
(2) Unambiguous?
(3) Redundant?
(4) In conflict with others?
(5) Free from errors of fact?
(6) Physically possible to meet?
(7) Verifiable?
(8) Consistent with other requirements?
(9) Articulated with only one “shall” (actual or implied)?
(10) Supported by sufficient evidence to be clearly understood?
(11) Bound by a suitable tolerance (if measured in units)?
(12) Atomic - free from multiple characteristics which would be better expressed as multiple requirements?
(13) Supported by appropriate Threshold and Objective targets?
(14) Supported by a rationale, if it has no parent in the parent document?

e. Does the requirement set:

(15) Contain multiple requirements which would be better expressed as a single requirement?
(16) Contain reliability, availability and fault tolerance requirements?
(17) Contain safety requirements?
(18) Contain Human Factors requirements?
(19) Contain input from all Stakeholders?
(20) Cover all stakeholder needs under all operating conditions?

7. Satisfactory Requirement set Validation will be captured in a Validation Statement, generated by the ITEA manager / Supplier equivalent. The statement will contain:

a. Date Requirements set Validation carried out

b. Baseline details of all documents included in the activity (including referenced material) capturing reference title / number and version details

c. Details of those carrying out the validation (names / staff numbers)

d. Pass / Fail status of every requirement against the validation criteria (captured as a DOORS attribute)

e. Statement of impact for any requirements which fail the validation criteria

f. Plan for correction of any failures

g. Statement of acceptance by Sponsor / Supplier equivalent for every requirement which fails validation and is not to be corrected

8. DE&S Requirement set Validation is conducted during SFR and SRR. It is further conducted whenever the URD or SRD is changed (such as during tender negotiations). Likewise, whenever the Supplier up-issues a requirements document, a re-validation of the requirement set will need to be conducted.

9. It is assumed the URD will not change throughout the remainder of the project.

10. It is expected that the SRD will change during the negotiation phases, and a re-validation activity must be conducted to ensure the revised document continues to fulfil the needs of the URD.

11. It is expected that the supplier requirements suite will be updated many times during the design phase.

12. The ITEA manager is responsible for ensuring the SRD in use (i.e. the version forming part of the current document baseline) has a valid Validation statement.

13. The ITEA manager is also responsible for ensuring re-validation of the Supplier requirements documents is carried out at appropriate times (as a minimum, pre-Critical Design Review(CDR)).

14. The Project Engineer is responsible for ensuring the SRD is re-validated after each round of updates have been incorporated.

15. Validation of Design. Design Validation is a Supplier activity, achieved through internal reviews of the designs of the different domains (Systems, Software, Electronic Hardware, Mechanical) at two major reviews, namely Preliminary Design Review and Critical Design Review (PDR and CDR).

16. The output of these reviews will be assessed by DE&S as part of the assurance that the supplier designs meet the requirements, and are being developed in accordance with the contractually agreed processes. Passing CDR indicates the supplier has a validated, compliant, detailed design and allows them to progress onto the Implementation phase: building / procuring the system for V&V activities.

17. The ITEA Manager is responsible for liaising with the supplier to agree and then attend / assess any design reviews deemed appropriate to gathering design evidence. They will be supported by members of the DLoD community as requested by the ITEA Manager.

18. **Validation of Delivered Capability.**

19. The delivered capability will be Validated through User trials Figure 1 contains the details of the activities planned.

Integration

20. Integration is conducted by the supplier with support from the authority.

21. During Integration, the Prime Contractor will be performing verification activities to successively prove their output against their own specifications, culminating in Factory Acceptance Tests (FATs), Certification and Analyses.

22. Initially this will be at the Module/Unit/Component level, but then at Subsystem and finally System level to show compliance of their total product against the specification.

23. At the end of the Integration phase an Acceptance Review (AR) will be held. During the review, the ITEAP Working Group will review all V&V evidence gathered up to that point, from this evidence they will decide whether to allow the system into the Verification phase of the project.

Verification

24. Verification activities will be Prime Contractor led supported by the Authority with the Authority retaining the right to amend a test plan and/or location. This aims to demonstrate compliance to all the System Requirements, normally via System Acceptance Tests (SATs). Again, at the end of this phase an Acceptance Review is required to progress to Validation of Delivered Capability.

25. The ITEA manager is responsible for ensuring these reviews are being conducted, and the review minutes passed to DE&S for evidence of adherence to the required processes, or to initiate discussion where the system being developed is straying from the requirements.

Capturing V&V evidence

26. The ITEA manager is responsible for assigning every UR and every SR to one-or-more V&V events, which will provide evidence of compliance to the requirements. Clearly they will rely on input from the DLoD community to assist in this, ensuring all requirements are appropriately covered.

27. The assignment to events will be captured in the Verification and Validation Requirements Matrix (VVRM). This Matrix will be created within DOORS in the System Acceptance Test module.

28. The actual evidence gathered during each event will vary. Some evidence can be captured within DOORS such as Validation ‘pass/fail’ status for each requirement. Other evidence will be in the form of statements or test reports, which cannot easily be recorded within DOORS, and thus will be saved in the ITEA area of the project folder structure.

29. Figure 1 shows an overview of the GEAR reviews and phases that will contribute to V&V events used to gather the evidence that the system meets the requirements, and how these are aligned to the normal systems engineering ‘V’ lifecycle model.

30. In addition to the formal V&V events that demonstrate the requirements are satisfied, several other activities will be required to confirm that the evidence being collected is robust and of sufficient quality. Although these are not V&V events in their own right, it is important that these activities occur and evidence for these is collected, such that formal V&V events can be demonstrated to be valid.

DJFI V&V Alignment to GEAR

31. Figure 1 shows how the DJFI V&V events will be aligned to the GEAR process. In this diagram, all GEAR activities are shown as boxes, containing the primary events and outputs. The diamonds show reviews, some of which are GEAR reviews specifically identified in GEAR, the others, contained within the 'Demonstration Monitoring and Control' activity are classed as Technical Quality Audits (TQA's) within GEAR.

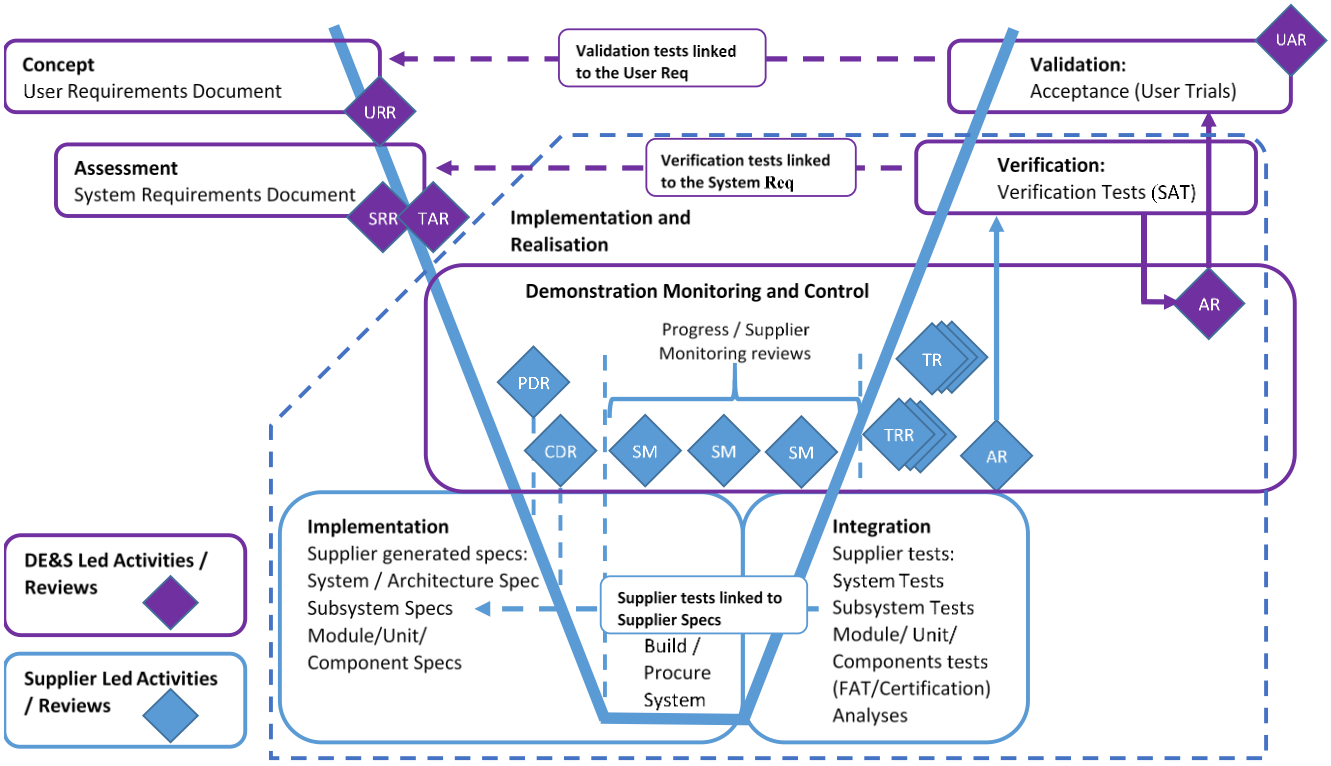

Figure 1: Verification and Validation Activities Aligned to GEAR Process

32. Figure 2 below shows how each V&V event is linked to GEAR and the contribution it makes to the overall V&V activity.

Name	Alignment to GEAR	V&V Contribution
User Requirements Review (URR) System Requirements Review (SRR) Tender Analysis Review (TAR)	Gear reviews prior to implementation	Validates requirements Ensures supplier is fit for purpose with respect to their V&V activities
Progress Reviews Supplier Monitoring Test Readiness Reviews	Technical Quality Audits during Demonstration GEAR phase	Assures that V&V activities are being conducted as required by DE&S (i.e. this plan)
Acceptance Reviews	Technical Quality Audits during Demonstration GEAR phase	Allows progress of an item into a stage of V&V by examining evidence that it meets relevant

Name	Alignment to GEAR	V&V Contribution
	User Acceptance Review at the end of User Acceptance phase	criteria. Evidence could be from Design reviews, Tests and Analyses, or using existing information
Test Reviews	TQA's during Demonstration	Reviews the outcome of a particular test, ensuring the results meet expectations
Design Reviews (PDR & CDR)	Technical Quality Audits (TQA's) during Implementation	Formal V&V Events that provide evidence of a requirement meeting the agreed MOP (threshold or objective as agreed during contract negotiations)
Analyses	Integral parts of the Demonstration phase	
Tests (Certification, FAT, SAT & User Trial)		

Figure 2: V&V Events Alignment to GEAR

Verification and Validation Requirements Matrix (VVRM) Management

VVRM Approach

33. **VVRM Approach.** Figure 3 shows how the verification events have been derived from the URD. The SRD contains what the D-JFI system is required to do in order to satisfy the User Requirements, this includes what contractors' solution capabilities are required and the extent of GFA integration.

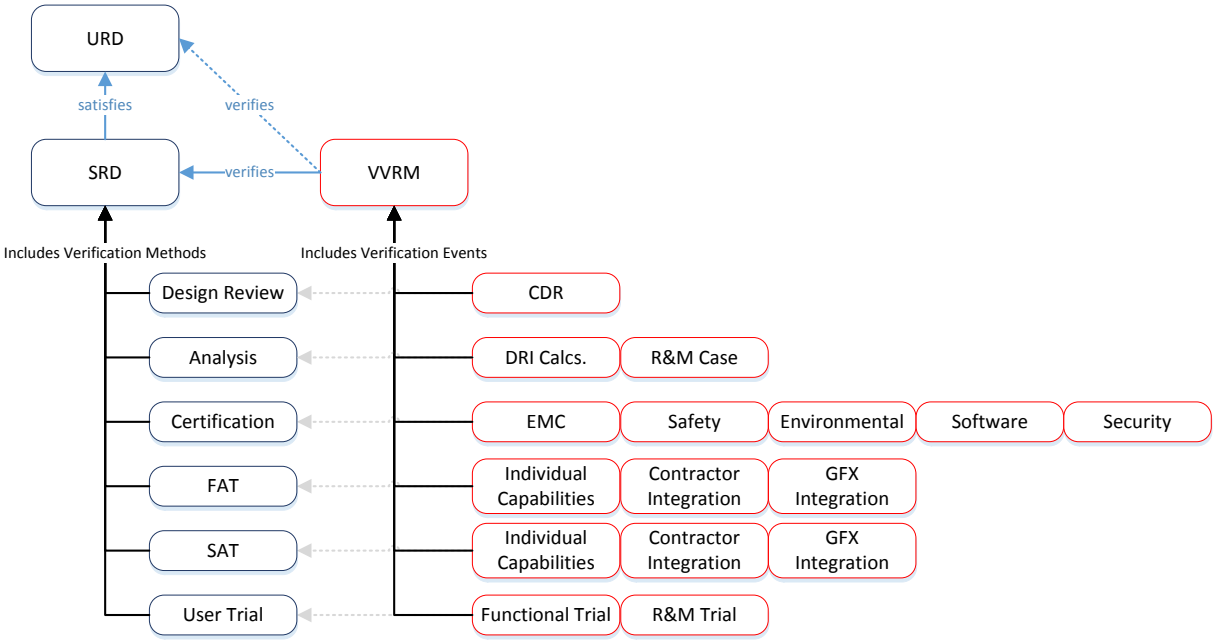

Figure 3: DOORS VVRM Schema

34. As the SRD and VVRM will be created in DOORS, filters can be used to show the requirements that will be tested at a given event. Figure 3 shows the events listed in the VVRM and how these are traced to the Methods identified in the SRD. Figure 4 below describes these events in more detail.

35. Each System Requirement is assigned a minimum of one Verification Method and often many more where the requirement is of importance and specific elements can be verified / accepted early. Each Verification Method assigned to a requirement within the SRD constitutes a unique acceptance entry in the VVRM. This creates more acceptance events than requirements but allows each one to be accepted and commented on individually as the project progresses. An example of how a System Requirement is verified at multiple events is shown in Figure 4.

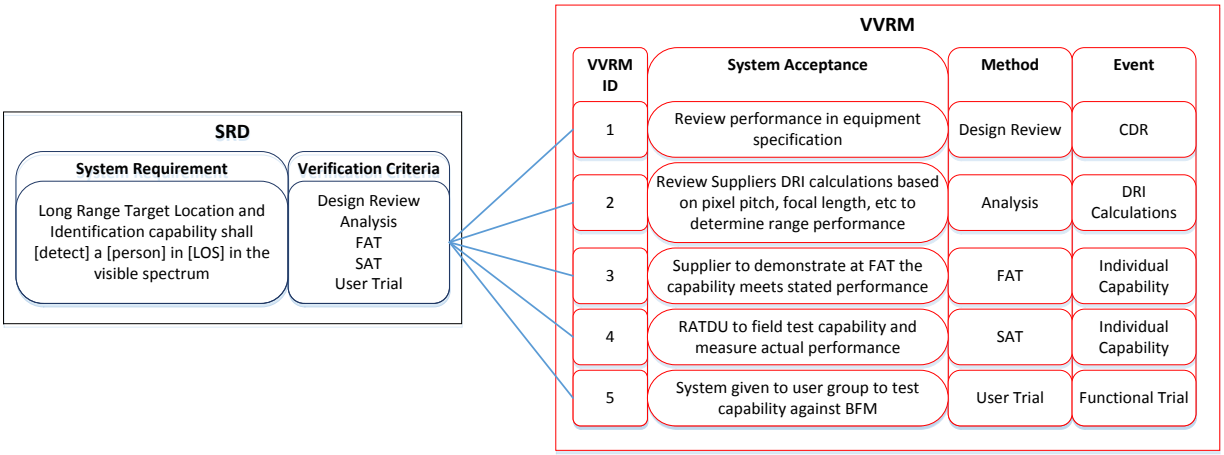

Figure 4: Example of a System Requirement with multiple T&E events in the VVRM

T&E Methods and Events

36. This section provides a breakdown of the Test and Evaluation Methods which are quoted in the SRD for each requirement and the events these consist of.

a. Design Reviews

(1) PDR. Preliminary Design Review is the first design review, where the supplier presents their early design solutions. Acceptance of PDR by DE&S is permission to continue with further design work.

(2) CDR. Critical Design Review is the last design review where the supplier presents their final design solution. Acceptance of CDR by DE&S is permission to manufacture equipment to support the FAT.

b. Analysis

(1) R&M Case. The Reliability and Maintainability case produced by the supplier will define the calculated reliability figures, safety hazards, scheduled and preventative maintenance tasks and their intervals / duration.

(2) DRI Calculations. The Detect, Recognise and Identify calculations are to be produced by the supplier, using their equipment specifications (e.g. focal length and pixel pitch) to provide confidence the system can place the correct number of pixels on target for the stated ranges. Example calculations to determine the range for DRI are:

(a) Equation 1.

$$\text{Target Critical Dimensions} = \sqrt{\text{Target Height (m) x Target Width (m)}}$$

(b) Equation 2:

$$\text{Pixel IFOV (mrad)} = \frac{\text{detector pixel pitch (µm)}}{\text{Optics effective focal length (mm)}}$$

(c) Equation 3.

$$\text{No. of } \left(\frac{\text{pixels}}{\text{Meter}}\right) \text{ req'd in plane of target} = \text{"PPM"} = \frac{\text{2 x No. of cycles from Johnsons criterion}}{\text{Target critical dimension (m)}}$$

(d) Equation 4.

$$\text{Range (m)} = \frac{(1000 \frac{\text{radians}}{\text{mrad}})}{\text{PPM } \left(\frac{\text{Pixels}}{\text{M}}\right) \text{ x Pixel IFOV (mrad)}}$$

c. Certification

(1) EMC. Electromagnetic Compatibility Testing to measure the emissive and susceptive field strengths. This is to ensure the system does not introduce interference or receive interference from nearby systems.

(2) Safety. Safety certification to demonstrate that the system is safe to use. E.g. Laser Eye Safety, H&S at Work Act.

(3) Environmental. Testing of environmental conditions (e.g. temperature, vibration, etc.) using a Defence approved independent test house.

(4) Software. Software certification to certify the software meets the approved standard.

37. **FAT.** FAT will be contractor lead supported by the authority. The Supplier will be responsible for defining and running the FAT. MoD will attend a FAT day to review the capability demonstration from the supplier. Representatives will include the Project Manager, Requirements Manager and RA TDU Trials Manager. The supplier will then produce a FAT test report with attached completed test schedules as formal evidence of FAT completion.

a. **Individual Capabilities.** Factory Acceptance Testing of the individual supplier capabilities in isolation. E.g. testing the Target Identification and Location capability for range / visual acuity.

b. **Contractor Integration.** Factory Acceptance Testing of the integrated contractor solution (Without GFA) to demonstrate that the suppliers' equipment can integrate with each other. E.g. Receiving Target Locations onto the End User Device.

c. **GFA Integration.** Factory Acceptance Testing of the contractor solution with GFA interfaces. The GFA will be made available to the supplier and use of simulation may be required. Use of simulation to demonstrate that the information received from a GFA interface is appropriately handled / displayed is the responsibility of the contractor.

38. **SAT.** SAT will be contractor lead supported by the authority with the authority retaining the right to amend a test plan and or location. The supplier will be responsible for defining the test plans and booking test facilities once agreed by the authority. The supplier will be able to attend any SAT tests as required to witness the results. The contractor will produce a test report which details their test activities and test findings / recommendations.

a. **Individual Capabilities.** System Acceptance Test run by the contractor to test the individual supplier capabilities in isolation. E.g. testing the Target Identification and Location capability for location accuracy against known points.

b. **Contractor Integration.** System Acceptance Test run by the contractor to demonstrate that the integrated contractor solution (Without GFA) can integrate with each other. E.g. Using the laser designation capability remotely from the End User Device.

c. **GFA Integration**. System Acceptance Test run by the contractor to demonstrate that the whole system (including GFA) performs as expected.

39. **User Acceptance Trials.** The RA TDU will be responsible for organising the User Trials and will witness the tests as required. They will capture the users' feedback and include this in a formal test report.

a. **Functional Trials**. RA TDU to organise functional user trials with the user community. The user community will consist of representatives from JALO (representing JTACs and SF), 1 Artillery Brigade (main capability user) and VHR Brigade. This will be a less prescribed test activity with more emphasis on the users to use the equipment as expected in use on operations. This will include how the system is stored / carried on the person and its usability. User feedback will provide evidence of acceptance.

b. Interoperability tests could potentially be carried out at a multinational training event such as Exercise Bold Quest hosted in the US which occurs every October. The DACAS and FMV functional user trials can only be carried out at this type of event as it requires capable air assets available to support the user training.

c. **R&M Trials.** RA TDU to organise reliability and maintainability trials. This includes testing the system against the battlefield mission and battlefield day (e.g. number of switch on / offs and use time) to observe for any failures or issues which jeopardise the quoted reliability figures.

Aligning GEAR and Elbit Verification Categories

The basis of both the GEAR and Elbit verification categories are from ISO15288. In the table below each definition is listed. The full details are GEAR verifications are list above.

Verification Category	D-JFI ITEA Annex I Definition	Elbit Definition
Analysis	**R&M Case.** The Reliability and Maintainability case produced by the supplier will define the calculated reliability figures, safety hazards, scheduled and preventative maintenance tasks and their intervals / duration. **DRI Calculations.** The Detect, Recognise and Identify calculations are to be produced by the supplier, using their equipment specifications (e.g. focal length and pixel pitch) to provide confidence the system can place the correct number of pixels on target for the stated ranges.	System Analysis and Inspection Report **–** *This is the I&A aspect of IADT.* This can include test evidence of sub-systems compliance and qualification prior to execution of SAT
Design Review	**PDR.** Preliminary Design Review is the first design review, where the supplier presents their early design solutions. Acceptance of PDR by DE&S is permission to continue with further design work. **CDR.** Critical Design Review is the last design review where the supplier presents their final design solution. Acceptance of CDR by DE&S is permission to manufacture equipment to support the FAT.	Requirement is to be discussed at SRR, PDR & CDR to provide theoretical evidence of future compliance – progressive acceptance and instil confidence in solution as we progress through design phase. This documentation evidence will be backed up by bread board testing at PDR and prototype testing at CDR.

Verification Category	D-JFI ITEA Annex I Definition	Elbit Definition
Certification	**EMC.** Electromagnetic Compatibility Testing to measure the emissive and susceptive field strengths. This is to ensure the system does not introduce interference or receive interference from nearby systems. **Safety.** Safety certification to demonstrate that the system is safe to use. E.g. Laser Eye Safety, H&S at Work Act. **Environmental.** Testing of environmental conditions (e.g. temperature, vibration, etc.) using a Defence approved independent test house. **Software.** Software certification to certify the software meets the approved standard.	Test evidence provided in the formal of formal certification against a specific standard. Testing to be conducted be either Team Elbit or outsourced to specialist test house. *This is the T aspect of IADT.* Examples are: Environmental, EMC
FAT	FAT will be contractor lead supported by the authority. The Supplier will be responsible for defining and running the FAT. MoD will attend a FAT day to review the capability demonstration from the supplier. Representatives will include the Project Manager, Requirements Manager and RA TDU Trials Manager. The supplier will then produce a FAT test report with attached completed test schedules as formal evidence of FAT completion. a. Individual Capabilities. Factory Acceptance Testing of the individual supplier capabilities in isolation. E.g. testing the Target Identification and Location capability for range / visual acuity. b. Contractor Integration. Factory Acceptance Testing of the integrated contractor solution (Without GFA) to demonstrate that the suppliers' equipment can integrate with each other. E.g. Receiving Target Locations onto the End User Device. c. GFA Integration. Factory Acceptance Testing of the contractor solution with GFA interfaces. The GFA will be made available to the supplier and use of simulation may be required. Use of simulation to demonstrate that the information received from a GFA interface is appropriately handled / displayed is the responsibility of the contractor.	Acceptance Test Procedure to confirm that what has been built has been built correctly – this is a subset of SAT. This will be conducted on every system through the production phase. *This is the D aspect of IADT*

Verification Category	D-JFI ITEA Annex I Definition	Elbit Definition
SAT	SAT will be contractor lead supported by the authority with the authority retaining the right to amend a test plan and or location. The supplier will be responsible for defining the test plans and booking test facilities once agreed by the authority. The supplier will be able to attend any SAT tests as required to witness the results. The contractor will produce a test report which details their test activities and test findings / recommendations. a. Individual Capabilities. System Acceptance Test run by the contractor to test the individual supplier capabilities in isolation. E.g. testing the Target Identification and Location capability for location accuracy against known points. b. Contractor Integration. System Acceptance Test run by the contractor to demonstrate that the integrated contractor solution (Without GFA) can integrate with each other. E.g. Using the laser designation capability remotely from the End User Device. c. GFA Integration. System Acceptance Test run by the contractor to demonstrate that the whole system (including GFA) performs as expected.	A single test activity which is conducted within Elbit SIL. This is a complete system test and will be captured within System Test Report. *This is the D aspect of IADT*

Verification Category	**D-JFI ITEA Annex I Definition**	**Elbit Definition**
User Trial	The RA TDU will be responsible for organising the User Trials and will witness the tests as required. They will capture the users' feedback and include this in a formal test report. a. Functional Trials. RA TDU to organise functional user trials with the user community. The user community will consist of representatives from JALO (representing JTACs and SF), 1 Artillery Brigade (main capability user) and VHR Brigade. This will be a less prescribed test activity with more emphasis on the users to use the equipment as expected in use on operations. This will include how the system is stored / carried on the person and its usability. User feedback will provide evidence of acceptance. b. Interoperability tests could potentially be carried out at a multinational training event such as Exercise Bold Quest hosted in the US which occurs every October. The DACAS and FMV functional user trials can only be carried out at this type of event as it requires capable air assets available to support the user training. c. R&M Trials. RA TDU to organise reliability and maintainability trials. This includes testing the system against the battlefield mission and battlefield day (e.g. number of switch on / offs and use time) to observe for any failures or issues which jeopardise the quoted reliability figures.	Test activities which specifically require end users or access to a wider environment than that which can be created within a controlled SIL. *This is the D aspect of IADT*
Ease of Maintenance Assessment		Specific Milestone activity where this requirement will be reviewed and accepted.
Ready for Training Date		Specific Milestone activity where this requirement will be reviewed and accepted.
Through Life, Post Training Validation		Specific Milestone activity where this requirement will be reviewed and accepted.
Verification Category	**D-JFI ITEA Annex I Definition**	**Elbit Definition**

Unit Trials		Only allocated to one requirement, propose this is removed

Table 1: GEAR and Elbit verification categories

VVRM Management Plan

40. The VVRM outlines the anticipated test and acceptance events / activities required to accept the contractors' solution. The System Acceptance Tests conducted by the RA TDU are against the requirements stated in the SRD. User Trials have been identified to test the system using representatives from the user community including JALO (representing JTACs and SF), 1 Artillery Brigade (main capability user) and VHR Brigade.

41. As the project matures through the Assessment and Demonstration phase, the VVRM will be kept updated in line with the following events:

a. Any changes to the URD or SRD will be reflected in the VVRM

b. During the Assessment phase contractor down-selection trials, any lessons learnt will be used to update the VVRM

c. As the contractor's solution is maturing and more is known of the equipment approach / capabilities, the VVRM will be re-visited and matured to target specific test actions

d. As the verification planning matures the VVRM will be updated to include this detail. E.g. currently testing the contractor's solution in isolation at FAT is a single event, as test plans mature this could be broken down to each individual capability. This will allow the ability to filter for FAT test requirements for each item of equipment

42. Prior to any test and acceptance event the VVRM can be used to facilitate the trials planning. The DOORS database has been set up to allow each event to be filtered, this will allow checklists to be produced which identify the high-level test action and the acceptance threshold and objective taken from the SRD. Any test schedules produced will use these VVRM checklist to ensure all expected test activities are covered in the schedules.

43. Once the test and acceptance activities have commenced the VVRM will be updated to track the acceptance and any test observations. For example, test schedule references, test results (pass, pass with concession, fail) any recorded values (specially to note differences with the SRD Measures of Performance) and test observations for contractor review can be recorded within the VVRM. This will allow the tool to track and manage the complete equipment and capability acceptance case and provide visibility of test results prior to the issue of the formal test reports. Once the results and evidence are included then the VVRM can be exported and used in the Acceptance Case arguments to accept the capability.

Evidence Management

44. Test activity generates a large amount of data that must be transformed into a form that can be easily evaluated and from which knowledge can be generated and Stakeholder Acceptance decisions made. In general, the data will be presented in reports. Examples of the expected test reports for D-JFI include:

a. Test / Trial Reports: each test or trial will produce a completed test form, which will include performance data together with Trials Officer and Acceptance Officer assessments of the trial

b. Exception Reports: where a specific occurrence takes place that presents a risk to the T&E Schedule and wider Acceptance, an Exception Report will be raised to highlight the details and the potential risk

c. Non-Equipment DLOD Reports: throughout the project, non-Equipment DLOD will be required to submit reports to indicate satisfactory completion of a milestone or achievement of a requirement

45. These reports must clearly articulate compliance with the requirements and provide robust data to support these conclusions. Where there is non-compliance, the reports must clearly identify the gap in performance and the impact this will have on overall System performance, including any remedial action that is required (together with a date by when that action must be complete).

Evidence Portfolio

46. Ensuring the consolidation and appropriate distribution of Test data and reports is a fundamental ITEA activity. An evidence Portfolio will be maintained throughout the Project to ensure that all evidence is stored and easily accessible. The evidence will need to be shared across DLOD and therefore the Portfolio will be created in the D-JFI document site.

47. Individual requirements in the VVRM held within the D-JFI DOORS Integrated Database will be linked to appropriate evidence documents in the evidence Portfolio. This will enable full traceability from the evidence documents to the requirements.

48. The D-JFI Project Team will own and maintain the evidence Portfolio, ensuring that it is logically organised and that the links from the requirements in the D-JFI DOORS Integrated Database remain up to date and valid.

49. It will be responsibility of the authorities who undertake individual Tests and Trials to ensure that their reports are passed to the D-JFI ITEA Manager so that they can be entered into the evidence Portfolio.

VVRM Structure

50. The VVRM is created in DOORS as a set of attributes applied to the SRD (**Table 2**), System Acceptance Test (SAT) (**Table 3**) and Test Procedure (**Table 4**) DOORS Modules. These modules share the VVRM attributes using Attribute DXL so that data is only written once in one of the modules and then shared to the other two modules, operating this way then there is only one source of truth.

51. **Table 5: Views and Attributes in the VVRM Modules**. displays a possible view using the DXL attributes in the SRD, SAT and Test Procedures DOORS Modules,

Attribute	**Values**	**Purpose**
Verification Status	Passed Partial Failure Failed Incomplete Not Stated Not Specified	By default, displays 'Not Specified', this is a DXL attribute that displays a calculated result of all values in the 'Test Status' in the linked objects in the Acceptance Test Modules. The calculation is if all the tests have passed then the value displayed is 'Passed', if all the tests have failed then the value displayed is 'Failed' else the value is set to 'Partial Failure' If all the tests are set to 'Not Yet Conducted', 'N/A' or 'not set' then the value displayed is 'Not Started'
Verification Category	Analysis Design Review Certification FAT SAT User Trial Ready for Training Date Through Life, Post Training Validation Unit Trials	Identifies which Verification activities are needed to demonstrate compliance with the requirement.
System Acceptance test	DXL Attribute that displays linked attribute values from the SAT	Displays: • Test ID • Test Title (Object Heading) • Test Description (Object Text) • Test Status • Test Review Status.
Test Category	Design Review for CDR Analysis for R&M Case Analysis DRI Calculation Certification for EMC Certification for Safety Certification for Environmental Certification for Software Certification for Security FAT Individual Capability FAT Contractor Integration FAT GFA Integration SAT Individual Capability SAT Contractor Integration SAT GFA Integration User Acceptance Trials	Multiple choice attribute used to indicate which test the requirement is to be tested against. This is a subset of the Verification Categories

Attribute	Values	Purpose
Test Procedures and Results	DXL Attribute that displays attribute values from the Test Procedure Module	Displays: • Test ID • Product • Success Criteria (Object Text) • Results & Comments • Test Status • Results

Table 2: VVRM Attributes in the SRD Module

Attribute	Values	Purpose
SAT ID		Unique identifier for each object
Test Title	Text, uses the Object Heading attribute	Title of the Test
Test Description	Text, uses the Object Text attribute	Description of the Test
Test Status	Passed Partial Failure Failed Incomplete Not Stated Not Specified	Used to set the status of the individual test.
Test Category	Design Review for CDR Analysis for R&M Case Analysis DRI Calculation Certification for EMC Certification for Safety Certification for Environmental Certification for Software Certification for Security FAT Individual Capability FAT Contractor Integration FAT GFA Integration SAT Individual Capability SAT Contractor Integration SAT GFA Integration User Acceptance Trials	A single choice attribute used to identify which Test Category for the Test.
Review Status	Draft Proposed Owner Not Satisfied Owner Satisfied not set	Identifies the status of the ITEA WG test review
Attribute	**Values**	**Purpose**

Responsibly Organisation	Prime Contractor RA TDU Authority	Which organisation is responsible for the delivery of the test
System Requirement	DXL Attribute that displays attribute values from the SRD Module	Displays: • SR ID • Requirement (Object Text) • Priority • Status • Threshold MOP • Objective MOP • SR Owner • Verification Category
Test Procedures & Results	DXL Attribute that displays attribute values from the Test Procedure Module	Displays: • Test ID • Product • Success Criteria (Object Text) • Results & Comments • Test Status • Results

Table 3: VVRM Attributes in the System Acceptence Test Module

Attribute	**Values**	**Purpose**
Test ID		Unique identifier for each object
Test Procedure (Object Text)	Object text of the object with the heading 'Procedure Steps'	Describe the test procedure
Product	Text	The product or component of the product that is being tested
Success Criteria (Object Text)	Object Text of the child objects of 'Procedure Steps'	Used to describe what the successful outcome is for the test
Test Status	Passed Partial Failure Failed Incomplete Not Stated Not Specified	Used to set the status of the individual test.
Test Event	FAT SAT UAT	A single choice attribute used to identify which Test Category for the Test.
Review Status	Draft Proposed Owner Not Satisfied Owner Satisfied not set	Identifies the status of the ITEA WG test review

Attribute	**Values**	**Purpose**
Activity	Verification Point Expected Results	Verification Points will link to SAT objects to create the traceability and hence the compliance, or not, to the System Requirements. Expected Result objects will not link to any SAT objects as they are not required to demonstrate compliance. However, are used to demonstrate confidence and to resolve any discovered faults.
Results	Passed Failed Partial Failure Not Run N/A	Drop list to indicate the results of the test
Results and Comments	Text	A text field to enter a precise of the test report, its location and hyperlink and other related documents
System Requirements	DXL Attribute that displays linked attribute values from the SRD	Lists the System Requirements that the test satisfies. The following details of each requirement are displayed: SR ID Requirement Priority Status Threshold MOP Objective MOP SR Owner Verification Criteria
System Acceptance test	DXL Attribute that displays linked attribute values from the SAT	Displays: • Test ID • Test Title (Object Heading) • Test Description (Object Text) • Test Status • Test Review Status.

Table 4: VVRM attributes in the Test Procedures Module

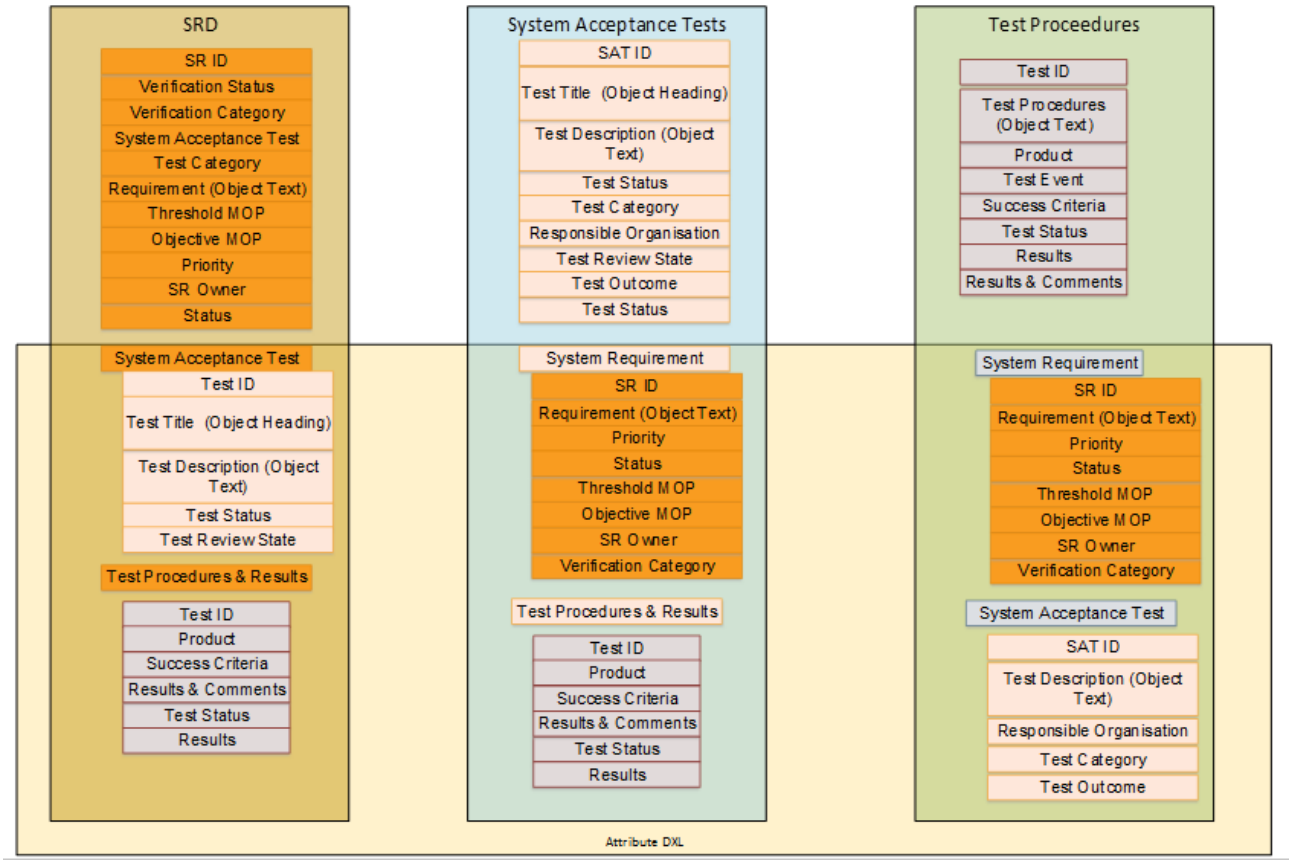

Table 5: Views and Attributes in the VVRM Modules