

CHANGE REQUEST COVER SHEET

Change Request Number: 09-15

Date Received: 1/21/2009

Title: T&E Guidance

Name: David Woodson

Phone: 202-267-7601

Policy OR Guidance: Guidance

Section/Text Location Affected: T&E Guidance Document

Summary of Change: Major change approved by ASAG 01-13-09

Reason for Change: Change T&E focal point to Tech Centeer and test director plus general update

Development, Review, and/or Concurrence: Approved by ASAG 01-13-09

Target Audience: Service teams and test teams

Potential Links within FAST for the Change: None

Briefing Planned: No

ASAG Responsibilities: Review and Comment

Potential Links within FAST for the Change: None

Links for New/Modified Forms (or) Documents (LINK 1) [null](#)

Links for New/Modified Forms (or) Documents (LINK 2) [null](#)

Links for New/Modified Forms (or) Documents (LINK 3) [null](#)

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Section 5 : KEY TEST AND EVALUATION ORGANIZATIONS [\[Old Content\]](#)

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Section 5 : KEY TEST AND EVALUATION ORGANIZATIONS.

This section identifies organizations that are key contributors to test activities throughout the project lifecycle.

Test and Evaluation Process Guidelines:

Section 5.1 : SERVICE ORGANIZATION.

The service organization plans, directs, and implements all SI test activities and coordinates inputs on schedule and resources from IOT&E and Field Familiarization for use in overall planning. Service organizations are responsible for requirements management, determining the need for user involvement, and the coordination of user teams throughout the test process. It is the responsibility of the service organization to ensure operational needs at the national and field level are adequately represented and considered.

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Section 5.2 : NEXTGEN AND OPERATIONS PLANNING (ATO-P).

ATO-P ensures the overall quality of testing in the ATO. The WJHTC is the organization responsible for providing test leadership and technical expertise to service organizations in planning and conducting SI test activities. It is responsible for the preparation of required test documentation, coordination, and conduct of SI test and evaluation and the reporting of the results. ATO-P also plans and conducts test activities for some ISM systems. The Test Standards Board (TSB) provides ATO test program oversight. Test programs are assessed for technical approach and conformance to established standards to ensure quality test methods across the ATO. The TSB maintains validation and verification processes and implements test process initiatives. Test plans, procedures, and reports are reviewed and recommendations are provided to test directors and ATO management.

Test and Evaluation Process Guidelines:

Section 5.3 : OFFICE OF INDEPENDENT OPERATIONAL TEST AND EVALUATION.

The Office of IOT&E is responsible for planning and conducting IOT&E on designated programs. The Office of IOT&E develops IOT&E sections for inclusion in the T&E section of Exhibit 300 Program Baseline, Attachment 3: Implementation Strategy and Planning. The Office of IOT&E co-approves the ISP T&E section on programs designated for IOT&E. The IOT&E Team develops IOT&E plans and procedures. The Office of IOT&E also provides assistance in the development of COIs for inclusion in the program's Exhibit 300 Program Baseline, Attachment 1: Program Requirements.

Test and Evaluation Process Guidelines:

Section 5.4 : SITE TEST ORGANIZATION.

Air Traffic and Technical Operations facility managers typically appoint site test directors. This is initiated by a service organization request and coordinated with the appropriate service area representative. Site test director activities include overseeing the site testing of new or modified NAS systems. Test directors also plan, manage, and report the results of site tests conducted by site Air Traffic and Technical Operations personnel.

Test and Evaluation Process Guidelines:

Section 5.5 : THE WILLIAM J. HUGHES TECHNICAL CENTER.

WJHTC Integrated Engineering Services is the organization responsible for providing test leadership and technical expertise to service organizations in planning and conducting System Test activities. It is responsible for the preparation of required test documentation, coordination, and conduct of System Test and reporting the results. This is defined and outlined in the approved service organization plan. WJHTC also plans and conducts test activities for some ISM systems.

Test and Evaluation Process Guidelines:

Section 5.6 : SECOND-LEVEL SUPPORT.

National Second-level Support provides centralized technical and engineering services in support of operational NAS systems. These services include field support and restoration activities, problem identification and resolution, and system engineering and enhancement. National Second-level Support organizations plan and conduct all phases of test activities for ISM systems and provide operational and technical expertise to the service organizations in support of System Test activities.

Test and Evaluation Process Guidelines:

Section 5.7 : TECHNICAL OPERATIONS.

The headquarters organization with national oversight of field Technical Operations programs (e.g., certification, maintenance, trend analysis) has the responsibility to ensure service area and technical field needs are adequately represented and considered at the national level. Technical Operations may also be responsible for the coordination of some Key Site Test activities.

Test and Evaluation Process Guidelines:

Section 7.1.1 : Development Test, PAT, and SAT Planning.

During the SI phase, as the program matures, a procurement package, including a statement of work and specification, is developed. The test lead, working as part of the service organization, should coordinate the preparation of test sections for both the statement of work and the specification. The statement of work should contain a description of contractor test activities needed to support Development Test, PAT, and SAT. Requirements for these test activities are listed in the specification. All items listed in the VRTM to be accomplished during Development Test, PAT, or SAT should be included in the statement of work and specification so the developer can demonstrate compliance.

Test and Evaluation Process Guidelines:

Section 7.1.1 : OT Planning.

Requirements and OT items assigned in the VRTM to operational testing may be grouped by the test lead into manageable segments for accomplishment. A single OT plan or multiple plans may be prepared. The strategy should be consistent with the ISP. Planning is tailored to each system. Test location, facilities, and resources required are program-dependent. Early operational testing (when possible) is encouraged. Testing in the factory or at the WJHTC should be a priority. When necessary, operational testing may be conducted at the first field site. Because the scope of operational testing includes integration testing, as well as effectiveness and suitability testing, it may be convenient to prepare the integration test plan and the effectiveness and suitability test plan separately. Second-level maintenance, Air Traffic, and Technical Operations personnel play an important role in operational testing. Through their involvement with and representation on the service organization, these personnel should assist and work with the test lead to plan and participate in operational tests and evaluations.

Test and Evaluation Process Guidelines:

Section 7.1.1 : Development Test and OT for System Modifications and P³Is.

System modifications and P³Is are subject to the same kinds of testing as newly developed systems. Because the modifications may be developed by an FAA maintenance organization and the changes may be limited in scope or contain only SW modifications, the extent of the testing and who performs the tests may be different than those for newly developed systems. Significant modifications and P³I testing should be planned in coordination with the service organization, the test lead, and the maintenance organization. Development Test and OT plans are recommended. When the maintenance organization develops the modification, it is responsible for planning and implementing an appropriate test program. P³I OT is planned by the test lead for the service organization. This allows the service organization to assess the P³Is before it is deployed to the key site.

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Test and Evaluation Process Guidelines:**Section 7.2.1 : Relationship of Operational Requirements, COIs, and CPPs.**

COIs and CPPs are developed by the service organization with the mission need from mission-critical requirements and are documented in the PR Attachment. Table 7.2-1 shows where COIs and CPPs are defined and the responsible organizations.

While a COI focuses on a high-level question that needs to be answered during the T&E of a system, CPPs are measurable performance parameters. In addition to defining COIs, the service organization with the mission need also defines important quantifiable requirements in the PR Attachment as CPPs. The T&E section of the ISP should provide a strategy for evaluating the system that will ensure the COIs are answered and all CPPs are evaluated, thereby ensuring that operational readiness will be verified.

	Documented In:	Author	Approval	Role of Testers
COIs/ CPPs	PR Attachment Exhibit 300 Program Baseline	Service organization with the mission need	Service organization with the mission need and operating service organization	Review and provide input to ensure COIs are testable

Table 7.2-1: Where COIs and CPPs are Defined, and Who Defines Them
Test and Evaluation Process Guidelines:
Section 7.2.1 : Identifying Candidates for COIs.

The service organization with the mission need is responsible for identifying a complete set of COIs. All mission-critical requirements must trace to the set of COIs that is developed. Not all COIs, however, are testable because of schedule or location conflicts. COI development and operational requirements definition are done as part of the same process. COIs are developed with the help of the user and test organizations to ensure the COIs are comprehensive. The tester has a critical role in ensuring the COIs are verifiable and testable. For most systems, the high-level requirements can be addressed by the development of six to ten COIs. Typically, the service organization with the mission need uses the following two-step

process to develop COIs:

1. Based upon the SLMNS, the service organization with the mission need develops questions that if answered will determine whether the system can be used within the NAS. These COIs then are documented in the PR Attachment. Examples of COIs include:

- Does the performance of the _____ system support existing Air Traffic Control operations?
- Can the _____ system be interfaced and used effectively with existing NAS systems?
- Does the _____ system provide an Air Traffic and Technical Operations user interface that is acceptable, fully supports existing/planned operations and maintenance, and minimizes personnel skill requirements and training?
- Is the Reliability, Maintainability, and Availability of the _____ system suitable for incorporation into the NAS when used in an operational environment with the available resources, logistics plan, maintenance procedures, etc.?

2. After completing an initial list of COIs, the service organization with the mission need consults with other experts to ensure the list is complete and testable. Experts who can provide valuable input include:

- Current operational users
- Testers (to ensure the COIs are testable)
- People who have had experience procuring, testing, and fielding similar systems in the past (can provide lessons learned information)

Test and Evaluation Process Guidelines:

Section 7.2.1 : Verification of Operational Requirements via COI Decomposition.

Resolution of a COI usually cannot be accomplished by a single test measurement. Instead, individual measurements provide answers to various sub-questions, and the resulting answers must be combined for full resolution of a COI. Each COI, therefore, must be broken down into a set of quantifiable measures.

The tester provides an outline of his or her test program by decomposing the COIs from the Exhibit 300 Program Baseline, first into MOEs and MOSs, and then into MOPs. For each COI, there will be multiple MOEs/MOSs, and for each MOE/MOS there are typically multiple MOPs. The tester's completed COI decomposition is confirmed by the user during the test planning stage. Figure 7.2-1 illustrates the decomposition process. MOPs that correspond to each CPP listed in the Exhibit 300 Program Baseline must also be developed. Table 7.2-2 provides definitions of COIs, CPPs, MOEs, MOSs, and MOPs.

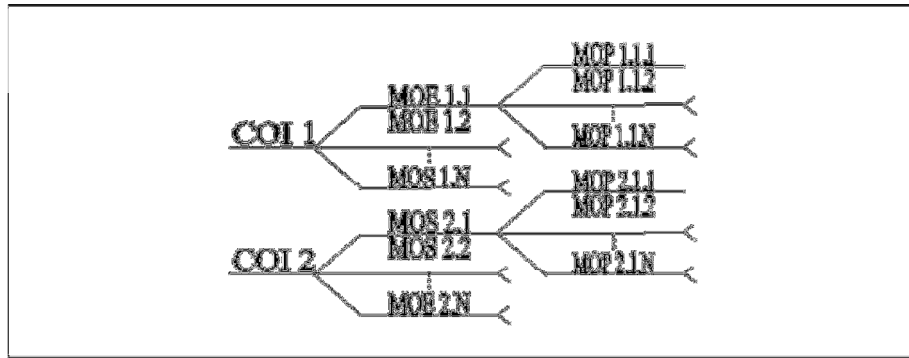


Figure 7.2-1: COI Decomposition

	Definition
COI	Key operational effectiveness or operational suitability issue that must be examined in operational testing to determine a product's capability to perform its mission.
CPP	Performance parameters that are top-level critical requirements come directly from the Exhibit 300 Program Baseline. For each parameter a threshold and objective are stated as well.
MOE	First-level decomposition of an effectiveness component associated with a COI. Operational effectiveness addresses the degree to which a product accomplishes its mission when used by representative personnel in the expected operational environment.
MOS	First-level decomposition of a suitability component associated with a COI. Operational suitability addresses the degree to which a product intended for field use satisfies its availability, compatibility, transportability, interoperability, reliability, maintainability, safety, human factors, logistics supportability documentation, personnel, and training requirements.
MOP	Quantitative/qualitative values that characterize the MOEs/MOSs. These values are measurable by a test process.

Table 7.2-2: COI, CPP, MOE, MOS, and MOP Definitions

COI decomposition is accomplished early in the planning of operational testing. A radar system example is provided below (see Figure 7.2-3) to illustrate the COI decomposition process. The tester's job is to develop the MOEs, MOSs, and MOPs. The tester works with users to reach agreement on the COI decomposition. Figure 7.2-3 illustrates actual COIs, CPPs, MOEs, and MOPs.

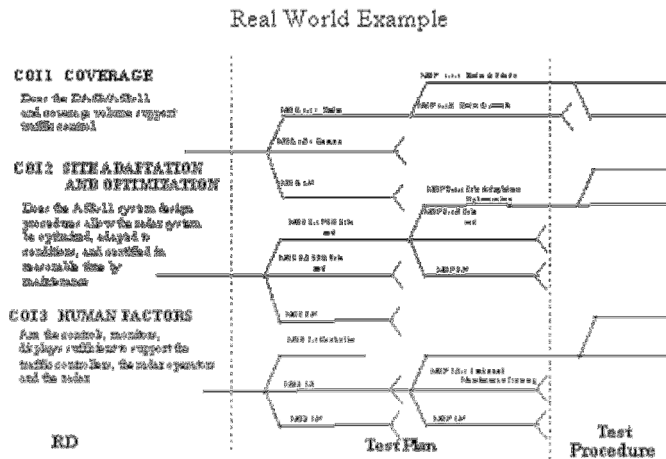


Figure 7.2-3: Actual COIs, MOEs, and MOPs

Figure 7.2-3 depicts overall responsibility of the COI decomposition process. Appendix D contains a full example of the COI decomposition for the ASR-11 program.

	Documented In:	Author	Agreement	Role of Service Organization
MOEs	Test Plans	Testers	Users	Ensure that COI decomposition accurately reflects operational needs, via agreement with test plans
MOSs	Test Plans	Testers	Users	
MOPs	Test Plans	Testers	Users	

Table 7.2-4: Overall Responsibility of COI Decomposition Process

The development and use of COIs is essential to the operational evaluation of new systems. Complete and testable COIs benefit sponsors, users, and testers. While sponsors are responsible for COI development, tester involvement ensures COIs are testable and user involvement ensures user requirements are reflected properly. The joint efforts of the sponsor, user, and test organizations are necessary to verify overall operational readiness.

Test and Evaluation Process Guidelines:

Section 7.4 : USER PRIORITIZATION PROCESS.

Using the prioritized list and estimated timeframes and costs, a determination will be made as to which need will be packaged in the next system release and its proposed release date. Service organizations are responsible for coordinating with appropriate users and stakeholders to weigh operational priorities in light of deployment opportunities and other agency considerations. The result should be a complete system baseline package or project definition before proceeding to the design and development stage. The implementing service organization identifies opportunities to deliver the changes to the operational environment. This may result in an implementation package that contains only one change or several components, or it may entail a complete HW and SW system release. Following the packaging process, a preliminary notification of planned changes to affected

organizations will be delivered.

Test and Evaluation Process Guidelines:
APPENDIX D - ASR-11 COI EXAMPLE.

COI 1.0 COVERAGE

Does the DASR/ASR-11 performance and coverage volume support air traffic control operations?

MOE 1.1 Radar Coverage: Does the DASR/ASR-11 radar coverage volume support air traffic control operations?

MOP 1.1.1 Radar Altitude Coverage: 0 to 24,000 ft AGL.

MOP 1.1.2 Radar Azimuth Coverage: 0 to 360 degrees.

MOP 1.1.3 Radar Range Coverage: 0.5 to 55 nm (Cont: 0.5 to 60 nm).

MOP 1.1.4 Radar Elevation Coverage: 0 to 30 degrees.

MOP 1.1.5 Target Speed: 25 to 700 knots.

MOP 1.1.6 Probability of Detection: The ASR-11 will detect 1.0 meter squared RCS Swerling 1 target to a range of 55 nmi (Contract says 60 nmi) in the clear and at the nose of the main beam with a single scan probability of detection of 0.8 at a Probability of false alarm of 10^{-6} : (*Contract additionally requires*) P_{fa} of 10^{-6} over 92% of the radial velocities between -700 to +700 knots.

MOE 1.2 Beacon Coverage: Does the beacon coverage meet the requirements of the air traffic controller?

MOP 1.2.1 Beacon Altitude Coverage: 0 to 60,000 feet.

MOP 1.2.2 Beacon Elevation Angle Coverage: 0.5 to 40 degrees.

MOP 1.2.3 Beacon Azimuth Coverage: 0 to 360 degrees.

MOP 1.2.4 Beacon Range Coverage: 0.5 to 60 nmi or 0.5 to 120 nmi slant range on site selectable basis.

MOP 1.2.5 Beacon Code Validity:

a) Validated 95% of the time when 4 or more replies are

received per mode.

b) Be correct at least 99% of the time in the presence of FRUIT as specified in 3.2.2.4., and

c) have validation of incorrect codes due to FRUIT or other causes less than 1% of the time.

MOP 1.2.6 Beacon Code Reliability: 0.995 minimum for targets with a round reliability of 0.75 with three-fourths of the modes responding, in a steadystate condition of 10,000 ATRBS and 200 Mode-S false-replies unsynchronized-in-time (FRUIT) per second, of which 30% are in the main beam.

MOE 1.3 Radar/Beacon Capacity: Is the capacity of the ASR-11 radar and beacon sufficient to support the requirements of the air traffic controller?

MOP 1.3.1: Radar/Beacon Capacity:

a) 700 real aircraft targets in any mix of PSR only, PSR/SSR merge, or SSR only targets, in the presence of an additional 300 false PSR targets and 100 false SSR reports, uniformly or non-uniformly distributed in azimuth for a 360-degree scan, and not be impacted by weather channel processing.

b) A peak of 250 targets uniformly distributed in a 90-degree sector.

c) A peak of 100 targets uniformly distributed across two 11.25-degree sectors.

d) A peak of 16 targets per 1.3-degree wedge lasting for not more than two contiguous wedges.

MOP 1.3.2 Target Overload Processing: When the target load exceeds the capacity defined in paragraph 3.4.1, the ASR-11 shall have a internal processing capable of automatically decreasing the number of reports. In severe overloading cases, the ASR-11 should incrementally reduce processor maximum range on primary targets in order to ensure maintaining the performance requirements on beacon targets. When the overload condition clears, full reporting of all targets out to maximum slant range should be restored.

MOE 1.4 Radar/Beacon Reinforcement: Is the radar reinforcement of

beacon targets sufficient to meet the requirements of the air traffic controller?

MOP 1.4.1 Radar Reinforcement Rate:

- a) The ASR-11 will merge SSR (case a and case b) and PSR target reports when the same aircraft target is detected by both radars. The PSR and SSR targets should be successfully merged 98% of the time.
- b) The ASR-11 will provide the following site-selectable sources for range and azimuth position data for merged target reports,
 - 1) Range and azimuth of the SSR target, and
 - 2) Range and azimuth of the PSR target.

MOE 1.5 Radar/Beacon Data Timeliness: Is the radar/beacon target data sufficiently timely to meet the requirements of the air traffic controller?

MOP 1.5.1 Radar/Beacon Target Data Timeliness: A data delay of less than 2.0 seconds under all conditions.

COI 2.0 FALSE ALARM RATE

Does the number and distribution of false target reports from the ASR-11 allow reliable aircraft detection, identification, and tracking consistent with the air traffic control mission and airspace requirements?

MOE 2.1 Radar False Alarm Rate: Is the radar false alarm rate sufficiently low to support the requirements of the air traffic controller?

MOP 2.1.1 Radar False Alarm Rate:

- a) No more than one false scan-to-scan correlated search report per scan averaged over fifteen minutes under normal clutter conditions. Normal clutter conditions include thermal noise, terrain, stationary discrete, sea, and distributed rain.
- b) No more than 10 false scan-to-scan correlated search reports per scan averaged over 10 scans when the clutter environment exceeds normal conditions. Excessive clutter conditions include surface vehicles, anomalous propagation,

angels, and cellular rain.

MOP 2.1.2 Radar Target Split Rate: No greater than 1% for targets having an SNR greater than or equal to 20 dB.

MOE 2.2 Beacon False Alarm Rate: Is the beacon false alarm rate sufficiently low to support the requirements of the air traffic controller?

MOP 2.2.1 Beacon False Alarm Rate: No more than one false beacon report per scan resulting from steady state FRUIT and no more than one as a result of reflections of the main beam.

MOP 2.2.2 Beacon Target Split Rate: No more than one split beacon target report per scan when averaged over 15 minutes.

COI 3.0 AIRCRAFT SEPARATION

Does the ASR-11 detect closely spaced aircraft with sufficient reliability to allow the controller to maintain separation standards?

MOE 3.1 Radar Accuracy: Is the radar sufficiently accurate in reporting the position of the aircraft to support the air traffic controller?

MOP 3.1.1 Radar Range Accuracy: 275 feet

MOP 3.1.2 Radar Azimuth Accuracy: 0.16 degrees

MOE 3.2 Radar Resolution: Is the radar resolution capability to resolve two closely spaced aircraft sufficient to support air traffic controller requirements?

MOP 3.2.1 Radar Range Resolution: 0.125 nmi.

MOP 3.2.2 Radar Azimuth Resolution: 2.8 degrees (Contract Spec says **2.6** degrees).

MOE 3.3 Beacon Accuracy: Is the beacon sufficiently accurate in reporting the position of the aircraft to support the air traffic controller?

MOP 3.3.1 Beacon Range Accuracy: 190 feet.

MOP 3.3.2 Beacon Azimuth Accuracy: 0.08 degrees RMS.

MOE 3.4 Beacon Resolution: Is the beacon resolution capability to resolve

two closely spaced aircraft sufficient to support the air traffic controller?

MOP 3.4.1 Beacon Range Resolution: 95% when identical targets are separated in slant range by 0.05 to 0.5 nmi inclusive (assuming identical transponder reply delays) and 99.9 % when they are separated by more than 0.5 nmi.

MOP 3.4.2 Beacon Azimuth Resolution: 95% for two identical targets, which are 0.05 nmi of each other in slant range and separated by 2.1 degrees (assuming identical transponder delays). Additionally, 99% for the same two targets which are within 0.05 nmi of each other in slant range and have at least one distinguishing characteristic and are separated by 1.5 degrees.

COI 4.0 RELIABILITY, MAINTAINABILITY, AVAILABILITY

Is the reliability, maintainability, and availability of the ASR-11 suitable for incorporation into the NAS when used in an operational environment with the available resources, logistics plan, maintenance procedures, and personnel?

MOS 4.1 Availability: Is the ASR-11 sufficiently available to support air traffic control operations.

MOP 4.1.1 Radar Operational Availability: 0.99984.

MOP 4.1.2 Beacon Operational Availability: 0.99998.

MOP 4.1.3 MTBCF: The mean time between failures (MTBCF) shall be equivalent to a dual channel system having a single channel mean time between failure (MTBF) of 750 hours and an antenna MTBF of 10,000 hours including RMM. (Therefore, total system MTBCF of 1304 hours).

MOP 4.1.4 MTBCMA: 1070 hours.

MOP 4.1.5 MTTR: No greater than 0.5 hours.

MOP 4.1.6 Redundant System Reconfiguration: System reconfigures in less than 4 seconds.

MOP 4.1.7 MTR: The system Mean Time to Restore (MTR) shall be not more than 0.5 hours.

MOS 4.2 Integrated Diagnostics: Does the ASR-11 detect and isolate

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faults within the system?

MOP 4.2.1 BIT/FIT Detection/Isolation Rate (Auto): 90% or greater to an ambiguity group of three line replacement units or less using automatic mode.

MOP 4.2.2 BIT/FIT Detection/Isolation Rate (Automatic/Manual): 95% or greater to one LRU using automatic and manual modes.

MOP 4.2.3 BIT/FIT Detection/Isolation Rate (All Means): 100%.

MOP 4.2.4 BIT False Alarm Rate: (None Specified).

MOS 4.3 Preventative Maintenance: Will the required preventative maintenance require excessive downtimes that will impact air traffic control?

MOP 4.3.1 Maintenance Frequency: No more than 4 visits per year with a total time required less than 12 staff hours?

MOP 4.3.2 Preventative Maintenance Tasks: Accomplished with ASR-11 on-line without degrading system performance.

MOS 4.4 Equipment Certification: Can the ASR-11 system equipment certification, for both scheduled and as a result of a failure/repair, be readily performed on site and remotely?

MOP 4.4.1 Remote Equipment Certification: The ASR-11 System is certifiable remotely.

MOP 4.4.2 On-Site Certification: The ASR-11 certification is readily performed on-site using the guidance in its maintenance handbook.

MOS 4.5 Spares Provisioning: Are adequate spare parts available and distributed to both designated levels of ASR-11 maintenance (i.e., site and depot)?

MOP 4.5.1 Spares Provisioning: Sufficient types and quantities of spare parts available at both designated levels of ASR-11 maintenance (i.e., site and depot).

MOS 4.6 System Documentation: Does the ASR-11 Technical Instruction Book (TIB) accurately reflect the delivered systems and are they

understandable and concise at the level of the intended reader?

MOP 4.6.1 TIB Coverage (Breadth): The Technical Instruction Books have sufficient breadth and coverage to give the technician the ability to locate and define a system casualty and to determine the corrective measures required.

MOP 4.6.2 TIB Adequacy (Depth): The ASR-11 Technical Instruction Books give sufficient detail for the diagnoses and repair of all ASR-11 System elements.

MOP 4.6.3 TIB Accuracy: The ASR-11 Technical Instruction Books are sufficiently accurate to support detailed trouble shooting and repair efforts.

MOP 4.6.4 TIB Utility: The ASR-11 Technical Instruction Books material is organized and presented in a logical and useable way.

COI 5.0 SITE ADAPTATION AND OPTIMIZATION

Does the ASR-11 system design and procedures allow the radar system to be optimized, adapted to site conditions, and certified in a reasonable time by available maintenance personnel?

MOS 5.1 PSR Site Adaptation and Optimization: Can the necessary PSR adaptation/optimization process be supported in a timely manner?

MOP 5.1.1 Site Adaptation and Optimization Resources: The available procedures, test equipment, analysis tools, and Technical Operations personnel resources will support the PSR site adaptation and optimization at the various ASR-11 sites.

MOP 5.1.2 Site Reoptimization and Periodicity Procedures: Adequate procedures exist for the special and/or periodic PSR reoptimization at the various ASR-11 sites.

MOS 5.2 SSR Site Adaptation and Optimization: Can the necessary SSR adaptation/ optimization process be supported in a timely manner?

MOP 5.2.1 Site Adaptation and Optimization Resources: The provided procedures, test equipment, analysis tools, and Technical Operations personnel resources support the SSR site adaptation and optimization at the various ASR-11 sites.

MOP 5.2.2 Site Reoptimization and Periodicity Procedures:

Adequate procedures exist for the special and/or periodic SSR reoptimization at the various ASR-11 sites.

COI 6.0 INTEROPERABILITY

Does the ASR-11 System operate effectively within the NAS system?

MOS 6.1 Electromagnetic Interference/Compatibility: Can the ASR-11 operate within the proximity of other systems without degrading its performance or the performance of other systems?

MOP 6.1.1 ASR-11 Susceptibility: ASR-11 operations are not affected by EMI resulting from the operations of other equipment.

MOP 6.1.2 ASR-11 Compatibility: ASR-11 generated emissions do not result in electromagnetic interference degrading other systems.

MOS 6.2 External Interfaces: Does the ASR-11 provide the required interfaces for successful utilization through and with other elements of the NAS?

MOP 6.2.1 External Interfaces: The ASR-11 provides interfaces for operations with:

- a) Existing automation systems (ARTS IIA, ARTS IIE, ARTS IIIA, and PIDP (TPX-42)) with both analog and CD format inputs.
- b) Standard Terminal Automation Replacement System (STARS) for both CD and Asterisk format input.
- c) Maintenance processor subsystem (MPS).

MOS 6.3 Automation Interface: Can the ASR-11 provide four digital data ports to provide independent outputs in multiple combinations?

MOP 6.3.1 Automation Interface: The ASR-11 has four digital data ports that provide independent outputs simultaneously in any combination of the required formats.

MOS 6.4 Service Certification: Can the necessary TRACON service certifications be accomplished?

MOP 6.4.1 Certification: The ASR-11 system provides for the local

and remote monitoring of PSR and SSR parameters required for service certification.

MOS 6.5 Transition Switchover: Does the ASR-11 system design and installation allow for a transition period between the existing system and the new ASR-11?

MOP 6.5.1 Transition Switchover Time: The system provides the ability to completely switch over from the ASR-11 system to the existing system or from the existing system to the ASR-11 within five minutes.

MOS 6.6 Primary Power: Is the ASR-11 operationally effective when subjected to the commercial prime power conditions experienced at the site?

MOP 6.6.1 Transients: The system recovers from short timeframe transients in voltage or amperage without degradation.

MOP 6.6.2 UPS: The UPS successfully switches to battery power when necessary without any loss of ASR-11 service.

MOP 6.6.3 Engine Generator Transition: The engine generator energizes and the ASR-11 operation successfully transitions within 10 seconds when a voltage increase or decrease of 10% or more is sensed.

COI 7.0 SAFETY

Is the ASR-11 system safe to operate and maintain?

MOS 7.1 Safety: Are ASR-11 personnel, equipment, or facilities exposed to unnecessary or uncontrolled hazards during operations and maintenance of the system?

MOP 7.1.1 Electrical Hazards: Personnel exposure to electrical hazards is adequately controlled through appropriate guards, interrupts, and warnings.

MOP 7.1.2 Radiation Hazards: Spurious radiation within maintenance areas is below acceptable levels and appropriate warnings and interrupts are utilized.

MOP 7.1.3 Physical Hazards: Adequate guards and barriers are in place to prevent personnel harm from required physical activity

necessary to perform maintenance actions and noise in maintenance areas is below acceptable levels.

MOP 7.1.4 Other Hazards: TBD.

COI 8.0 HUMAN FACTORS:

Are the controls, monitors and displays sufficient to support the air traffic controllers, the radar operators and the radar maintainers?

MOS 8.1 Controller Interface/Workload: The controller can easily perform necessary display customization and readily ascertain and confirm that the radar is performing properly.

MOS 8.2 Technical Operations INTERFACE/WORKLOAD: The on-site maintenance interface support all facets of operation and maintenance in an effective and efficient manner.

MOS 8.3 Training: Does the ASR-11 Training provide the necessary skills, experience, and knowledge to allow the successful operation, maintenance and use of the ASR-11?

MOP 8.3.1 Technical Operations/Maintenance Training: The maintenance training address both systems engineering and maintenance technician training and provides the knowledge and skills to control, operate, and maintain the system at the respective site, region, and depot levels.

MOS 8.3.2 ATC Training: The controller training provides personnel with the required knowledge and skills to fully utilize the ASR-11.

COI 9.0 WEATHER DETECTION AND DISPLAY:

Does the ASR-11 provide accurate and reliable weather data suitable for safe aircraft routing by air traffic control?

MOS 9.1: Weather Detection and Display: Does the ASR-11 provide six-level weather detection capability within the coverage volume with minimal degradation from ground clutter and second time around weather sufficient to support air traffic control operations?

MOP 9.1.1 Weather Detection: The PSR will detect, categorize, and report precipitation within the six reflectivity-intensity range levels (18

to 57 dBz) defined by the National Weather Service.

MOP 9.1.2 Weather Reporting Error: 2.5 dB maximum reporting error in the absence of ground clutter, including bias, when operating in either linear or circular antenna polarization modes.

MOP 9.1.3 Weather Data Timeliness: Collect reflectivity data, within a maximum period of six scans, and output data within one scan following collection.

MOP 9.1.4 Weather Data Resolution: Data granularity of 0.5 nmi in range and 1.4 degrees.

SECTIONS ADDED:

Test and Evaluation Process Guidelines:

NEXTGEN AND OPERATIONS PLANNING (ATO-P)

ATO-P ensures the overall quality of testing in the ATO. The WJHTC is the organization responsible for providing test leadership and technical expertise to service organizations in planning and conducting SI test activities. It is responsible for the preparation of required test documentation, coordination, and conduct of SI test and evaluation and the reporting of the results. ATO-P also plans and conducts test activities for some ISM systems. The Test Standards Board (TSB) provides ATO test program oversight. Test programs are assessed for technical approach and conformance to established standards to ensure quality test methods across the ATO. The TSB maintains validation and verification processes and implements test process initiatives. Test plans, procedures, and reports are reviewed and recommendations are provided to test directors and ATO management.

Test and Evaluation Process Guidelines:

Section 4.1 : KEY TEST AND EVALUATION ORGANIZATIONS

This section identifies organizations that are key contributors to test activities throughout the project lifecycle

Test and Evaluation Process Guidelines:

Test and Evaluation Process Guidelines:

Section 5 : KEY TEST AND EVALUATION ORGANIZATIONS

This section identifies organizations that are key contributors to test activities throughout the project lifecycle.

Test and Evaluation Process Guidelines:

Section 5.1 : SERVICE ORGANIZATION

The service organization plans, directs, and implements all SI test activities and coordinates inputs on schedule and resources from IOT&E and field familiarization for use in overall planning. Service organizations are responsible for managing requirements, determining the need for user involvement, and coordinating user teams throughout the test process. It is

the responsibility of the service organization to ensure operational needs at the national and field level are adequately represented and considered.

Test and Evaluation Process Guidelines:

Section 5.2 : NEXTGEN AND OPERATIONS PLANNING (ATO-P)

ATO-P ensures the overall quality of testing in the ATO. The WJHTC is the organization responsible for providing test leadership and technical expertise to service organizations in planning and conducting SI test activities. It is responsible for the preparation of required test documentation, coordination and conduct of SI test and evaluation, and the reporting of the results. ATO-P also plans and conducts test activities for some ISM systems. The Test Standards Board (TSB) provides ATO test program oversight. Test programs are assessed for technical approach and conformance to established standards to ensure quality test methods across the ATO. The TSB maintains validation and verification processes and implements test process initiatives. Test plans, procedures, and reports are reviewed and recommendations provided to test directors and ATO management.

Test and Evaluation Process Guidelines:

Section 5.3 : OFFICE OF INDEPENDENT OPERATIONAL TEST AND EVALUATION

The Office of IOT&E is responsible for planning and conducting IOT&E on designated programs. The Office of IOT&E develops IOT&E sections for inclusion in the T&E section of Exhibit 300 Program Baseline, Attachment 3: Implementation Strategy and Planning. The Office of IOT&E co-approves the ISP T&E section on programs designated for IOT&E. The IOT&E team develops IOT&E plans and procedures. The Office of IOT&E also provides assistance in the development of COIs for inclusion in the program's Exhibit 300 Program Baseline, Attachment 1: Program Requirements.

Test and Evaluation Process Guidelines:

Section 5.4 : SITE TEST ORGANIZATION

Air Traffic and Technical Operations facility managers typically appoint site test directors. This is initiated by a service organization request and coordinated with the appropriate service area representative. Site test director activities include overseeing the site testing of new or modified NAS systems. Test directors also plan, manage, and report the results of site tests conducted by site Air Traffic and Technical Operations personnel.

Test and Evaluation Process Guidelines:

Section 5.5 : SECOND-LEVEL SUPPORT

National second-level support provides centralized technical and engineering services in support of operational NAS systems. These services include field support and restoration activities, problem identification and resolution, and system engineering and enhancement. National second-level support organizations plan and conduct all phases of test activities for ISM systems and provide operational and technical expertise to the service organizations in support of system test activities.

Test and Evaluation Process Guidelines:

Section 5.6 : TECHNICAL OPERATIONS

The headquarters organization with national oversight of field Technical Operations programs (e.g., certification, maintenance, trend analysis) has the responsibility to ensure

service area and technical field needs are adequately represented and considered at the national level. Technical Operations may also be responsible for the coordination of some key site test activities.

SECTIONS EDITED:

Section 2 : TEST AND EVALUATION GUIDING PRINCIPLES

Old Content: Test and Evaluation Process Guidelines:

Section 2 : TEST AND EVALUATION GUIDING PRINCIPLES

1. T&E programs should be structured to:
 - Provide essential information to support decision-making
 - Provide essential information for assessing technical and acquisition risk
 - Verify the attainment of technical performance specifications and objectives
 - Verify that systems are operationally effective and suitable for intended use
2. Test objectives for each AMS lifecycle phase should be designed to mitigate potential operational risks and to demonstrate system performance appropriate to that phase. Quantitative criteria should provide substantive evidence for analysis of Hardware (HW), Software (SW), and system maturity and readiness to proceed through the acquisition management process.
3. Each T&E phase should have specific milestones (entrance and exit criteria) that should be satisfied prior to entering the next T&E phase. This applies to both the Solution Implementation (SI) phase and the In-Service Management (ISM) phase during the lifecycle.
4. Independent Operational Test and Evaluation (IOT&E) is an essential part of the T&E process for designated programs, and it provides decision-makers with an independent assessment of operational readiness.
5. Parallel testing is encouraged when it is more efficient than, and at least as effective as, serial testing.
6. The Test and Evaluation Gold Standard and Implementation Guide defines the activities to be performed in the ISM phase. The Test and Evaluation Gold Standard and Implementation Guide details five phases that must be addressed by the ISM Team for all National Airspace System modifications. They are the “Define It,” “Design It,” “Build It,” “Test It,” and “Key Site/National Deployment” phases. The details can be found at:
http://intranet.aos.faa.gov/aos22/pi/t&e/Documents/IG_v2.0_.doc

New Content: Test and Evaluation Process Guidelines:

Section 2 : TEST AND EVALUATION GUIDING PRINCIPLES

1. T&E programs should be structured to:
 - Provide essential information to support decision-making

Provide essential information for assessing technical and acquisition risk
Verify the attainment of technical performance specifications and objectives
Verify that systems are operationally effective and suitable for intended use

2. Test objectives for each AMS lifecycle phase should be designed to mitigate potential operational risks and to demonstrate system performance appropriate to that phase. Quantitative criteria should provide substantive evidence for analysis of hardware (HW), software (SW), and system maturity and readiness to proceed through the acquisition management process.
3. Each T&E phase should have specific milestones (entrance and exit criteria) that should be satisfied prior to entering the next T&E phase. This applies to both solution implementation (SI) and in-service management (ISM) during the lifecycle.
4. Independent operational test and evaluation (IOT&E) is an essential part of the T&E process for designated programs, and it provides decision-makers with an independent assessment of operational readiness.
5. Parallel testing is encouraged when it is more efficient than, and at least as effective as, serial testing.
6. The Test and Evaluation Handbook and the Verification and Validation Operations Guide define the T&E activities to be performed during investment analysis and solution implementation. These documents provide detailed information for conducting high-quality and consistent test and evaluation that fulfill the mission of verification and validation (V&V). Supporting documentation for these activities can be found in the V&V repository maintained by the Test Standard Board. The Test Standards Board website is on the internet at http://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.
7. The Test and Evaluation Gold Standard and Implementation Guide defines the activities to be performed during ISM. The Test and Evaluation Gold Standard and Implementation Guide details five phases that must be addressed by the ISM Team for all National Airspace System modifications. They are the “Define It,” “Design It,” “Build It,” “Test It,” and “Key Site/National Deployment” phases. The details can be found at: http://intranet.aos.faa.gov/aos22/pi/t&e/Documents/IG_v2.0_.doc

Red Line Content: Test and Evaluation Process Guidelines:

Section 2 : TEST AND EVALUATION GUIDING PRINCIPLES

1. T&E programs should be structured to:
 - Provide essential information to support decision-making
 - Provide essential information for assessing technical and acquisition risk
 - Verify the attainment of technical performance specifications and objectives
 - Verify that systems are operationally effective and suitable for intended use

2. Test objectives for each AMS lifecycle phase should be designed to mitigate potential operational risks and to demonstrate system performance appropriate to that phase. -Quantitative criteria should provide substantive evidence for analysis of ~~Hardware~~hardware (HW), ~~Software~~software (SW), and system maturity and readiness to proceed through the acquisition management process.
3. Each T&E phase should have specific milestones (entrance and exit criteria) that should be satisfied prior to entering the next T&E phase. -This applies to both ~~the Solution~~solution ~~Implementation~~implementation (SI) ~~phase~~ and ~~the In-~~In-Service Managementservice ~~management~~ (ISM) ~~phase~~ during the lifecycle.
4. Independent ~~Operational~~operational Testtest and ~~Evaluation~~evaluation (IOT&E) is an essential part of the T&E process for designated programs, and it provides decision-makers with an independent assessment of operational readiness.
5. Parallel testing is encouraged when it is more efficient than, and at least as effective as, serial testing.
6. *The Test and Evaluation Handbook and the Verification and Validation Operations Guide define the T&E activities to be performed during investment analysis and solution implementation. These documents provide detailed information for conducting high-quality and consistent test and evaluation that fulfill the mission of verification and validation (V&V). Supporting documentation for these activities can be found in the V&V repository maintained by the Test Standard Board. The Test Standards Board website is on the internet at http://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.*
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Section 3 : TEST AND EVALUATION DURING THE ACQUISITION MANAGEMENT PHASES - OVERVIEW

Old Content: Test and Evaluation Process Guidelines:

Section 3 : TEST AND EVALUATION DURING THE ACQUISITION MANAGEMENT PHASES - OVERVIEW

The T&E processes for acquisition management have been developed to ensure consistency in testing approaches throughout the lifecycle of the program. Figure 3.0-1 illustrates the relationship of test activities to the different phases of a typical acquisition. This section describes the relationship between these test activities and explains how and when requirements are verified. In addition, it describes how an assessment of operational readiness is made.

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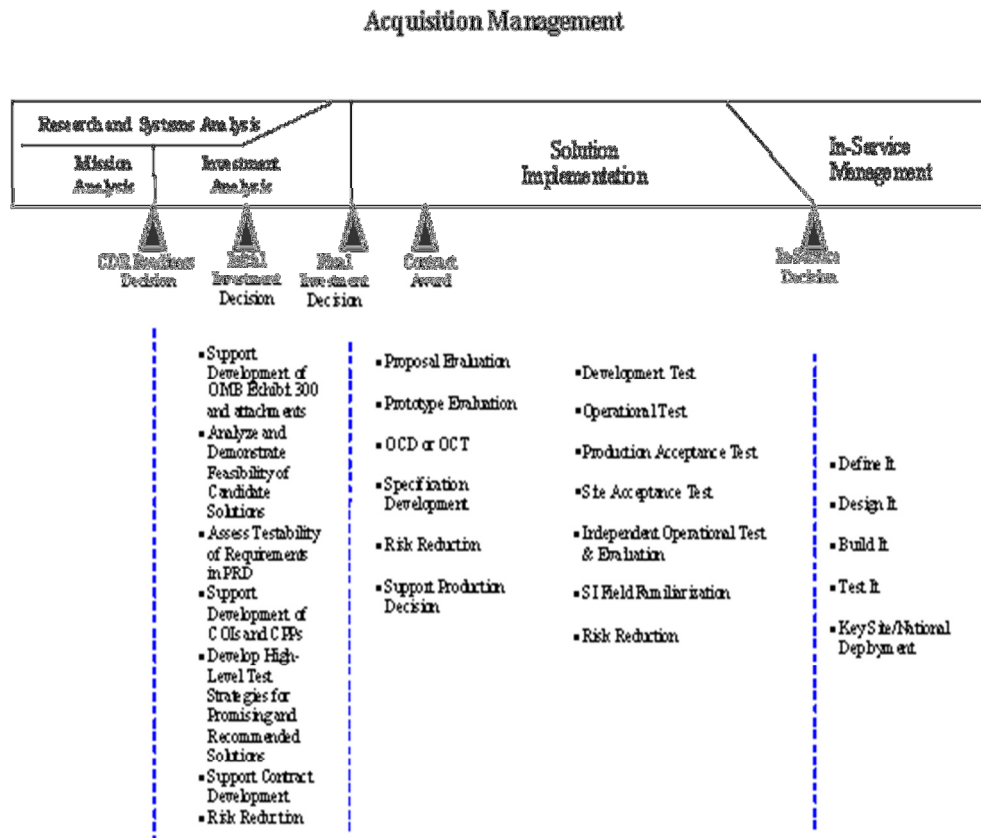


Figure 3.0-1: Tests and Test Activities Associated with NAS Investment Programs

The acquisition process begins with the research and systems analysis and the mission analysis phases. Research and systems analysis is tightly coupled with, and supportive of, other AMS lifecycle management processes. It is especially important during the early stages of lifecycle management, when activities such as simulation, rapid prototyping, and Computer-Human Interface development are conducted to define requirements, develop operational concepts, and reduce risk before entering Investment Analysis.

During mission analysis, a service-level Mission Need Statement (SLMNS) is developed, along with a set of initial requirements, to help determine what investment alternatives will be evaluated in the next phase. The Chief Operating Officer (COO) of the Air Traffic Organization or the Associate Administrator (non-Air Traffic Organization) of the line of business approves the SLMNS. Test activities conducted during the mission analysis phase include concept feasibility demonstrations, which are conducted to determine the viability of a concept or new capability and to assess of the testability of the initial requirements. A favorable outcome results in the creation of an approved set of initial requirements and candidate alternatives.

The two-part Investment Analysis phase includes initial and final investment analyses. It also assesses the testability of the refined requirements and generates an estimation of the cost needed to conduct test activities. These, in turn, serve as inputs to the Office of Management and Budget (OMB) Exhibit 300 and its attachments. When appropriate, candidate solutions may be

analyzed and demonstrated to support the development and validation of the Program Requirements (PR), attachment to Exhibit 300 Program Baseline. Another attachment, the Implementation Strategy and Planning (ISP) document, also supplements information in the Exhibit 300 Program Baseline. Part 1 of the ISP defines the lifecycle management strategy for the overall investment program. Part 2 is a network of actions and activities to execute the phase of the program approved for implementation by the Joint Resources Council (JRC).

The Investment Analysis phase usually concludes with the authorization for the program to proceed to the JRC for a final investment decision. The JRC authorizes movement of the program to the SI phase.

Figure 3.0-2 identifies the six major elements of the T&E processes implemented during the Investment Analysis, SI, and ISM phases of the AMS. These processes also identify test process documentation, test tools, and test environments that support the test objectives. The T&E processes can be used to plan high-level T&E activities as they relate to the phases of the AMS.

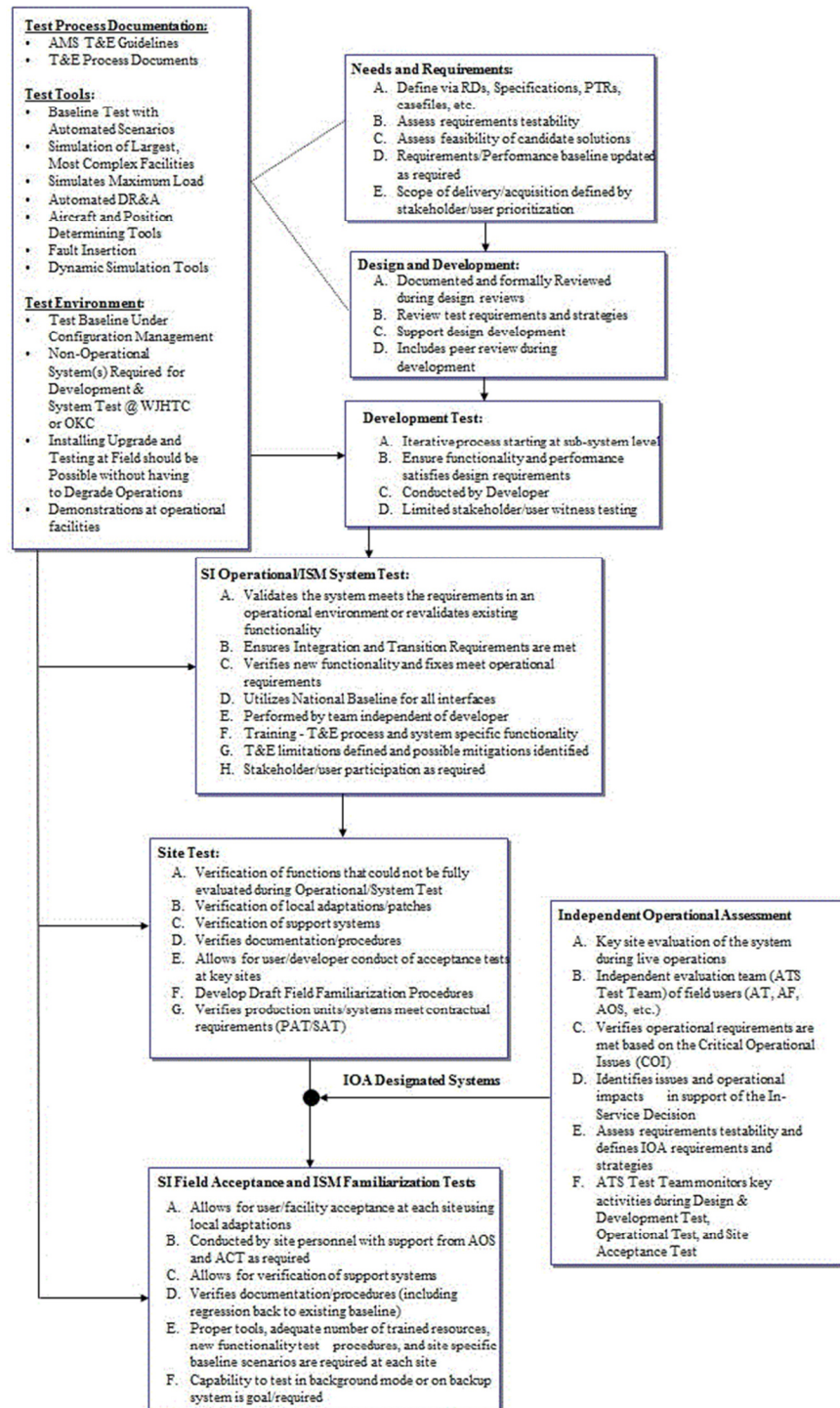


Figure 3.0-2: Test and Evaluation Process

The SI phase typically begins with refinement and expansion of the ISP, leading to a full-scale development, Commercial-Off-The-Shelf (COTS)/Non-Developmental Item (NDI) procurement

or operational prototype. SI System Test (which includes Development Test, Operational Test (OT), Production Acceptance Test (PAT), Site Acceptance Test (SAT)), IOT&E, and Field Familiarization, are performed by various FAA organizations to verify that requirements have been met and that the system is ready for operational use.

The implementing service organization is responsible for System Test; the Office of IOT&E is responsible for performing IOT&E on designated programs, and site and regional Air Traffic and Technical Operations personnel perform Field Familiarization for new systems. Early in the SI phase, prototype testing may be conducted to validate requirements and verify risk reduction plans associated with Investment Analysis assumptions. In some cases, the JRC may authorize the program to proceed through prototype testing. However, it may not advance to full-scale development until prototype test results are known and the JRC approves an updated Exhibit 300 Program Baseline.

System Test is designed to accomplish two objectives during the SI phase. First, it verifies the satisfaction of all requirements associated with the acquisition of a system. Second, it answers the Critical Operational Issues (COIs) contained in the PR Attachment. When it is successfully completed, the service organization determines if the system is ready either for an In-Service Decision (ISD) (when IOT&E is not required) or IOT&E. Following SAT, Field Familiarization is performed to verify that the site is ready to transition to the new system. IOT&E is performed on designated programs, as directed by the Vice President of Safety Services. It is designed to evaluate the operational readiness of the system in its intended operational environment. An IOT&E report provides an operational readiness assessment to the Vice President of Safety Services and the ISD authority.

The ISM phase typically starts after system deployment. NAS modifications identified during the ISM phase generally originate while the system is sustained in an operational state. Changes to the baseline are handled via the NAS Change Proposal (NCP)/case file process. All HW/SW modifications performed during the ISM phase of the acquisition management process must follow a structured and disciplined T&E process. The process is defined in the Test and Evaluation Gold Standard and Implementation Guide and is accomplished through a five-phase approach:

- Needs and Requirements Defined (“Define It”)
- Design and Development (“Design It”)
- Development Test (“Build It”)
- System Test (“Test It”)
- Field Acceptance and Field Familiarization Test (“Key Site/National Deployment”)

(Refer to http://intranet.aos.faa.gov/aos22/pi/t&e/Documents/IG_v2.0_.doc)

ISM System Test (defined in paragraph 3.2.4.2 and not to be confused with SI System Test), Key Site Test, and Field Familiarization. T&E is conducted to ensure that modified components, functionality, or enhancements operate properly and do not degrade system effectiveness or suitability. All activities are conducted with appropriate user/stakeholder involvement to ensure that the modifications are ready for deployment.

To make programs more efficient, it is sometimes necessary to tailor the standard acquisition/modification approach (e.g., spiral development, technical refresh, prototyping, emergency HW/SW releases, etc.). Each ISM Team must evaluate the need or requirement and determine how the Test and Evaluation Gold Standard Matrix will be addressed and/or tailored, for a specific program or NAS modification. Test standards detailed in the Test and Evaluation Gold Standard and Implementation Guide should be used as a basis to develop a tailored test approach.

FAA T&E processes rely on the development and use of T&E documents, test tools, and test environments. These are utilized to confirm operational readiness by measuring specific system performance and simulating operational environments. Test documentation, test tools, and test environments are initially developed and used during SI T&E and are then modified and/or supplemented during ISM T&E based on changes or upgrades to the system.

New Content: Test and Evaluation Process Guidelines:

Section 3 : TEST AND EVALUATION DURING THE ACQUISITION MANAGEMENT PHASES - OVERVIEW

T&E processes for acquisition management have been developed to ensure consistency in testing approaches throughout the lifecycle of the program. Figure 3.0-1 illustrates the relationship of test activities to the different phases of a typical acquisition. This section describes the relationship between these test activities and explains how and when requirements are verified. In addition, it describes how an assessment of operational readiness is made.

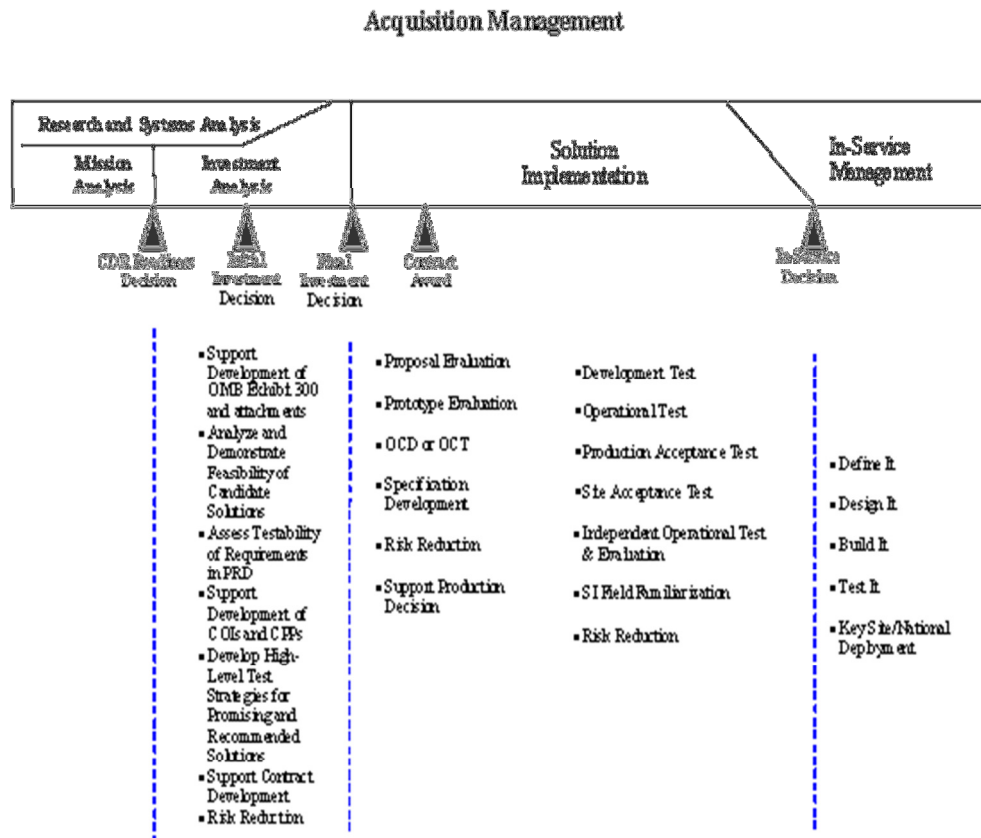


Figure 3.0-1: Tests and Test Activities Associated with NAS Investment Programs

The acquisition process begins with the research and systems analysis and mission analysis phases. Research and systems analysis is tightly coupled with, and supportive of, other AMS lifecycle management processes. It is especially important during the early stages of lifecycle management, when activities such as simulation, rapid prototyping, and computer-human interface development are conducted to define requirements, develop operational concepts, and reduce risk before entering investment analysis.

During mission analysis, a priority service need undergoes concept and requirements definition during which initial requirements and investment alternatives are defined. The Chief Operating Officer or Associate or Assistant Administrator of the line of business with the mission need makes the investment analysis readiness decision. Test activities conducted during mission analysis include concept feasibility demonstrations, which are conducted to determine the viability of a concept or new capability and to assess of the testability of initial requirements. A favorable outcome results in the creation of an approved set of initial requirements and candidate alternatives.

The two-part investment analysis phase includes initial and final investment analyses. During this phase, the testability of refined requirements are assessed and the cost to conduct test activities is estimated. These, in turn, serve as inputs to the Office of Management and Budget (OMB) Exhibit 300 (designated programs only) and required AMS documentation. When appropriate, candidate solutions may be analyzed and demonstrated to support the development and validation of the program requirements document. The

implementation strategy and planning document (ISPD) defines the lifecycle management strategy for the overall investment program.

Investment analysis usually concludes with authorization for the program to proceed to the investment decision authority (IDA) for a final investment decision. The JRC authorizes movement of the program to solution implementation.

Figure 3.0-2 identifies the six major elements of the T&E processes implemented during the investment analysis, SI, and ISM phases of the AMS. These processes also identify test process documentation, test tools, and test environments that support test objectives. The T&E processes can be used to plan high-level T&E activities as they relate to the phases of the AMS.

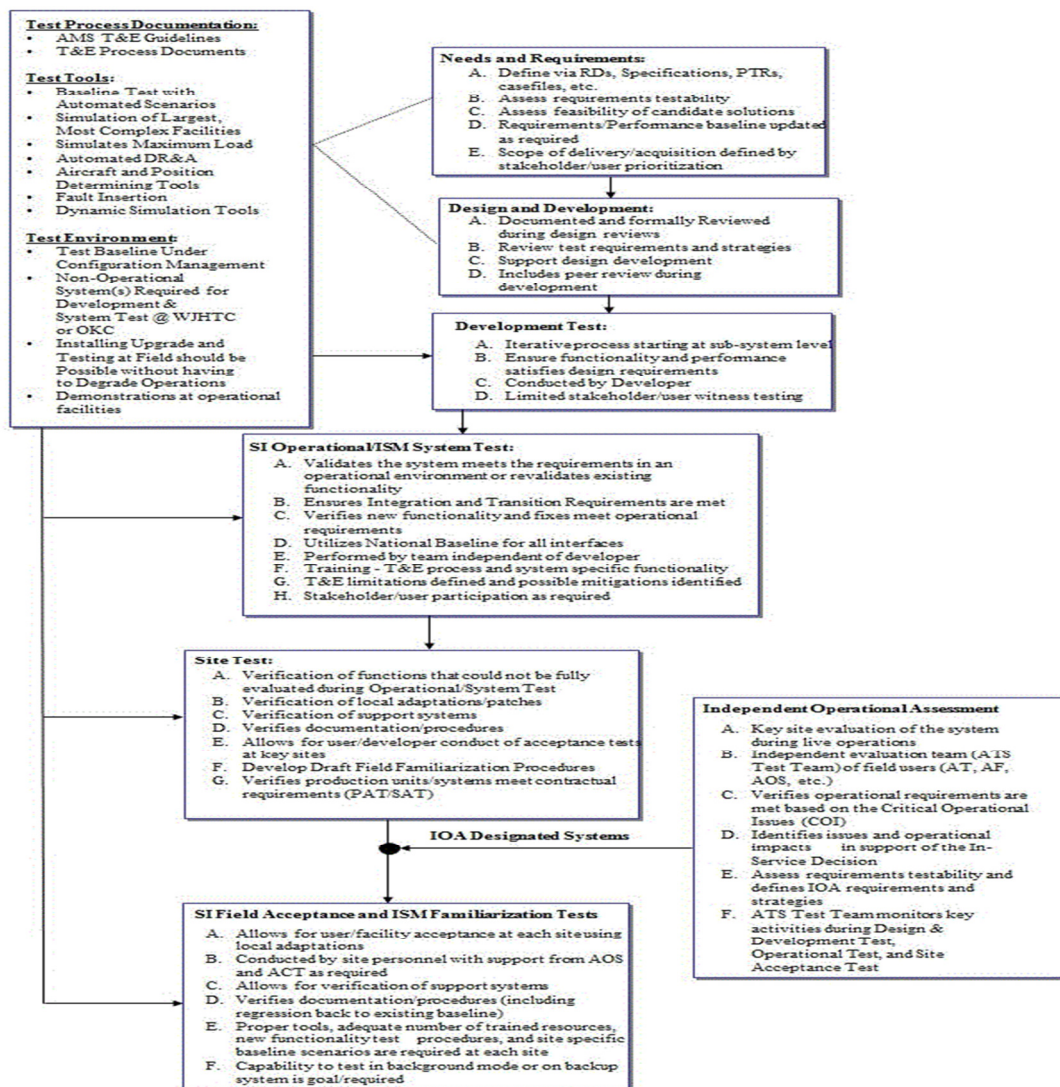


Figure 3.0-2: Test and Evaluation Process

Solution implementation typically begins with refinement and expansion of the ISPD, leading to a full-scale development, Commercial-Off-The-Shelf (COTS)/Non-Developmental Item (NDI) procurement or operational prototype. Development test (DT), operational test (OT), production acceptance test (PAT), site acceptance test (SAT), IOT&E, and field familiarization are performed by various FAA organizations to verify that requirements have been met and the system is ready for operational use.

The implementing service organization is responsible for DT, OT, and SAT; the Office of IOT&E is responsible for performing IOT&E on designated programs; and site and regional Air Traffic and Technical Operations personnel perform field familiarization for new systems. During investment analysis or early in solution implementation, prototype testing may be conducted to validate requirements and verify risk reduction plans associated with investment analysis assumptions. In some cases, the IDA may authorize the program to proceed through prototype testing. However, it may not advance to full-scale development until prototype test results are known and the IDA approves an updated Acquisition Program Baseline.

Development test demonstrates that all technical and performance requirements specified in the contract have been met. Operational test answers the Critical Operational Issues (COIs) contained in the program requirements document. When the combination of DT and OT is completed, the service organization determines if the product is ready either for an in-service decision (ISD) (when IOT&E is not required) or IOT&E. Following SAT, field familiarization is performed to verify the site is ready to transition to the new system. T&E documents that provide detailed process guidance and examples can be found in the V&V repository maintained on the Test Standards Board website at

http://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.

IOT&E is performed on designated programs, as directed by the Vice President of Safety Services. It evaluates the operational readiness of the system in its intended operational environment. An IOT&E report provides an operational readiness assessment to the Vice President of Safety Services and the ISD authority.

ISM typically starts after system deployment. NAS modifications identified during ISM generally originate while the system is sustained in an operational state. Changes to the baseline are handled via the NAS Change Proposal (NCP)/case file process. All HW/SW modifications performed during ISM must follow a structured and disciplined T&E process. The process is defined in the Test and Evaluation Gold Standard and Implementation Guide and is accomplished through a five-phase approach:

- Needs and requirements defined (“Define It”)
- Design and development (“Design It”)
- Development test (“Build It”)
- System test (“Test It”)
- Field acceptance and field familiarization test (“Key site/National deployment”)

(Refer to http://intranet.aos.faa.gov/aos22/pi/t&e/Documents/IG_v2.0_.doc)

ISM system test (defined in paragraph 3.2.4.2) should not to be confused with solution implementation development test, key site test, and field familiarization. ISM T&E is conducted

to ensure that modified components, functionality, or enhancements operate properly and do not degrade system effectiveness or suitability. All activities are conducted with appropriate user/stakeholder involvement to ensure the modifications are ready for deployment.

To make programs more efficient, it is sometimes necessary to tailor the standard acquisition/modification approach (e.g., spiral development, technical refresh, prototyping, emergency HW/SW releases). Each ISM team must evaluate the need or requirement and determine how the Test and Evaluation Gold Standard Matrix will be addressed and/or tailored for a specific program or NAS modification. Test standards detailed in the Test and Evaluation Gold Standard and Implementation Guide should be used as a basis to develop a tailored test approach.

FAA T&E processes rely on the development and use of T&E documents, test tools, and test environments. These are used to confirm operational readiness by measuring specific system performance and simulating operational environments. Test documentation, test tools, and test environments are initially developed and used during SI T&E and are then modified and/or supplemented during ISM T&E based on changes or upgrades to the system.

Red Line Content: Test and Evaluation Process Guidelines:

Section 3 : TEST AND EVALUATION DURING THE ACQUISITION MANAGEMENT PHASES - OVERVIEW

~~The~~ T&E processes for acquisition management have been developed to ensure consistency in testing approaches throughout the lifecycle of the program. ~~Figure 3.0-1 illustrates the relationship of test activities to the different phases of a typical acquisition. This section describes the relationship between these test activities and explains how and when requirements are verified. In addition, it describes how an assessment of operational readiness is made.~~

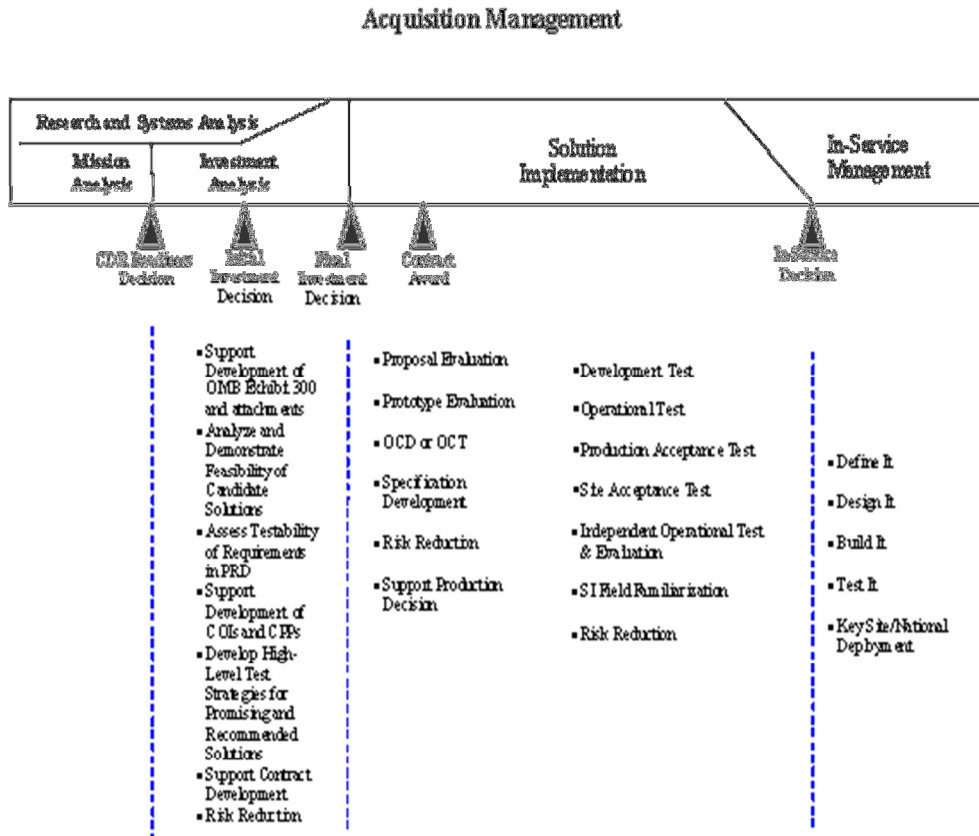


Figure 3.0-1: Tests and Test Activities Associated with NAS Investment Programs

The acquisition process begins with the research and systems analysis and ~~the~~ mission analysis phases. -Research and systems analysis is tightly coupled with, and supportive of, other AMS lifecycle management processes. -It is especially important during the early stages of lifecycle management, when activities such as simulation, rapid prototyping, and ~~Computer~~computer-~~Human~~human ~~Interface~~interface development are conducted to define requirements, develop operational concepts, and reduce risk before entering ~~Investment~~investment ~~Analysis~~analysis.

During mission analysis, a priority ~~service-level~~ Mission Need Statement (SLMNS)need ~~is~~undergoes ~~developed~~concept along with a set of and requirements definition during which initial requirements, ~~to help determine what~~ and investment alternatives ~~will be evaluated in the next~~are ~~phase~~defined. -The Chief Operating Officer (COO) of the Air Traffic Organization or the Associate ~~Administrator (non-Air or Traffic~~Assistant Organization)Administrator of the line of business ~~approves~~with the mission need makes the SLMNSinvestment analysis readiness decision. -Test activities conducted during ~~the~~ mission analysis ~~phase~~ include concept feasibility demonstrations, which are conducted to determine the viability of a concept or new capability and to assess of the testability of ~~the~~ initial requirements. -A favorable outcome results in the creation of an approved set of initial requirements and candidate alternatives.

The two-part ~~Investment Analysis~~investment analysis phase includes initial and final investment analyses. ~~It~~During also ~~this~~ assesses ~~phase~~, the testability of ~~the~~ refined requirements ~~and~~

~~generates an estimation~~ are of assessed and the cost ~~needed~~ to conduct test activities is estimated. -These, in turn, serve as inputs to the Office of Management and Budget (OMB) Exhibit 300 and its attachments. -When appropriate, candidate solutions may be analyzed and demonstrated to support the development and validation of the Program Requirements (PR); attachment to Exhibit 300 Program Baseline. -Another attachment, the Implementation Strategy and Planning (ISP) document, also supplements information in the Exhibit 300 Program Baseline. -Part 1 of the ISP defines the lifecycle management strategy for the overall investment program. -Part 2 is a network of actions and activities to execute the phase of the program approved for implementation by the Joint Resources Council (JRC).

~~The Investment Analysis phase~~ analysis usually concludes with ~~the~~ authorization for the program to proceed to the JRC for a final investment decision. -The JRC authorizes movement of the program to ~~the SI~~ solution phase implementation.

Figure 3.0-2 identifies the six major elements of the T&E processes implemented during the ~~Investment Analysis~~ investment analysis, SI, and ISM phases of the AMS. -These processes also identify test process documentation, test tools, and test environments that support ~~the~~ test objectives. -The T&E processes can be used to plan high-level T&E activities as they relate to the phases of the AMS.

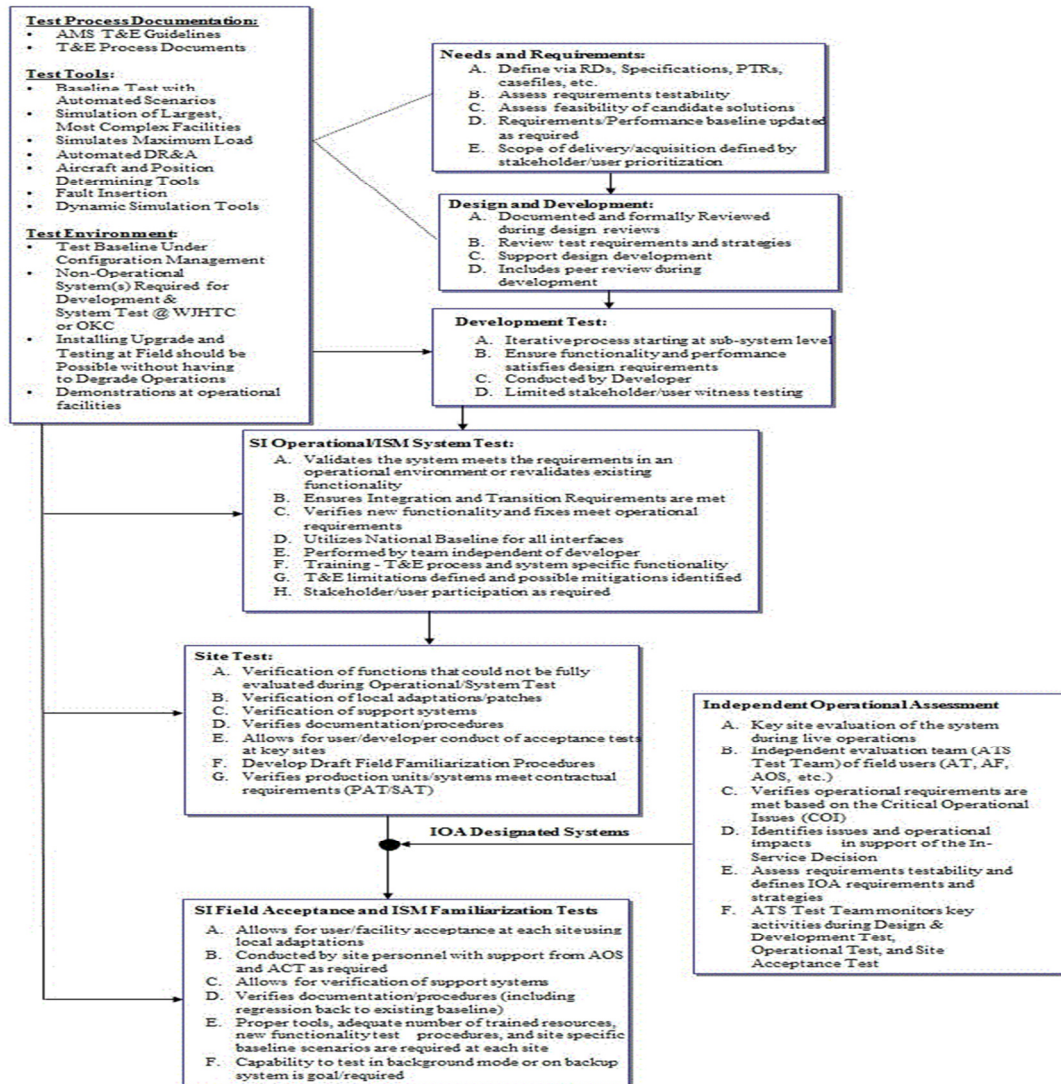


Figure 3.0-2: Test and Evaluation Process

The SI Solution phase implementation typically begins with refinement and expansion of the ISP, leading to a full-scale development, Commercial-Off-The-Shelf (COTS)/Non-Developmental Item (NDI) procurement or operational prototype. SI System Development Test test (which includes Development Test DT), Operational Test operational test (OT), Production production Acceptance Test acceptance test (PAT), Site site Acceptance Test acceptance test (SAT), IOT&E, and Field field Familiarization familiarization are performed by various FAA organizations to verify that requirements have been met and that the system is ready for operational use.

The implementing service organization is responsible for System DT, Test OT, and SAT; the Office of IOT&E is responsible for performing IOT&E on designated programs; and site and regional Air Traffic and Technical Operations personnel perform Field field

~~Familiarization~~familiarization for new systems. ~~During Early in the SI~~investment analysis or early phase in solution implementation, prototype testing may be conducted to validate requirements and verify risk reduction plans associated with ~~Investment Analysis~~investment analysis assumptions. -In some cases, the JRC may authorize the program to proceed through prototype testing. -However, it may not advance to full-scale development until prototype test results are known and the JRC approves an updated Exhibit 300 Program Baseline.

~~System Test is designed to accomplish two objectives during the SI phase.~~ Development First, ~~test~~ it verifies the satisfaction of all demonstrates that all technical and performance requirements ~~associated~~specified ~~with~~in the ~~acquisition~~contract of a system have been met. ~~Second,~~ Operational ~~it~~test answers the Critical Operational Issues (COIs) contained in the PR ~~Attachment~~attachment. -When ~~the~~ the combination is of DT successfully and OT is completed, the service organization determines if the system is ready either for an ~~in-Service~~service Decisiondecision (ISD) (when IOT&E is not required) or IOT&E. -Following SAT, ~~Field Familiarization~~field familiarization is performed to verify ~~that~~ the site is ready to transition to the new system. T&E documents that provide detailed process guidance and examples can be found in the V&V repository maintained on the Test Standards Board website at http://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.

IOT&E is performed on designated programs, as directed by the Vice President of Safety Services. -It ~~is designed to evaluate~~evaluates the operational readiness of the system in its intended operational environment. -An IOT&E report provides an operational readiness assessment to the Vice President of Safety Services and the ISD authority.

~~The ISM phase~~ typically starts after system deployment. -NAS modifications identified during ~~the ISM phase~~ generally originate while the system is sustained in an operational state. -Changes to the baseline are handled via the NAS Change Proposal (NCP)/case file process. -All HW/SW modifications performed during ~~the ISM phase of the acquisition management process~~ must follow a structured and disciplined T&E process. -The process is defined in the Test and Evaluation Gold Standard and Implementation Guide and is accomplished through a five-phase approach:

- Needs and ~~Requirements~~requirements ~~Defined~~defined (“Define It”)
- Design and ~~Development~~development (“Design It”)
- Development ~~Test~~test (“Build It”)
- System ~~Test~~test (“Test It”)
- Field ~~Acceptance~~acceptance and ~~Field~~field ~~Familiarization Test~~familiarization test (“Key Sitesite/National Deploymentdeployment”)

(Refer to http://intranet.aos.faa.gov/aos22/pi/t&e/Documents/IG_v2.0_.doc)

ISM ~~System~~system ~~Test~~test (defined in paragraph 3.2.4.2) ~~and should~~ not to be confused with ~~SI~~solution ~~System~~implementation ~~Test~~development test, ~~Key Site Test~~key site test, and ~~Field~~field ~~Familiarization~~familiarization. ISM T&E is conducted to ensure that modified components, functionality, or enhancements operate properly and do not degrade system

effectiveness or suitability. -All activities are conducted with appropriate user/stakeholder involvement to ensure ~~that~~ the modifications are ready for deployment.

To make programs more efficient, it is sometimes necessary to tailor the standard acquisition/modification approach (e.g., spiral development, technical refresh, prototyping, emergency HW/SW releases, ~~etc.~~). -Each ISM ~~Team~~team must evaluate the need or requirement and determine how the Test and Evaluation Gold Standard Matrix will be addressed and/or tailored, for a specific program or NAS modification. -Test standards detailed in the Test and Evaluation Gold Standard and Implementation Guide should be used as a basis to develop a tailored test approach.

FAA T&E processes rely on the development and use of T&E documents, test tools, and test environments. -These are ~~utilized~~used to confirm operational readiness by measuring specific system performance and simulating operational environments. -Test documentation, test tools, and test environments are initially developed and used during SI T&E and are then modified and/or supplemented during ISM T&E based on changes or upgrades to the system.

Section 3.1.1 : Initial Investment Analysis

Old Content: Test and Evaluation Process Guidelines:

Section 3.1.1 : Initial Investment Analysis

The initial PRD establishes the operational framework and performance requirements for satisfying a mission need. During the development of the PRD, each requirement is assessed for testability. Requirements found not to be testable are often further refined or decomposed into testable requirements, and the results are provided to the service organization. Test professionals also review COIs and Critical Performance Parameters (CPPs) to ensure they are complete, testable, and traceable to system or operational requirements. COIs are key operational effectiveness or suitability issues expressed as questions about system concerns, such as capabilities, practicability, and environmental effects. COIs are examined in tests during the SI phase to determine a product's capability to perform its mission. CPPs are top-level system performance parameters that are expressed as specific, quantified values.

The Exhibit 300 Program Baseline establishes the performance, cost, schedule, and benefits boundaries for implementing the solution. The PR Attachment contains the appropriate CPPs and COIs. Test professionals develop a high-level test strategy and estimate test costs for each candidate solution for inclusion in the Business Case Analysis Report. They also review vendor performance data and demonstrations of COTS/NDI products that may satisfy the mission need.

Feasibility analyses and demonstrations address the refinement of the PR Attachment and assess human factors and the evaluation of procedural impacts. The evaluation of a specific technology can reduce risk and collect data necessary to support investment decisions.

New Content: Test and Evaluation Process Guidelines:

Section 3.1.1 : Initial Investment Analysis

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The initial PRD establishes the operational framework and performance requirements for satisfying a mission need. During development of the PRD, each requirement is assessed for testability. Requirements found not to be testable are often further refined or decomposed into testable requirements, and the results are provided to the service organization. Test professionals also review COIs and Critical Performance Parameters (CPPs) to ensure they are complete, testable, and traceable to system or operational requirements. COIs are key operational effectiveness or suitability issues expressed as questions about system concerns, such as capabilities, practicability, and environmental effects. COIs are examined in tests during the SI phase to determine a product's capability to perform its mission. CPPs are top-level system performance parameters that are expressed as specific, quantified values.

The Acquisition Program Baseline (APB) establishes the performance, cost, and schedule boundaries for implementing the solution. The PRD contains the appropriate CPPs and COIs. Test professionals develop a high-level test strategy and estimate test costs for each candidate solution for inclusion in the Business Case Analysis Report (BCAR). They also review vendor performance data and demonstrations of COTS/NDI products that may satisfy the mission need.

Feasibility analyses and demonstrations address the refinement of the PRD and assess human factors and the evaluation of procedural impacts. The evaluation of a specific technology can reduce risk and collect data necessary to support investment decisions.

Red Line Content: Test and Evaluation Process Guidelines:
Section 3.1.1 : Initial Investment Analysis

The initial ~~PRD~~PR document establishes the operational framework and performance requirements for satisfying a mission need. -During ~~the~~ development of the ~~PRD~~PR document, each requirement is assessed for testability. -Requirements found not to be testable are often further refined or decomposed into testable requirements, and the results are provided to the service organization. -Test professionals also review COIs and Critical Performance Parameters (CPPs) to ensure they are complete, testable, and traceable to system or operational requirements. -COIs are key operational effectiveness or suitability issues expressed as questions about system concerns, such as capabilities, practicability, and environmental effects. -COIs are examined in tests during the SI phase to determine a product's capability to perform its mission. -CPPs are top-level system performance parameters that are expressed as specific, quantified values.

The Exhibit 300 Program Baseline establishes the performance, cost, schedule, and benefits boundaries for implementing the solution. -The PR ~~Attachment~~attachment contains the appropriate CPPs and COIs. -Test professionals develop a high-level test strategy and estimate test costs for each candidate solution for inclusion in the Business Case Analysis Report (BCAR). -They also review vendor performance data and demonstrations of COTS/NDI products that may satisfy the mission need.

Feasibility analyses and demonstrations address the refinement of the PR ~~Attachment~~attachment and assess human factors and the evaluation of procedural impacts. -The evaluation of a specific technology can reduce risk and collect data necessary to support investment decisions.

Section 3.2 : SI AND ISM TEST AND EVALUATION

Old Content: Test and Evaluation Process Guidelines:

Section 3.2 : SI AND ISM TEST AND EVALUATION

The most significant T&E activities associated with the acquisition and delivery of new NAS systems are conducted during the SI phase. During this phase, the test strategy is implemented through a series of tests that includes Development Test, OT, PAT, SAT, Field Familiarization, and IOT&E (for designated programs). Objectives for this series of tests are developed to verify that requirements have been met. Detailed guidelines are provided for Development Test, OT, PAT, and SAT in the William J. Hughes Technical Center (WJHTC) System Test and Evaluation Process Document. Detailed guidelines are provided for IOT&E in the IOT&E Operations Manual. Table 3.2-1 lists the high-level objectives of each of the SI test phases.

All NAS modifications should be developed and implemented following the Test and Evaluation Gold Standard and Implementation Guide. Service teams responsible for the development and implementation of NAS modifications to the field must comply with the Test and Evaluation Gold Standard (TEGS). In addition, major upgrades or sustainment efforts for operational NAS systems may also be designated for IOT&E. These programs must adhere to an IOT&E process that is equivalent to the process followed for new acquisitions.

SI Test Objectives	DT	OT	PAT	SAT	FF	IOT&E
Verify contractor compliance to contracted functional and performance requirements	x					
Verify the engineering design, development, and maintenance process	x					
Verify system compliance to electromagnetic interference requirements	x					
Identify deficiencies in system design and documentation, the NAS, HW, SW, human performance factors, and operational concepts	x	x		x		x
Verify that human factors implementation meets user needs		x			x	x
Resolve COIs		x				x
Assess operational effectiveness, supportability, and suitability, including the human component	x	x		x	x	x
Verify the system meets Reliability, Maintainability, and Availability requirements	x	x				x
Evaluate the compatibility and interoperability with existing or planned systems or equipment	x	x		x	x	x
Assess system operations in a degraded mode	x	x		x	x	
Verify the system is safe, secure, and survivable	x	x		x	x	x
Assess the site adaptability of the system	x	x		x	x	x

Assess the transition switch-over capability/plan	x	x		x	x	x
Verify the adequacy of manuals, handbooks, supporting plans, and other documentation for operations, maintenance, and training	x	x		x	x	x
Assess the degree to which the system can be monitored, operated, and maintained by users in an operational environment		x			x	x
Verify system operations under stress and NAS loading	x	x		x		
Assess NAS end-to-end performance with the system installed to ensure pre-existing NAS functionality is not degraded by new system insertion/integration		x		x	x	x
Ensure production units are of consistent quality and are equivalent to the first article			x	x		
Verify production units are free from manufacturing defects			x	x		
Verify Installation and Integration of fielded systems is consistent with approved SAT plans				x		

Table 3.2-1: SI Test Objectives

After deployment, NAS systems may require modifications during their in-service lifetimes. The T&E process is designed to standardize the manner in which HW/SW modifications are tested and evaluated in support of deployment to the field.

During ISM, the test strategy is implemented through a series of tests that includes Development Test, System Test, Key Site Test, Field Acceptance Test, and Field Familiarization.

Objectives for tests during SI and ISM phases are developed to verify that requirements have been met. Using different environment and test tools, the series of tests may verify the same requirement more than once. There are planning documents regarding the amount of parallel testing, repeat testing in different test environments, and regression testing necessary to produce a comprehensive, cost-effective test program. These considerations should be addressed during test strategy and test plan development.

Table 3.2-2 lists the high-level objectives of each of the test phases of ISM:

ISM Test Objectives	Development Test	System Test	Key Site Test	Field Familiarization
Verify compliance to functional and performance requirements	x			
Verify the engineering design, development, and maintenance process	x			

Verify system compliance to interference requirements	X			
Identify deficiencies in system design and documentation, the NAS, HW, SW, human performance factors, and operational concepts	X	X	X	X
Identify and demonstrate mitigation of risks	X	X	X	X
Assess operational effectiveness, supportability, and suitability, including the human component	X	X	X	X
Verify the system meets Reliability, Maintainability, and Availability requirements	X	X	X	X
Evaluate the compatibility and interoperability with existing or planned systems or equipment	X	X	X	X
Assess system operations in a degraded mode	X	X	X	X
Verify the system is safe, secure, and survivable	X	X	X	X
Assess the site adaptability of the system		X	X	X
Verify the adequacy of manuals, handbooks, supporting plans, and other documentation for operations, maintenance, and training		X	X	X
Assess the degree to which the system can be monitored, operated, and maintained by users in an operational environment		X	X	X
Verify system operations under stress and NAS loading		X	X	X
Assess NAS end-to-end performance with the system installed to ensure pre-existing NAS functionality is not degraded by new system insertion/integration		X	X	X
Verify operational procedures		X	X	X
Verify functional certification procedures		X	X	X
Verify system is compliant with physical and information security requirements	X	X	X	
Verify the Safety Risk Management Requirements have been met	X	X	X	
Verify HW and SW installation instructions			X	X

Table 3-2.2: ISM Test Objectives

New Content: Test and Evaluation Process Guidelines:
Section 3.2 : SI AND ISM TEST AND EVALUATION

The most significant T&E activities associated with the acquisition and delivery of new NAS systems are conducted during solution implementation. During this phase, the test strategy is implemented through a series of tests that includes DT, OT, SAT, field familiarization, and IOT&E (for designated programs). Objectives for this series of tests are developed to verify that requirements have been met. Detailed guidelines are provided for DT, OT, and SAT in the Test and Evaluation Handbook. Detailed guidelines for IOT&E are provided in the IOT&E Operations Manual. Table 3.2-1 lists the high-level objectives of each SI test phase.

All NAS modifications should be developed and implemented following the Test and Evaluation Gold Standard and Implementation Guide. Service teams responsible for the development and implementation of NAS modifications to the field must comply with the Test and Evaluation Gold Standard (TEGS). In addition, major upgrades or sustainment efforts for operational NAS systems may also be designated for IOT&E. These programs must adhere to an IOT&E process that is equivalent to the process followed for new acquisitions.

SI Test Objectives	DT	OT	SAT	FF	IOT&E
Verify contractor compliance to contracted functional and performance requirements	x				
Verify the engineering design, development, and maintenance process	x				
Verify system compliance to electromagnetic interference requirements	x				
Identify deficiencies in system design and documentation, the NAS, HW, SW, human performance factors, and operational concepts	x	x	x		x
Verify that human factors implementation meets user needs		x		x	x
Resolve COIs		x			x
Assess operational effectiveness, supportability, and suitability, including the human component	x	x	x	x	x
Verify the system meets Reliability, Maintainability, and Availability requirements	x	x			x
Evaluate the compatibility and interoperability with existing or planned systems or equipment	x	x	x	x	x
Assess system operations in a degraded mode	x	x	x	x	
Verify the system is safe, secure, and survivable	x	x	x	x	x
Assess the site adaptability of the system	x	x	x	x	x
Assess the transition switch-over capability/plan	x	x	x	x	x
Verify the adequacy of manuals, handbooks, supporting plans, and other documentation for operations, maintenance, and training	x	x	x	x	x
Assess the degree to which the system can be monitored, operated, and maintained by users in an operational environment		x		x	x
Verify system operations under stress and NAS loading	x	x	x		
Assess NAS end-to-end performance with the system installed to ensure pre-existing NAS functionality is not degraded by new system		x	x	x	x

insertion/integration					
Ensure production units are of consistent quality and are equivalent to the first article	x		x		
Verify production units are free from manufacturing defects	x		x		
Verify Installation and Integration of fielded systems is consistent with approved SAT plans			x		

Table 3.2-1: SI Test Objectives

After deployment, NAS systems may require modifications during their in-service lifetimes. The T&E process is designed to standardize the manner in which HW/SW modifications are tested and evaluated in support of deployment to the field. During ISM, the test strategy is implemented through a series of tests that includes development test, system test, key site test, field acceptance test, and field familiarization.

Objectives for tests during SI and ISM are developed to verify that requirements have been met. Using different environment and test tools, the series of tests may verify the same requirement more than once. There are planning documents regarding the amount of parallel testing, repeat testing in different test environments, and regression testing necessary to produce a comprehensive, cost-effective test program. These considerations should be addressed during test strategy and test plan development. Table 3.2-2 lists the high-level objectives of each of the test phases of ISM:

ISM Test Objectives	Development Test	System Test	Key Site Test	Field Familiarization
Verify compliance to functional and performance requirements	x			
Verify the engineering design, development, and maintenance process	x			
Verify system compliance to interference requirements	x			
Identify deficiencies in system design and documentation, the NAS, HW, SW, human performance factors, and operational concepts	x	x	x	x
Identify and demonstrate mitigation of risks	x	x	x	x
Assess operational effectiveness, supportability, and suitability, including the human component	x	x	x	x
Verify the system meets reliability, maintainability, and availability requirements	x	x	x	x
Evaluate the compatibility and interoperability with existing or planned systems or equipment	x	x	x	x

Assess system operations in a degraded mode	X	X	X	X
Verify the system is safe, secure, and survivable	X	X	X	X
Assess the site adaptability of the system		X	X	X
Verify the adequacy of manuals, handbooks, supporting plans, and other documentation for operations, maintenance, and training		X	X	X
Assess the degree to which the system can be monitored, operated, and maintained by users in an operational environment		X	X	X
Verify system operations under stress and NAS loading		X	X	X
Assess NAS end-to-end performance with the system installed to ensure pre-existing NAS functionality is not degraded by new system insertion/integration		X	X	X
Verify operational procedures		X	X	X
Verify functional certification procedures		X	X	X
Verify system is compliant with physical and information security requirements	X	X	X	
Verify safety risk management requirements have been met	X	X	X	
Verify HW and SW installation instructions			X	X

Table 3-2.2: ISM Test Objectives

Red Line Content: Test and Evaluation Process Guidelines:

Section 3.2 : SI AND ISM TEST AND EVALUATION

The most significant T&E activities associated with the acquisition and delivery of new NAS systems are conducted during ~~the SI~~solution phase~~implementation~~. -During this phase, the test strategy is implemented through a series of tests that includes ~~Development Test~~DT, OT, ~~PAT~~, SAT, ~~Field Familiarization~~field familiarization, and IOT&E (for designated programs). -Objectives for this series of tests are developed to verify that requirements have been met. -Detailed guidelines are provided for ~~Development Test~~DT, OT, ~~PAT~~, and SAT in the ~~William J. Hughes Technical Center (WJHTC) System Test and Evaluation Process Document~~Handbook. -Detailed guidelines ~~are provided~~ are provided in the IOT&E Operations Manual. -Table 3.2-1 lists the high-level objectives of each ~~of the SI test phases~~phase.

All NAS modifications should be developed and implemented following the Test and Evaluation Gold Standard and Implementation Guide. -Service teams responsible for the development and implementation of NAS modifications to the field must comply with the Test and Evaluation Gold Standard (TEGS). -In addition, major upgrades or sustainment efforts for operational NAS

systems may also be designated for IOT&E. -These programs must adhere to an IOT&E process that is equivalent to the process followed for new acquisitions.

<u>SI</u>	<u>PAT</u> Development <u>Test</u>	<u>SAT</u> System <u>Test</u>	<u>FF</u> Key <u>Site</u> <u>Test</u>	<u>IOT&E</u> Field <u>Familiarization</u>
ISM Test Objectives				
DT-OT				
Verify contractor compliance to contracted functional and performance requirements	x—			
Verify the engineering design, development, and maintenance process	x—			
Verify system compliance to electromagnetic interference requirements	x—			
Identify deficiencies in system design and documentation, the NAS, HW, SW, human performance factors, and operational concepts	x	x—	x—	x
Verify that human Identify factors implementation meets user <u>and demonstrate mitigation of needs—x—risks</u>	x	x— Resolve COIs—	x—	x
Assess operational effectiveness, supportability, and suitability, including the human component—x	x—	x	x	x
Verify the system meets Reliability, Maintainability, and Availability requirements	x	x—	x	x
Evaluate the compatibility and interoperability with existing or planned	x—	x	x	x

systems or equipment x				
Assess system operations in a degraded mode	x	x—	x	x—
Verify the system is safe, secure, and survivable x	x—	x	x	x
Assess the site adaptability of the system x x— x x x Assess the transition switch over capability/plan x x		x	x	x
Verify the adequacy of manuals, handbooks, supporting plans, and other documentation for operations, maintenance, and training x x		x	x	x
Assess the degree to which the system can be monitored, operated, and maintained by users in an operational environment		x—	x	x
Verify system operations under stress and NAS loading x x		x	x	x
Assess NAS end-to-end performance with the system installed to ensure pre-existing NAS functionality is not degraded by new system insertion/integration		x	x	x
Verify operational procedures		x	x	x
Ensure production units are of consistent quality and are equivalent to Verify the first <u>functional certification</u> article—procedures		x	x—	x
Verify production units are free from manufacturing <u>system is compliant with physical and</u>	x	x	x	

defects— <u>information security requirements</u>				
Verify Installation and Integration of fielded <u>the systems is consistent with approved SAT</u> <u>Safety Risk Management Requirements have been plans met</u>	<u>-x</u>	<u>-x</u>	<u>x</u>	
* <u>Verify HW and SW installation instructions</u>			<u>x</u>	X

Table 3.2-1: SI Test Objectives

After deployment, NAS systems may require modifications during their in-service lifetimes.- The T&E process is designed to standardize the manner in which HW/SW modifications are tested and evaluated in support of deployment to the field.-During ISM, the test strategy is implemented through a series of tests that includes Development Testdevelopment test, Systemsystem Testtest, Keykey Site Testsite test, Fieldfield Acceptance Testacceptance test, and Fieldfield Familiarizationfamiliarization.

Objectives for tests during SI and ISM ~~phases~~ are developed to verify that requirements have been met.- Using different environment and test tools, the series of tests may verify the same requirement more than once.- There are planning documents regarding the amount of parallel testing, repeat testing in different test environments, and regression testing necessary to produce a comprehensive, cost-effective test program.- These considerations should be addressed during test strategy and test plan development. Table Table 3.2-2 lists the high-level objectives of each of the test phases of ISM:

ISM Test Objectives	Development Test	System Test	Key Site Test	Field Familiarization
Verify compliance to functional and performance requirements	X			
Verify the engineering design, development, and maintenance process	X			
Verify system compliance to interference requirements	X			
Identify deficiencies in system design and documentation, the NAS, HW, SW, human performance factors, and operational concepts	X	X	X	X
Identify and demonstrate mitigation of risks	X	X	X	X

Assess operational effectiveness, supportability, and suitability, including the human component	X	X	X	X
Verify the system meets Reliability <i>reliability</i> , Maintainability <i>maintainability</i> , and Availability <i>availability</i> requirements	X	X	X	X
Evaluate the compatibility and interoperability with existing or planned systems or equipment	X	X	X	X
Assess system operations in a degraded mode	X	X	X	X
Verify the system is safe, secure, and survivable	X	X	X	X
Assess the site adaptability of the system		X	X	X
Verify the adequacy of manuals, handbooks, supporting plans, and other documentation for operations, maintenance, and training		X	X	X
Assess the degree to which the system can be monitored, operated, and maintained by users in an operational environment		X	X	X
Verify system operations under stress and NAS loading		X	X	X
Assess NAS end-to-end performance with the system installed to ensure pre-existing NAS functionality is not degraded by new system insertion/integration		X	X	X
Verify operational procedures		X	X	X
Verify functional certification procedures		X	X	X
Verify system is compliant with physical and information security requirements	X	X	X	
Verify the Safety <i>safety</i> Risk Management Requirements <i>risk management requirements</i> have been met	X	X	X	
Verify HW and SW installation instructions			X	X

Table 3-2.2: ISM Test Objectives

Section 3.2.3.1 : SI Development Test

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.3.1 : SI Development Test

The primary objective of SI Development Test is to demonstrate that all technical and performance requirements specified in the contract have been met. Development Test is

normally performed by the contractor and witnessed by the service organization at the factory and/or WJHTC. It typically begins with a series of HW and SW tests. HW tests begin at the board level or component level and proceed to the system level. SW testing begins by verifying the most detailed requirements at the unit level. It then proceeds to verify higher-level integrated requirements at the segment level and verify requirements at the Computer Software Configuration Item level. Development Test at the vendor facility also includes a design qualification test that demonstrates the system's ability to satisfy the system specification. Development Test verifies the system meets contract requirements.

New Content: Test and Evaluation Process Guidelines:
Section 3.2.3.1 : SI Development Test

The primary objective of SI development test is to demonstrate that all technical and performance requirements specified in the contract have been met. Development test is normally performed by the contractor and witnessed by the service organization at the factory and/or WJHTC. It typically begins with a series of HW and SW tests. HW tests begin at the board level or component level and proceed to the system level. SW testing begins by verifying the most detailed requirements at the unit level. It then proceeds to verify higher-level integrated requirements at the segment level and verify requirements at the computer software configuration item level. Development test at the vendor facility also includes a design qualification test that demonstrates the system's ability to satisfy the system specification. Development test verifies the system meets contract requirements. During some acquisitions, production acceptance testing (PAT) is conducted by the vendor on each system it produces before the product leaves the factory. PAT usually consists of quality control tests plus a subset of other tests. These tests verify that the assembly line is producing units with the same quality and performance as the first article.

Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.3.1 : SI Development Test

The primary objective of SI ~~Development Test~~ development test is to demonstrate that all technical and performance requirements specified in the contract have been met. -Development ~~Test~~test is normally performed by the contractor and witnessed by the service organization at the factory and/or WJHTC. -It typically begins with a series of HW and SW tests. -HW tests begin at the board level or component level and proceed to the system level. -SW testing begins by verifying the most detailed requirements at the unit level. -It then proceeds to verify higher-level integrated requirements at the segment level and verify requirements at the ~~Computer Software Configuration Item~~computer software configuration item level. -Development ~~Test~~test at the vendor facility also includes a design qualification test that demonstrates the system's ability to satisfy the system specification. -Development ~~Test~~test verifies the system meets contract requirements. During some acquisitions, production acceptance testing (PAT) is conducted by the vendor on each system it produces before the system leaves the factory. PAT usually consists of quality control tests plus a subset of other tests. These tests verify that the assembly line is producing units with the same quality and performance as the first article.

Section 3.2.5.1 : SI Site Tests

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.5.1 : SI Site Tests

During some acquisitions, PAT is conducted by the vendor on each system it produces before the system leaves the factory. Production tests usually consist of quality control tests plus a subset of Development Test. These tests verify the assembly line is producing units with the same quality and performance as the first article.

Following delivery to the site, each system undergoes installation and check-out and SAT. These tests are conducted by the vendor to ensure the system is installed and functioning properly in preparation for site acceptance.

New Content: Test and Evaluation Process Guidelines:

Section 3.2.5.1 : SI Site Tests

Following delivery to the site, each system undergoes installation and check-out and site acceptance testing (SAT). These tests are conducted by the vendor to ensure the product is installed and functioning properly in preparation for site government acceptance.

Red Line Content: Test and Evaluation Process Guidelines:

Section 3.2.5.1 : SI Site Tests

~~During some acquisitions, PAT is conducted by the vendor on each system it produces before the system leaves the factory. Production tests usually consist of quality control tests plus a subset of Development Test. These tests verify the assembly line is producing units with the same quality and performance as the first article.~~ Following delivery to the site, each system undergoes installation and check-out and site acceptance testing (SAT). -These tests are conducted by the vendor to ensure the system is installed and functioning properly in preparation for site government acceptance.

Section 3.2.8 : SI to ISM Transition

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.8 : SI to ISM Transition

The Operational Readiness Date (ORD) signifies the end of OSD, at which time, switchover to the new system is complete. Following OSD, the system is formally accepted by the site via the Joint Acceptance Inspection process. This leads to the commissioning of the new system, decommissioning of the legacy system, and transition to the ISM phase of the lifecycle. ORD/commissioning should not occur at any site until after the ISD.

New Content: Test and Evaluation Process Guidelines:
Section 3.2.8 : SI to ISM Transition

Initial operating capability (IOC) signifies the site is ready for conditional operational use of the product. The period from IOC to the operational readiness date (ORD) may include an operational suitability demonstration (OSD). ORD signifies the end of conditional operational use, at which time, switchover to the new product is complete. The product is formally accepted by the site via the joint acceptance inspection process. This leads to the commissioning of the new product, decommissioning of the legacy product, and transition to the ISM phase of the lifecycle. ORD/commissioning should not occur at any site until after the ISD.

Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.8 : SI to ISM Transition

Initial operating capability (IOC) signifies the site is ready for conditional operational use of the system. The ~~Operational~~period from IOC to the operational ~~Readiness Date~~readiness date (ORD) may include an operational suitability demonstration (OSD). ORD signifies the end of ~~OSD~~conditional operational use, at which time, switchover to the new system is complete. ~~Following OSD, the~~The system is formally accepted by the site via the ~~Joint Acceptance Inspection~~joint acceptance inspection process. ~~This leads to the commissioning of the new system, decommissioning of the legacy system, and transition to the ISM phase of the lifecycle. ORD/commissioning should not occur at any site until after the ISD.~~

Section 6.1 : EXHIBIT 300 PROGRAM BASELINE

Old Content: Test and Evaluation Process Guidelines:
Section 6.1 : EXHIBIT 300 PROGRAM BASELINE

The Exhibit 300 Program Baseline establishes the performance baseline and operational framework for the investment program. CPPs that will be used by the JRC to monitor the program are recorded in OMB Exhibit 300. This document is developed as part of Investment Analysis and is approved as part of the Investment Decision. The COO of the Air Traffic Organization or the Associate Administrator of the line of business with the need (non-Air Traffic Organization) approves the Exhibit 300 Program Baseline along with the Acquisition Executive, the Chief Financial Officer, and the Air Traffic Organization Senior Vice President of Finance. The operational requirements and COIs, which must be resolved as a basis for the ISD, are also identified in the Exhibit 300 Program Baseline. FAST provides detailed information on the T&E content of the PR (Attachment 1) and the ISP (Attachment 3).

New Content: Test and Evaluation Process Guidelines:
Section 6.1 : ACQUISITION PROGRAM BASELINE

The Acquisition Program Baseline establishes the performance baseline and operational framework for the investment program. CPPs that will be used by the IDA to monitor the program are recorded in OMB Exhibit 300 (designated programs only). This document is developed as part of investment analysis and is approved as part of the investment decision. The IDA and designated reviewers approve the Acquisition Program Baseline. The operational requirements and COIs, which must be resolved as a basis for the in-service decision, are also identified in the Program Requirements Document. FAST provides detailed information on the T&E content of the PRD and ISPD.

Red Line Content: Test and Evaluation Process Guidelines:

Section 6.1 : ~~EXHIBIT~~ACQUISITION ~~300~~PROGRAM BASELINE

The Exhibit 300 Program Baseline establishes the performance baseline and operational framework for the investment program. -CPPs that will be used by the JRC to monitor the program are recorded in OMB Exhibit 300. -This document is developed as part of ~~Investment Analysis~~investment analysis and is approved as part of the ~~Investment~~investment ~~Decision~~decision. -The COO of the Air Traffic Organization or the Associate Administrator of the line of business with the need (non-Air Traffic Organization) approves the Exhibit 300 Program Baseline along with the Acquisition Executive, the Chief Financial Officer, and the Air Traffic Organization Senior Vice President of Finance. -The operational requirements and COIs, which must be resolved as a basis for the ~~ISD~~in-service decision, are also identified in the Exhibit 300 Program Baseline. -FAST provides detailed information on the ~~T&E~~ content of the PR (Attachment 1) and the ISP (Attachment 3).

Section 6.1.2 : Implementation Strategy and Planning

Old Content: Test and Evaluation Process Guidelines:

Section 6.1.2 : Implementation Strategy and Planning

The ISP attachment supplements information in the Exhibit 300 Program Baseline. It defines the overall lifecycle management strategy for an investment program and contains a network of detailed actions and activities the service organization will undertake to implement the phase of the program approved by the JRC. Planning in the attachment encompasses and integrates all aspects of program implementation. These may include the acquisition of systems and equipment, construction or modification of facilities and physical infrastructure, functional integration within the FAA enterprise architecture, and procurement of services. The attachment also integrates activity in diverse functional disciplines supporting the program, such as systems engineering, contracting, system safety management, logistics support, T&E, security, Configuration Management, human integration, and Quality Assurance.

Part 1 of the ISP defines the lifecycle management strategy for the overall investment program. Part 2 is a network of actions and activities that will be undertaken to execute the phase of the program approved for implementation by the JRC. For IOT&E-designated programs, the Office of IOT&E co-approves the ISP T&E sections.

New Content: Test and Evaluation Process Guidelines:
Section 6.1.2 : Implementation Strategy And Planning Document

The ISPD defines the overall lifecycle management strategy for an investment program. Planning encompasses and integrates all aspects of program implementation. These may include the acquisition of systems and equipment, construction or modification of facilities and physical infrastructure, functional integration within the FAA enterprise architecture, and procurement of services. The document also integrates activity in diverse functional disciplines supporting the program, such as systems engineering, contracting, system safety management, logistics support, T&E, security, configuration management, human integration, and quality assurance. For IOT&E-designated programs, the Office of IOT&E co-approves the ISPD IOT&E section.

Red Line Content: Test and Evaluation Process Guidelines:
Section 6.1.2 : Implementation Strategy ~~and~~ And Planning Document

The ISP attachment supplements information in the Exhibit 300 Program Baseline. -It defines the overall lifecycle management strategy for an investment program and contains a network of detailed actions and activities the service organization will undertake to implement the phase of the program approved by the JRC. -Planning in the attachment encompasses and integrates all aspects of program implementation. -These may include the acquisition of systems and equipment, construction or modification of facilities and physical infrastructure, functional integration within the FAA enterprise architecture, and procurement of services. -The attachment also integrates activity in diverse functional disciplines supporting the program, such as systems engineering, contracting, system safety management, logistics support, T&E, security, ~~Configuration Management~~configuration management, human integration, and ~~Quality~~quality ~~Assurance~~assurance.

Part 1 of the ISP defines the lifecycle management strategy for the overall investment program. -Part 2 is a network of actions and activities that will be undertaken to execute the phase of the program approved for implementation by the JRC. -For IOT&E-designated programs, the Office of IOT&E co-approves the ISP ~~TIOT&E sections~~section.

Section 6.2.1 : Development Test Plan

Old Content: Test and Evaluation Process Guidelines:
Section 6.2.1 : Development Test Plan

The Contractor Master Test Plan (CMTP) is the highest-level Development Test plan. It describes all tests that will be conducted to demonstrate that specified technical and performance requirements have been met. The CMTP is developed in accordance with the guidance described in Appendix C-12. It identifies lower-level Development Test plans that will be prepared to describe tests required in the specification, such as electromagnetic tests, SW tests, first article tests, or capacity tests. In addition to test descriptions, Development Test plans describe the contractor's strategy for conducting tests, test resource requirements (i.e.,

equipment and personnel), test location, and test data reduction and analysis plans. Appendix C-5 provides detailed guidance on the content and format of Development Test plans. Appendix C-13 provides an alternate Development Test template for use on modifications and P³Is during the In-Service phase.

New Content: Test and Evaluation Process Guidelines:
Section 6.2.1 : Development Test Documentation

Detailed information for DT plans, procedures, reports, and other DT documentation is provided in the ATO-P Test and Evaluation Handbook. Templates and samples of the various plans and reports can be found in the V&V Repository. Both the Test and Evaluation Handbook and the V&V Repository are located at the Test Standard Board website:http://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.

Red Line Content: Test and Evaluation Process Guidelines:
Section 6.2.1 : Development Test Plan Documentation

The Detailed Contractor information Master Test Plan (CMTP) is the highest-level Development Test plan. It describes all tests that will be conducted to for demonstrate DT that plans, specified procedures, technical reports, and performance requirements have been met. other The CMTP DT documentation is developed provided in accordance with the guidance ATO-P described in Appendix Test and Evaluation C-12 Handbook. Templates It identifies and samples lower-level of Development Test the various plans that will be prepared and to describe tests required reports can be found in the specification, such as electromagnetic tests, SW tests, first article tests, or capacity tests. In addition to test descriptions, Development Test plans describe the contractor V’s strategy for conducting tests, test resource requirements (i.e., equipment and personnel), test location, and V test data reduction and analysis plans Repository. Appendix C-5 Both provides detailed guidance on the content Test and format Evaluation of Development Test Handbook and the plans. V V Appendix C-13 Repository provides an alternate Development are located at the Test template for use on Standard modifications Board and P3Is during the In-Service website:
phasehttp://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.

Section 6.2.2 : Operational Test Plan

Old Content: Test and Evaluation Process Guidelines:
Section 6.2.2 : Operational Test Plan

The OT plan forms the basis for the OT program. The OT plan describes all tests the service organization will conduct to determine whether Exhibit 300 Program Baseline requirements have been met, whether COIs have been resolved, and whether the new system is suitable for use in the NAS. Two major test series usually are described in an OT plan: the NAS integration test series and the suitability/effectiveness test series. The OT plan also describes the various planning and preparation activities required prior to OT, the OT

strategy/approach, test resource requirements, and test entry conditions. The OT plan contains an OT schedule and an FAA VRTM. Appendix C-I provides detailed guidance on the content and format of OT plans.

New Content: Test and Evaluation Process Guidelines:
Section 6.2.2 : Operational Test Documentation

Detailed information for OT plans, procedures, reports, and other documentation is provided in the ATO-P Test and Evaluation Handbook. Templates and samples of the various OT plans and reports can be found in the V&V Repository. Both the Test & Evaluation Handbook and the V&V Repository are located at the Test Standard Board website:http://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.

Red Line Content: Test and Evaluation Process Guidelines:
Section 6.2.2 : Operational Test ~~Plan~~ Documentation

~~The Detailed OT plan forms the information basis for the OT program. The OT plan describes all tests the service organization will conduct to determine whether Exhibit 300 Program Baseline requirements have been met plans, whether COIs have been procedures, resolved reports, and whether the new other system documentation is suitable for use in the NAS. Two major test series provided usually are described in an OT plan: the NAS integration test ATO-P series Test and the suitability/effectiveness test Evaluation series Handbook. The Templates OT plan and also describes samples of the various planning and preparation activities required prior to OT; the OT plans and strategy/approach, reports test resource can be requirements, found and test in the entry V&V conditions Repository. The Both OT plan the contains Test an & OT schedule Evaluation Handbook and an FAA the VRTM. V amp; Appendix C-IV provides detailed guidance on Repository are located at the content and Test format of Standard Board OT website:~~
~~plans~~http://www.faa.gov/about/office_org/headquarters_offices/ato/tc/initiatives/vnv/.

Section 6.2.3 : Production Acceptance Test Plan

Old Content: Test and Evaluation Process Guidelines:
Section 6.2.3 : Production Acceptance Test Plan

The PAT plan typically describes two distinct series of tests: manufacturing tests (to ensure the manufacturing process is producing quality units) and Factory Acceptance Test (to ensure each unit is defect-free and meets requirements before shipment). The PAT plan uses the same format as the Development Test plan, but extensive tailoring is recommended. Appendix C-5 provides content and format guidance for PAT plans.

New Content: Test and Evaluation Process Guidelines:
Section 6.2.3 : Field Familiarization Documentation

The field familiarization test plan is initially developed by the key site and used or tailored as required by subsequent sites. It describes the various planning and preparation activities required prior to testing. The plan describes the test activities in sufficient detail to guide the development of test procedures. (See Appendix C)

Test reports document the results of a test and usually recommend a course of action based on those results. The test report addresses test results, including test conduct, data collected, the data reduction and analysis process, and conclusions to be drawn from the test data. Content and format guidance for OT reports, development test/PAT reports, field familiarization test reports, and operational system functional verification reports are contained in Appendices C-3, C-7, and C-9. A format also is provided in Appendix C-10 for reporting the results of tests that compare the performance of systems.

Red Line Content: Test and Evaluation Process Guidelines:

Section 6.2.3 : ~~Production Acceptance~~Field Familiarization ~~Test Plan~~Documentation

The ~~PAT~~field familiarization test plan ~~typically~~is initially developed by the key site and used or tailored as required by subsequent sites. It describes ~~two distinct series of~~the various planning and ~~tests: preparation manufacturing tests~~activities required ~~(prior to ensure~~testing. The plan describes the ~~manufacturing process is producing quality~~test activities in sufficient detail ~~units)to and Factory Acceptance~~guide the development ~~Test~~of test procedures. ~~(to ensure~~See Appendix ~~each~~C)

Test ~~unit is~~reports document ~~defect-free~~the results of a test and ~~meets requirements~~ ~~before~~usually recommend a ~~shipment~~course of action based on those results. ~~-The PAT plan uses the~~test report addresses test ~~same~~results, ~~format~~including ~~a~~test conduct, data collected, the ~~Development Test~~data reduction ~~plan~~and analysis process, ~~but~~and conclusions ~~extensive tailoring~~to be ~~is~~drawn from the ~~recommended~~test data. Content ~~Appendix~~and format guidance for OT reports, development test/PAT reports, field familiarization test reports, and operational system functional verification reports are contained in Appendices C-5 ~~provides~~3, ~~content~~C-7, and C-9. A format ~~guidance~~also is provided in Appendix C-10 for ~~PAT~~reporting the results of tests that compare the performance of ~~plans~~systems.

Section 6.2.4 : Site Acceptance Test Plan

Old Content: Test and Evaluation Process Guidelines:

Section 6.2.4 : Site Acceptance Test Plan

The SAT plan describes tests that are conducted at each site to demonstrate the installed unit is integrated with other site equipment and is operating properly. SAT is usually a subset of Development Test. The SAT plan uses the same format as the PAT plan. (See Appendix C-5)

New Content: Test and Evaluation Process Guidelines:

Section 6.2.4 : Site Acceptance Test Plan Red Line Content: Test and Evaluation Process Guidelines:

Section 6.2.4 : Site Acceptance Test Plan *The SAT plan describes tests that are conducted at each site to demonstrate the installed unit is integrated with other site equipment and is operating properly. SAT is usually a subset of Development Test. The SAT plan uses the same format as the PAT plan. (See Appendix C-5)*

Section 6.2.5 : Field Familiarization Test Plan

Old Content: Test and Evaluation Process Guidelines:

Section 6.2.5 : Field Familiarization Test Plan

The Field Familiarization test plan is initially developed by the key site and utilized or tailored as required by subsequent sites. It describes the various planning and preparation activities required prior to testing. The plan describes the test activities in sufficient detail to guide the development of test procedures. (See Appendix C- 8)

New Content: Test and Evaluation Process Guidelines:

Section 6.2.5 : Field Familiarization Test Plan Red Line Content: Test and Evaluation Process Guidelines:

Section 6.2.5 : Field Familiarization Test Plan *The Field Familiarization test plan is initially developed by the key site and utilized or tailored as required by subsequent sites. It describes the various planning and preparation activities required prior to testing. The plan describes the test activities in sufficient detail to guide the development of test procedures. (See Appendix C- 8)*

Section 6.2.6 : Test Procedures

Old Content: Test and Evaluation Process Guidelines:

Section 6.2.6 : Test Procedures

The individual test procedures decompose the test plan into a step-by-step procedure to conduct the test. The content of the procedures should include test cases that are traceable to specific requirements defined in project or FAA VRTMs. Appendices C-2 and C-6 provide content and format guidance for OT procedures and Development Test/PAT procedures, respectively.

New Content: Test and Evaluation Process Guidelines:

Section 6.2.6 : Test Procedures Red Line Content: Test and Evaluation Process Guidelines:

Section 6.2.6 : Test Procedures *The individual test procedures decompose the test plan into a step-by-step procedure to conduct the test. The content of the procedures should include test cases that are traceable to specific requirements defined in project or FAA VRTMs. Appendices C-2 and C-6 provide content and format guidance for OT procedures and Development Test/PAT procedures, respectively.*

Section 6.2.7 : Quick-Look Test Reports

Old Content: Test and Evaluation Process Guidelines:
Section 6.2.7 : Quick-Look Test Reports

Quick-look test reports are abbreviated test reports that provide preliminary test results and conclusions to decision-makers within approximately 15 days of completing a test. The primary purpose of quick-look reports is to allow the program to proceed or the decision authority to render a preliminary decision without delay if preliminary test results reveal no significant problems. Appendix C-4 describes the format for quick-look test reports. An OT quick-look report may be acceptable documentation for the decision to declare IOC at a key site, but a final (not draft) OT Report must be completed and available as input to the In-Service Review process to support an In-Service Decision.

New Content: Test and Evaluation Process Guidelines:
Section 6.2.7 : Quick-Look Test Reports Red Line Content: Test and Evaluation Process Guidelines:

Section 6.2.7 : Quick-Look Test Reports ~~Quick-look test reports are abbreviated test reports that provide preliminary test results and conclusions to decision-makers within approximately 15 days of completing a test. The primary purpose of quick-look reports is to allow the program to proceed or the decision authority to render a preliminary decision without delay if preliminary test results reveal no significant problems. Appendix C-4 describes the format for quick-look test reports. An OT quick-look report may be acceptable documentation for the decision to declare IOC at a key site, but a final (not draft) OT Report must be completed and available as input to the In-Service Review process to support an In-Service Decision.~~

Section 6.2.8 : Test Reports

Old Content: Test and Evaluation Process Guidelines:
Section 6.2.8 : Test Reports

Test reports document the results of a test and usually recommend a course of action based on those results. The test report addresses test results, including test conduct, data collected, the data reduction and analysis process, and conclusions to be drawn from the test data. Content and format guidance for OT reports, Development Test/PAT reports, Field Familiarization test reports, and operational system functional verification reports are contained in Appendices C-3, C-7, and C-9. A format also is provided in Appendix C-10 for reporting the results of tests that compare the performance of systems.

New Content: Test and Evaluation Process Guidelines:
Section 6.2.8 : Test Reports Red Line Content: Test and Evaluation Process Guidelines:
Section 6.2.8 : Test Reports ~~Test reports document the results of a test and usually recommend a course of action based on those results. The test report addresses test results, including test conduct, data collected, the data reduction and analysis process, and conclusions to be drawn from the test data. Content and format guidance for OT reports, Development Test/PAT reports, Field Familiarization test reports, and operational system functional verification reports are contained in Appendices C-3, C-7, and C-9. A format also is provided in Appendix C-10 for reporting the results of tests that compare the performance of systems.~~

Section 7 : RECOMMENDED TEST AND EVALUATION PROCESSES

Old Content: Test and Evaluation Process Guidelines:

Section 7 : RECOMMENDED TEST AND EVALUATION PROCESSES

This section describes recommended processes (a series of actions or operations) for performing the tests and test activities described in Sections 2.0 through 4.0. The recommended processes should be tailored to each program and used when appropriate.

New Content: Test and Evaluation Process Guidelines:

Section 7 : RECOMMENDED TEST AND EVALUATION PROCESSES

This section is a brief summary of the recommended processes (a series of actions or operations) for performing the tests and test activities described in Sections 2.0 through 4. To meet the unique needs of a program, the T&E processes may be tailored based on:

- a) Program complexity
- b) Risks
- c) Size of the acquisition
- d) Acquisition strategies and type (e.g., COTS, services, software, hardware, procurement of systems or equipment, modification of facilities, changes in the physical infrastructure, development of functional interfaces, spiral development implementation, etc.)

A more comprehensive description of the recommended processes can be found in the Test and Evaluation Handbook.

Red Line Content: Test and Evaluation Process Guidelines:

Section 7 : RECOMMENDED TEST AND EVALUATION PROCESSES

This section is a brief ~~describes~~ summary of the recommended processes (a series of actions or operations) for performing the tests and test activities described in Sections 2.0 through 4.0. To ~~The recommended~~ meet the unique needs of a program, the T&E processes ~~should~~ may be tailored ~~to~~ based on:

- a) Program complexity
- b) Risks
- c) Size of ~~each~~ the ~~program~~ acquisition
- d) Acquisition strategies and ~~used~~ type (e.g., COTS, services, software, hardware, procurement of systems or equipment, modification of facilities, changes in the physical infrastructure, development of functional interfaces, spiral development ~~when~~ implementation, ~~appropriate~~ etc.)

A more comprehensive description of the recommended processes can be found in the Test and Evaluation Handbook.

Section 7.1 : SI SYSTEM TEST PLANNING PROCESS

Old Content: Test and Evaluation Process Guidelines:

Section 7.1 : SI SYSTEM TEST PLANNING PROCESS

Initial System Test planning is completed in the initial Investment Analysis phase by the service organization. This T&E planning information is documented in the ISP. An initial VRTM also is developed at this time. System Test planning is then developed to greater levels of detail and documented in the Development Test, OT, PAT, and SAT plans. A recommended process for planning System Test follows:

1. First, review the SLMNS, PR Attachment, Program Baseline, investment analysis documentation, and any other pertinent information relevant to the solution under consideration.

The service organization test lead, along with IOT&E (for designated programs), verifies that a set of COIs exists for the system and establishes a set of Measures of Effectiveness (MOEs) and Measures of Suitability (MOSs). Normally, a set of six to ten COIs in the form of broad questions about the usability of the system are included by the users in the PR Attachment. If COIs are not contained in the PR Attachment, the service organization with the mission need is contacted to provide the information and an updated PR Attachment. The MOEs and MOSs become agreed-upon measures that, if successfully answered, formulate the basis for a positive assessment of the associated COI. Typically, five to ten MOEs and/or MOSs are associated with each COI. The Measures of Performance (MOPs) are thresholds associated with an MOE or MOS and are used as a measure of success. If the MOS/MOE process is not completed in time for the initial ISP, it should be added when available and included for reference in the OT plan.

2. A preliminary VRTM is developed during this step. The VRTM is used to help guide high-level planning by listing all known requirements for the system and mapping them to a test that will verify each requirement. In the process of mapping, the tester is forced to group requirements into one of the available test categories and think about how the testing can be accomplished either at a specific location and time or through certain resource constraints. Initially, the VRTM should include all NAS requirements, including Interface Requirements Documents and Interface Control Documents, requirements from the PR Attachment (or program baseline, if applicable), MOEs/MOSs; and other OT items. If the equipment specification is available, it may be made a part of the VRTM, or a separate specification VRTM may be referenced. Normally, the equipment specification VRTM is verified completely during Development Test under the prime equipment contract. The intent of the VRTM is to capture and trace the verification of all system requirements. As more detailed requirements become known, they should be added to the VRTM. The list of other OT items that may be included in the VRTM is gleaned from the description of the types of testing contained in an OT program as described in Section 4.0 of this

guidance document. If not already listed in the VRTM, any of the following types of items may be included:

- NAS system integration items
- Reliability
- Maintainability
- Availability
- Degraded-mode operations
- Stress and NAS loading
- Human factors evaluations
- Safety
- Site adaptation
- Security
- Transition switch-over
- Supportability

New Content: Test and Evaluation Process Guidelines:
Section 7.1 : SI SYSTEM TEST PLANNING PROCESS

Initial test planning is accomplished during final investment analysis by the service organization. T&E program planning is based on the framework established in the Acquisition Program Baseline and AMS program documents. Program requirements are contained in the program requirements document. T&E support ensures the PRD contains Critical Operational Issues that are completely described, operational in nature, represent observable phenomena, and testable.

The implementation strategy and planning document (ISPD) defines the overall test strategy for a program. System complexity, contracting approach, project schedule, and impact on the NAS are considered when developing test program strategies.

As the program matures, a procurement package, including a statement of work and specification, is developed. The test director, working with the service organization, should coordinate preparation of test sections for the statement of work, CDRL, and specification.

The service organization is responsible for coordinating key site-selection activities. The test director will provide the service organization a description of any special capabilities needed at the key site.

Red Line Content: Test and Evaluation Process Guidelines:
Section 7.1 : SI SYSTEM TEST PLANNING PROCESS

Initial System Testtest planning is completed in the accomplished initial Investment Analysis phaseduring final investment analysis by the service organization.- This T&E planning information is documented in the ISP. An initial VRTM also is developed at this time. System Testprogram planning is then developed to greaterbased levelson of detail and documented in the Development Test, OT, PAT, and SAT plans. framework A recommended process for

planning System Test follows: First, established review in the SLMNS, PR Exhibit Attachment, 300 Program Baseline, investment analysis documentation, and any other pertinent information relevant to the solution its under consideration attachments. The service organization test lead, along with IOT&E (for designated programs), verifies that a set of COIs exists for the system and establishes a set of Measures of Effectiveness (MOEs) and Measures of Program Suitability Requirements (MOSs). Normally, a set of six to ten COIs in the form of broad questions about the usability of the system are included by the users in the PR Attachment. If COIs are not contained in the PR Attachment, the service organization with the mission need is contacted to provide the information and an updated PR Attachment.

program� The MOEs and MOSs become agreed-upon measures that, if successfully answered Exhibit 300, formulate the basis for a positive assessment of the associated Attachment COI. Typically, five to ten MOEs and/or MOSs are associated with each COI. T amp; The Measures of Performance (MOPs) are thresholds associated with an MOE or MOSE and are used as a measure of support ensures that PR contains Critical Operational success. Issues If the MOS/MOE that process is are completely not described, completed operational in time for the initial ISP nature, it should be represent added observable when available phenomena, and included for reference in the OT plan. 2. A preliminary VRTM is developed during this step testable. The VRTM is used to help guide high-level planning by listing all known requirements for

The the system Implementation Strategy and mapping them to a test that will verify each requirement. In the process of mapping, the tester Planning is (ISP) forced attachment to group requirements into one of the available test OMB categories and think about how Exhibit 300 Program Baseline defines the testing can be overall accomplished either attest strategy for a specific location and time or through certain resource constraints program. System Initially complexity, the VRTM should include contracting all NAS requirements approach, including Interface Requirements project Documents schedule, and Interface Control Documents, requirements impact from on the PR Attachment (or program baseline, NAS if are applicable), considered MOEs/MOSs; when and other OT items developing test program strategies. If

As the equipment specification is program available matures, it a may procurement be package, made including a part statement of the VRTM, or a work separate and specification VRTM may, be referenced is developed. Normally, the equipment specification VRTM is verified completely The during test Development director, Test under working with the prime service equipment organization, contract. should The intent coordinate preparation of the VRTM is to capture test and trace sections for the verification statement of all system requirements. As work, more CDRL, detailed and requirements specification.

The becomes service known, organization they should be added to is responsible for coordinating key the site-selection VRTM activities. The list of other OT items that may test be included in director will provide the VRTM is gleaned service from the organization a description of the types of testing contained in an OT program as described any in Section special capabilities 4.0 needed of this guidance document at the key site. If not already listed in the VRTM, any of the following types of items may be included:

NAS system integration items Reliability Maintainability Availability Degraded-mode operations Stress and NAS loading Human factors evaluations Safety Site adaptation Security Transition switch-over Supportability

Section 7.2 : SI METHOD FOR VERIFYING OPERATIONAL REQUIREMENTS

Old Content: Test and Evaluation Process Guidelines:

Section 7.2 : SI METHOD FOR VERIFYING OPERATIONAL REQUIREMENTS

AMS policy requires that the T&E process provide for the final verification of operational readiness. Operational readiness is the combined consideration of operational effectiveness and operational suitability. Operational effectiveness is the degree of mission accomplishment achieved by a system when used by representative personnel in the environment reflective of its intended operational use. Operational suitability is the degree to which a system can be used satisfactorily in the field with consideration given to availability, maintainability, safety, human factors, logistics, supportability, documentation, and training.

The goal of the FAA's test activities is to ensure new or modified systems meet user operational needs (i.e., operational capabilities). The two key elements of success in this process are:

- Ensuring user requirements for the new system's operational capabilities are clearly and accurately expressed in the PR Attachment and Exhibit 300 Program Baseline.
- Ensuring these operational requirements approved by the JRC in the Exhibit 300 Program Baseline are understood, confirmed to be testable, and subsequently verified by the tester through a structured test program.

One method used by testers to verify operational requirements is the resolution of COIs. COIs are key operational effectiveness and operational suitability issues that must be examined during operational testing to determine the system's capability to perform its mission. They address essential capabilities, risks, or uncertainties that must be evaluated. COIs are developed by the service organization with the mission need from mission-critical requirements and are identified in the PR Attachment. The T&E section of the PR Attachment and Exhibit 300 Program Baseline indicates that COIs must be resolved successfully as a basis for the ISD.

New Content: Test and Evaluation Process Guidelines:

Section 7.2 : SI DEVELOPMENT TEST

The DT process will differ from program to program, depending on size and complexity. It should progress from verifying requirements at the unit level and move incrementally to the fully integrated, fielded system level.

The following items define standard test activities that may be modified based on the program that needs to conduct DT:

a) DT Software Testing: Verification of the specifications at the B level (subsystem). DT software testing usually addresses new and modified software broken down to the computer software configuration item, computer software component, and functional design

components.

b) DT Hardware Testing: Verification of specifications at the B level. DT hardware testing usually addresses new and modified hardware broken down to the hardware configuration item and hardware design items.

c) Factory Acceptance Testing (FAT): Verification of primarily hardware, firmware, and COTS/NDI subsystem components to address B-level and A-level (system) specification items.

d) Functional Qualification Testing (FQT): Verification of partially integrated hardware and software subsystem components, including COTS/NDI and modified COTS/NDI, to address B-level and A-level specification items.

e) DT Integration Testing: Verification of proper installation and functioning of the complete system in the laboratory environment, including the verification of system interfaces with other NAS equipment and government furnished equipment.

f) DT System Testing: Verification of integrated software and hardware components to address A-level specification items under conditions that emulate projected operational conditions.

g) Production Acceptance Testing (PAT): Verification of production line units of developed hardware prior to installation at field sites to address B-level and some A-level specification items.

h) Site Acceptance Testing (SAT): Verification of fully-integrated software and hardware components to address A-level specification items that could not be tested sufficiently during DT system testing. SAT also demonstrates that requirements verified under DT system testing continue to remain in conformance as installed at the operational site by executing a subset of DT system tests.

Red Line Content: Test and Evaluation Process Guidelines:

Section 7.2 : SI METHOD DEVELOPMENT FOR VERIFYING OPERATIONAL REQUIREMENT TEST

AMS policy requires that the DT process will T&E differ process provide for from program to the program, final verification of operational readiness depending on size and complexity. It should progress from verifying requirements at the unit level and operational move suitability incrementally to Operational effectiveness the fully is integrated, the degree fielded system of level.

The mission accomplishment achieved by a system when used by representative personnel in following items define standard test activities that may be modified based on the environment reflective program of its intended operational that needs to conduct use. DT:

a) DT Operational Software Testing: suitability is Verification of the degrees specifications to at the which a B level system (subsystem). DT can be used satisfactorily in the field with consideration given software testing usually addresses new and modified software broken down to availability, the maintainability, computer safety, software human factors configuration item, logistics, computer supportability, software documentation component, and training functional design components. The

b) ~~DT Hardware Testing: goal~~ Verification of specifications at the FAAB level. ~~DT test activities hardware is to ensure testing usually addresses new or and modified systems meet user operational needs hardware broken down to the (i.e., hardware operational configuration capabilities) item and hardware design items.~~

c) ~~Factory The two~~ Acceptance Testing key (FAT): elements ~~Verification of success primarily in hardware, this firmware, process and are: Ensuring COTS/NDI user requirements for the subsystem components to address new B-level and A-level (system) specification items.~~

d) ~~DT~~ operational capabilities are ~~Functional clearly and~~ Qualification Testing accurately (FOT): expressed in the PR Attachment ~~Verification of partially integrated hardware and Exhibit 300 Program software Baseline. Ensuring subsystem these components, operational including requirements COTS/NDI approved by and modified the COTS/NDI, JRC into address the B-level Exhibit and 300 A-level Programs specification Baseline items.~~

e) ~~DT are~~ Integration understood, Testing: confirmed to be ~~Verification of proper testable, installation and subsequently verified functioning by of the tester complete through a structured test system in the laboratory program. One environment, method used by testers to verify operational requirements is the resolution including the verification of system interfaces with other NAS equipment and of government furnished COI equipment.~~

f) ~~DT System COIs~~ Testing: are key operational effectiveness ~~Verification of integrated software and operational hardware suitability issues that components to address must A-level be examined during operational testing to determine the specification items under conditions that emulate projected operational system conditions.~~

g) ~~DT~~ capability ~~Production to perform Acceptance its Testing mission. (PAT): They address essential~~ Verification of production capabilities, line risks, units or uncertainties that must be of developed hardware prior to evaluated. ~~installation COIs are developed by the at field sites to address service B-level organization with and some the A-level specification mission items.~~

h) ~~Site need~~ Acceptance from Testing (SAT): Verification of mission fully-critical integrated requirements software and are hardware identified in components to the address A-level specification items that could not be tested sufficiently during PRDT Attachment system testing. SAT The also demonstrates that T requirements ~~and E section verified of the PR Attachment and Exhibit 300 Program Baseline indicates that COIs must be resolved successfully as under DT system testing continue to remain in conformance as installed at the operational site by executing a basis subset of for the ISDDT system tests.~~

Section 7.3 : KEY SITE SELECTION PROCESS

Old Content: Test and Evaluation Process Guidelines;

Section 7.3 : KEY SITE SELECTION PROCESS

The service organization is responsible for coordinating key site selection activities. WJHTC Integrated Engineering Services, Technical Operations, and Air Traffic will provide the

service organization a description of any special capabilities needed at the key site. Consideration will be given to other activities scheduled at the various sites to avoid conflicting resource requirements or excessive workloads. Final selection of primary and back-up key site candidates will be communicated to all affected organizations as early as possible. Information will be fully and freely shared with FAA staff, bargaining unit employees, and management personnel. Selection of key site is performed in parallel with development and test, and must be completed with sufficient time to allow for preparation for key site activities.

New Content: Test and Evaluation Process Guidelines:
Section 7.3 : OPERATIONAL TEST

Operational test (OT) encompasses test and evaluation of a product or service's operational requirements. The primary objective of OT is to validate that a new or modified product or service is operationally effective and suitable for use in the National Airspace System and the NAS infrastructure is ready to accept the product or service.

Operational effectiveness and suitability testing includes user participation and may consist of the following test categories:

- a) Reliability
- b) Maintainability
- c) Availability
- d) Supportability
- e) Degraded operations
- f) Stress and NAS load testing of all interoperable subsystems
- g) Human factors evaluations
- h) Safety requirements validation and testing to identify new safety hazards
- i) Security
- j) Site adaptation
- k) Transition switchover
- l) Certification criteria

OT validation derives its test requirements from critical operational issues (COIs) and critical performance parameter (CPP) requirements specified in the program requirements document of the product or service under test. COIs focus on overall capability to support the operational mission. CPPs are requirements deemed essential to the successful performance of the product or service in meeting mission need.

A COI is decomposed into measures of effectiveness (MOEs) and measures of suitability (MOSs), both of which are analyzed to identify measures of performance (MOPs). The MOPs contain testable parameters which form the basis of OT test requirements. These OT test requirements form the foundation for test procedures by consolidating them into logical and comprehensive test run components. The V&V repository provides detailed information on the development and decomposition of COIs, MOEs, MOSs, and MOPs.

The data from OT is also used to support independent operational test and evaluation.

Red Line Content: Test and Evaluation Process Guidelines:

Section 7.3 : ~~KEY~~OPERATIONAL ~~SITE SELECTION PROCES~~TEST

The Operational test (OT) encompasses test and evaluation of a product or service's operational requirements. The primary objective of OT is to validate that a new or modified product ~~organization~~ or service is ~~responsible~~ operationally effective and suitable for ~~coordinating~~ use in the National Airspace System and the NAS ~~key~~ infrastructure ~~site~~ is ready to accept ~~selection~~ the product or ~~activities~~ service.

WJHTC Integrated Engineering Operational effectiveness and Services, suitability Technical Testing Operations, includes and user participation Air Traffic will provide and may consist of the ~~service~~ following ~~organization~~ test categories:

- a) Reliability
- b) Maintainability
- c) Availability
- d) Supportability
- e) Degraded operations
- f) Stress ~~description of any special capabilities needed at~~ and NAS load testing of all interoperable ~~the~~ subsystems
- g) Human ~~key~~ factors ~~site~~ evaluations
- h) Safety ~~Consideration will be given~~ requirements validation and testing to ~~other~~ identify new safety hazards
- i) Security
- j) Site adaptation
- k) Transition switchover
- l) Certification criteria

OT validation derives its test requirements from critical operational issues (COIs) and critical performance ~~activities~~ parameter ~~scheduled~~ (CPP) ~~at~~ requirements specified in the Program Requirements document of the ~~various~~ product or service under test. COIs focus on ~~sites~~ overall capability to ~~avoid~~ support the operational mission. ~~conflicting resource~~ CPPs are requirements deemed essential to the successful performance of the product or ~~excessive~~ service in meeting ~~workloads~~ mission need.-

A COI is ~~Final selection~~ decomposed into measures of ~~primary~~ effectiveness (MOEs) and ~~back-up~~ measures of suitability ~~key~~ (MOSSs), ~~site candidates will be communicated~~ both of which are analyzed to ~~all~~ identify measures of performance (MOPs). The MOPs contain ~~affected organizations as early~~ testable parameters which form ~~as~~ the basis of OT ~~possible~~ test requirements.- ~~Information will be fully and freely shared with FAA~~ These OT test requirements form the foundation for test ~~staff~~ procedures ~~bargaining unit~~ by consolidating ~~employees~~ them into logical and ~~management~~ comprehensive test run ~~personnel~~ components. The V amp;V Selection of key site is performed in parallel with development repository provides detailed information on the development and decomposition of ~~and~~ COIs, ~~test~~ MOEs, MOSSs, and ~~must~~ MOPs.

The data ~~be completed with sufficient time~~ from OT is also used to ~~allow for~~ support preparation for key site independent operational test and ~~activities~~ evaluation..

APPENDIX E - IOT&E DETAILS

Old Content: Test and Evaluation Process Guidelines:

APPENDIX E - IOT&E DETAILS New Content: Test and Evaluation Process Guidelines:

APPENDIX D - IOT&E DETAILS Red Line Content: Test and Evaluation Process Guidelines:

APPENDIX ~~E~~D - IOT&E DETAILS

E.1 IOT&E Documentation

Old Content: Test and Evaluation Process Guidelines:

E.1 IOT&E Documentation

During early program monitoring, the Office of IOT&E identifies risks and communicates these risks to the service organization via informal verbal communication and formal written communication. IOT&E required documentation includes input to the ISP test and evaluation section, an IOT&E plan, an IOT&E procedures document, and an IOT&E Team assessment report (IOT&E Report). Figure E1-1 depicts a generic timeline of IOT&E activities and shows when supporting IOT&E documents would normally be developed.

IOT&E Input to the ISP T&E Sections. The Office of IOT&E reviews and comments on the service organization's T&E strategy proposed in the ISP. The Office of IOT&E also provides the IOT&E section for the ISP. For the ISP T&E section, The Office of IOT&E documents the IOT&E activities, resources, and strategy. The Office of IOT&E has full approval of the IOT&E section of the ISP.

Office of IOT&E Co-approval of T&E Section of ISP. The Office of IOT&E, along with the service team lead, co-approves the entire T&E section of the ISP. The Office of IOT&E prepares a signature page for the front of the ISP T&E section and a memo to the service team lead detailing any issues or conditions prior to co-approval.

IOT&E plans and procedures. The IOT&E plans and procedures documents should include scheduling, resources, coverage of system test, and data collection and analysis to allow a formal IOT&E Team assessment of the system's operational readiness.

Pre-IOT&E Operational Issue Paper. Subsequent to OT completion and prior to the IOTRD, the Office of IOT&E and the IOT&E Team prepare an issue paper for the ATO stakeholders and service organization that provides a summary of the operational issues that are being tracked as IOT&E approaches.

Reports. The IOT&E Report will be distributed to the service organization and all ATO stakeholders at the Directorate and Vice President levels. The Report will also be sent to the

ATO COO. This Report supports a production decision or In-Service Decision. Due to the independent nature of the IOT&E Report, there is no formal comment/review process outside of the IOT&E Team. The IOT&E Report is based on all data available at that time.

Follow-on Assessment and Reporting. The Office of IOT&E, along with the IOT&E Team, provides a follow-up assessment on any new operational issues identified after the ISD and a status of significant operational issues that were identified in the original IOT&E Report. Results of the follow-up assessment are detailed in a Follow-up Report issued approximately six months following the ISD.

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Figure E1-1: Generic Timeline of IOT&E Activities

[Click here to view figure](#)

New Content: Test and Evaluation Process Guidelines:

D.1 IOT&E Documentation

During early program monitoring, the Office of IOT&E identifies risks and communicates these risks to the service organization via informal verbal communication and formal written communication. IOT&E required documentation includes input to the ISP test and evaluation section, an IOT&E plan, an IOT&E procedures document, and an IOT&E Team assessment report (IOT&E Report). Figure

D1-1 depicts a generic timeline of IOT&E activities and shows when supporting IOT&E documents would normally be developed.

IOT&E Input to the ISP T&E Sections. The Office of IOT&E reviews and comments on the service organization's T&E strategy proposed in the ISP. The Office of IOT&E also provides the IOT&E section for the ISP. For the ISP T&E section, The Office of IOT&E documents the IOT&E activities, resources, and strategy. The Office of IOT&E has full approval of the IOT&E section of the ISP.

Office of IOT&E Co-approval of T&E Section of ISP. The Office of IOT&E, along with the service team lead, co-approves the entire T&E section of the ISP. The Office of IOT&E prepares a signature page for the front of the ISP T&E section and a memo to the service team lead detailing any issues or conditions prior to co-approval.

IOT&E plans and procedures. The IOT&E plans and procedures documents should include scheduling, resources, coverage of system test, and data collection and analysis to allow a formal IOT&E team assessment of the system's operational readiness.

Pre-IOT&E Operational Issue Paper. Subsequent to OT completion and prior to the IOTRD, the Office of IOT&E and the IOT&E team prepare an issue paper for the ATO stakeholders

and service organization that provides a summary of the operational issues that are being tracked as IOT&E approaches.

Reports. The IOT&E report will be distributed to the service organization and all ATO stakeholders at the Directorate and Vice President levels. The report will also be sent to the ATO COO. This report supports a production decision or in-service decision. Due to the independent nature of the IOT&E report, there is no formal comment/review process outside of the IOT&E team. The IOT&E report is based on all data available at that time.

Follow-on Assessment and Reporting. The Office of IOT&E, along with the IOT&E team, provides a follow-up assessment on any new operational issues identified after the ISD and a status of significant operational issues that were identified in the original IOT&E report. Results of the follow-up assessment are detailed in a follow-up report issued approximately six months following the ISD.

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Figure D1-1: Generic Timeline of IOT&E Activities

[Click here to view figure](#)

Red Line Content: Test and Evaluation Process Guidelines:

[ED.1 IOT&E Documentation](#)

During early program monitoring, the Office of IOT&E identifies risks and communicates these risks to the service organization via informal verbal communication and formal written communication. IOT&E required documentation includes input to the ISP test and evaluation section, an IOT&E plan, an IOT&E procedures document, and an IOT&E Team assessment report (IOT&E Report). -Figure ~~E1~~

D1-1 depicts a generic timeline of IOT&E activities and shows when supporting IOT&E documents would normally be developed.

IOT&E Input to the ISP T&E Sections. -- The Office of IOT&E reviews and comments on the service organization's T&E strategy proposed in the ISP. The Office of IOT&E also provides the IOT&E section for the ISP. For the ISP T&E section, The Office of IOT&E documents the IOT&E activities, resources, and strategy. The Office of IOT&E has full approval of the IOT&E section of the ISP.

Office of IOT&E Co-approval of T&E Section of ISP. The Office of IOT&E, along with the service team lead, co-approves the entire T&E section of the ISP. The Office of IOT&E prepares a signature page for the front of the ISP T&E section and a memo to the service team lead detailing any issues or conditions prior to co-approval.

IOT&E plans and procedures. - The IOT&E plans and procedures documents should include scheduling, resources, coverage of system test, and data collection and analysis to allow a formal IOT&E ~~Team~~ team assessment of the system's operational readiness.

Pre-IOT&E Operational Issue Paper. Subsequent to OT completion and prior to the IOTRD, the Office of IOT&E and the IOT&E ~~Team~~ team prepare an issue paper for the ATO stakeholders and service organization that provides a summary of the operational issues that are being tracked as IOT&E approaches.

Reports. The IOT&E ~~Report~~ report will be distributed to the service organization and all ATO stakeholders at the Directorate and Vice President levels. -The ~~Report~~ report will also be sent to the ATO COO. -This ~~Report~~ report supports a production decision or ~~In-Service Decision~~ service decision. -Due to the independent nature of the IOT&E ~~Report~~ report, there is no formal comment/review process outside of the IOT&E ~~Team~~ team. -The IOT&E ~~Report~~ report is based on all data available at that time.

Follow-on Assessment and Reporting. The Office of IOT&E, along with the IOT&E ~~Team~~ team, provides a follow-up assessment on any new operational issues identified after the ISD and a status of significant operational issues that were identified in the original IOT&E ~~Report~~ report. -Results of the follow-up assessment are detailed in a ~~Follow~~ follow-up ~~Report~~ report issued approximately six months following the ISD.

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Figure ~~E1D1~~ E1D1-1: Generic Timeline of IOT&E Activities

[Click here to view figure](#)

E.2 IOT&E Team

Old Content: Test and Evaluation Process Guidelines:
E.2 IOT&E Team

Organizations that operate, maintain, or are otherwise operationally affected by the implementation of a new system are represented on the IOT&E Team. IOT&E Teams will include subject-matter experts at both the working level and supervisory levels from Headquarters and field operations.

The Office of IOT&E coordinates with appropriate ATO offices to obtain IOT&E Team members from field facilities. Additional participants may include FAA personnel who are system users such as the National Weather Service, and the Department of Defense.

Office of IOT&E's Role in IOT&E. The IOT&E Program Manager from the Office of IOT&E leads and provides full administrative support to the IOT&E Team during IOT&E. The Office of IOT&E facilitates the final IOT&E Team system assessment by ensuring proper collection,

analysis, and reporting of test results. The IOT&E Team reports the operational assessment of the evaluated system to the In-Service Decision authority. The Director of the Office of IOT&E represents independent test and evaluation within the FAA.

IOT&E Team Responsibility. The IOT&E Team is responsible for conducting independent operational assessments of designated programs. Although every attempt will be made to keep members' management informed of assessments and recommendations, IOT&E Team assessments and/or recommendations will be based solely on the analyses of system performance and capabilities during IOT&E and of data collected during earlier test phases.

Role of IOT&E Team During System Test and Field Familiarization. IOT&E may use the results from selected SI System Test events to aid the resolution of COIs. Members from the IOT&E Team observe selected system test events and have access to all system test and PTR data so that a complete IOT&E assessment can be made.

Role of Office of IOT&E and IOT&E Team in COI Development. Due to the important role COIs play in system tests and operational assessments, and due to problems created by inadequate COIs, the Office of IOT&E will work with the service organization to assist in the development of a complete set of testable COIs. COIs should reflect high-level operational requirements and should avoid including "issues of the day." COIs used in the test plans by the service organization and the IOT&E Program Manager should be those defined in the Exhibit 300 Program Baseline, Attachment 1: Program Requirements.

New Content: Test and Evaluation Process Guidelines:
D2 IOT&E Team

Organizations that operate, maintain, or are otherwise operationally affected by the implementation of a new system are represented on the IOT&E team. IOT&E teams will include subject-matter experts at both the working level and supervisory levels from Headquarters and field operations.

The Office of IOT&E coordinates with appropriate ATO offices to obtain IOT&E team members from field facilities. Additional participants may include FAA personnel who are system users such as the National Weather Service, and the Department of Defense.

Office of IOT&E's Role in IOT&E. The IOT&E program manager from the Office of IOT&E leads and provides full administrative support to the IOT&E team during IOT&E. The Office of IOT&E facilitates the final IOT&E team system assessment by ensuring proper collection, analysis, and reporting of test results. The IOT&E team reports the operational assessment of the evaluated system to the in-service decision authority. The Director of the Office of IOT&E represents independent test and evaluation within the FAA.

IOT&E Team Responsibility. The IOT&E team is responsible for conducting independent operational assessments of designated programs. Although every attempt will be made to keep members' management informed of assessments and recommendations, IOT&E team

assessments and/or recommendations will be based solely on the analyses of system performance and capabilities during IOT&E and of data collected during earlier test phases.

Role of IOT&E Team During System Test and Field Familiarization. IOT&E may use the results from selected SI system test events to aid the resolution of COIs. Members from the IOT&E team observe selected system test events and have access to all system test and PTR data so that a complete IOT&E assessment can be made.

Role of Office of IOT&E and IOT&E Team in COI Development. Due to the important role COIs play in system tests and operational assessments, and due to problems created by inadequate COIs, the Office of IOT&E will work with the service organization to assist in the development of a complete set of testable COIs. COIs should reflect high-level operational requirements and should avoid including "issues of the day." COIs used in the test plans by the service organization and the IOT&E program manager should be those defined in the Exhibit 300 Program Baseline, Attachment 1: Program Requirements.

Red Line Content: Test and Evaluation Process Guidelines:
E.2D2 IOT&E Team

Organizations that operate, maintain, or are otherwise operationally affected by the implementation of a new system are represented on the IOT&E Team. IOT&E Teams will include subject-matter experts at both the working level and supervisory levels from Headquarters and field operations.

The Office of IOT&E coordinates with appropriate ATO offices to obtain IOT&E Team members from field facilities. Additional participants may include FAA personnel who are system users such as the National Weather Service, and the Department of Defense.

Office of IOT&E's Role in IOT&E. The IOT&E Program Manager program manager from the Office of IOT&E leads and provides full administrative support to the IOT&E Team during IOT&E. The Office of IOT&E facilitates the final IOT&E Team system assessment by ensuring proper collection, analysis, and reporting of test results. The IOT&E Team reports the operational assessment of the evaluated system to the In-Service Decision decision authority. The Director of the Office of IOT&E represents independent test and evaluation within the FAA.

IOT&E Team Responsibility. The IOT&E Team is responsible for conducting independent operational assessments of designated programs. Although every attempt will be made to keep members' management informed of assessments and recommendations, IOT&E Team assessments and/or recommendations will be based solely on the analyses of system performance and capabilities during IOT&E and of data collected during earlier test phases.

Role of IOT&E Team During System Test and Field Familiarization. IOT&E may use the results from selected SI System Test system test events to aid the resolution of COIs. Members from the IOT&E Team observe selected system test events and have access to all system test and PTR data so that a complete IOT&E assessment can be made.

Role of Office of IOT&E and IOT&E Team in COI Development. Due to the important role COIs play in system tests and operational assessments, and due to problems created by inadequate COIs, the Office of IOT&E will work with the service organization to assist in the development of a complete set of testable COIs. COIs should reflect high-level operational requirements and should avoid including "issues of the day." COIs used in the test plans by the service organization and the IOT&E ~~Program Manager~~program manager should be those defined in the Exhibit 300 Program Baseline, Attachment 1: Program Requirements.

E.3 Relationship with Service Organizations

Old Content: Test and Evaluation Process Guidelines:

E.3 Relationship with Service Organizations

IOT&E Program Managers are extended, non-voting members of service organizations. They attend all pertinent service organization activities and work closely with the service organizations regarding IOT&E and the early identification of operational issues and risks during the monitoring process. The IOT&E Team is provided access to SI System Test documentation, which it reviews and on which it provides comments. The service organization may coordinate with the IOT&E PM if they would like to have a representative observe IOT&E. During IOT&E, the service organization may decide to withdraw the system if further development and/or corrective action is required before IOT&E proceeds.

Test Working Groups (TWGs). IOT&E program managers/and Office of IOT&E support staff participate on service organization TWGs. This participation facilitates a full understanding by Office of IOT&E of the service organization's test strategy and a full understanding by the service organization of the IOT&E strategy.

Operational Capabilities Tests and Demonstrations (OCTs, OCDs). To ensure that independence is maintained, the Office of IOT&E does not participate directly in OCDs or OCTs. Office of IOT&E personnel are present as observers, but do not have a role on the technical evaluation teams.

New Content: Test and Evaluation Process Guidelines:

D.3 Relationship with Service Organizations

IOT&E program managers are extended, non-voting members of service organizations. They attend all pertinent service organization activities and work closely with the service organizations regarding IOT&E and the early identification of operational issues and risks during the monitoring process. The IOT&E team is provided access to SI system test documentation, which it reviews and on which it provides comments. The service organization may coordinate with the IOT&E PM if they would like to have a representative observe IOT&E. During IOT&E, the service organization may decide to withdraw the system if further development and/or corrective action is required before IOT&E proceeds.

Test Working Groups (TWGs). IOT&E program managers/and Office of IOT&E support staff participate on service organization TWGs. This participation facilitates a full understanding by Office of IOT&E of the service organization's test strategy and a full understanding by the service organization of the IOT&E strategy.

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Red Line Content: Test and Evaluation Process Guidelines:

E.D.3 Relationship with Service Organizations

IOT&E ~~Program Managers~~program managers are extended, non-voting members of service organizations. They attend all pertinent service organization activities and work closely with the service organizations regarding IOT&E and the early identification of operational issues and risks during the monitoring process. The IOT&E ~~Team~~team is provided access to SI ~~System Test~~system test documentation, which it reviews and on which it provides comments. -The service organization may coordinate with the IOT&E PM if they would like to have a representative observe IOT&E. -During IOT&E, the service organization may decide to withdraw the system if further development and/or corrective action is required before IOT&E proceeds.

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Operational Capabilities Tests and Demonstrations (OCTs, OCDs).- To ensure that independence is maintained, the Office of IOT&E does not participate directly in OCDs or OCTs. Office of IOT&E personnel are present as observers, but do not have a role on the technical evaluation teams.

E.4 IOT&E Designation Process

Old Content: Test and Evaluation Process Guidelines:

E.4 IOT&E Designation Process

Key elements in the process for assigning an IOT&E program designation include:

- Potential programs for IOT&E designation are reviewed by an IOT&E Designation Board. The IOT&E Designation Board consists of Directors of En Route and Oceanic Safety and Operational Support, Terminal Safety and Operational Support, Flight Services Safety and Operational Support, Technical Operations Support, Systems Operations and Safety, and the Office of IOT&E. The Board's review of programs

results in a recommendation to the Vice President of Safety Services on IOT&E program designation. This IOT&E Designation Board will commit to providing sufficient resources to support the recommended program designations.

- The Board ensures that priorities are assigned based on factors such as complexity, criticality, acquisition cost, and risk.
- Program designation decisions will be re-verified at key program milestones.

New Content: Test and Evaluation Process Guidelines:

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Red Line Content: Test and Evaluation Process Guidelines:

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- The Board ensures that priorities are assigned based on factors such as complexity, criticality, acquisition cost, and risk.
- Program designation decisions will be re-verified at key program milestones.

E.5 IOT&E Method of System Assessment

Old Content: Test and Evaluation Process Guidelines:

E.5 IOT&E Method of System Assessment

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The assessment of the operational readiness of the system will be performed by the IOT&E Team after IOT&E. The system will be assessed for Operational Readiness based on the operational issues associated with the COIs. The IOT&E Team may not be able to fully evaluate all operational aspects of the system during IOT&E due to limitations that may be site-specific, part of the operational environment, or that otherwise prevent the collection of enough relevant information.

Issue Risk Assessment

The evaluation process begins by correlating the collected data from System Test, Field Familiarization, and IOT&E with the COI/MOEs/MOSs to verify that all operational requirements have been assessed. There will be a data trail from the data elements/MOPs to the MOEs/MOSs, and in turn, to the corresponding COIs.

The IOT&E Team will analyze the data to identify issues and categorize them as either Operational Risk issues or comments. Identified operational issues will then be assessed for operational risk using the process described below.

Operational Risk Issues: The risk ratings for these issues will be based on the consensus of the IOT&E Team members and will be supported by data that will have been collected during the evaluation, and, if applicable, data collected during earlier testing. The level of risk will be determined by assessing both the Operational Impact and Frequency of Occurrence using the following definitions:

Operational Impacts

The Operational Impacts are defined as follows:

CRITICAL – A problem that will prevent, degrade, or interrupt operational service or jeopardize safety, and has no acceptable workaround.

MAJOR – A problem that will —

a) prevent, degrade, or interrupt operational service or jeopardize safety, but has an acceptable workaround; or

b) disable a support system function that is essential to operational or system performance analysis, and has no acceptable workaround.

MINOR – A problem that presents a level of Operational Impact not covered by the Critical or Major categories above.

Frequency of Occurrence

The Frequency of Occurrence is defined as follows:

OFTEN – A problem that repeatedly occurred while the system/service was operational within the NAS and is very likely to recur when the causal conditions exist.

OCCASIONAL – A problem that intermittently occurred while the system/service was operational within the NAS and is likely to recur when the causal conditions exist.

ISOLATED – A problem that rarely occurred while the system/service was operational within the NAS or only occurred during any type of operational testing. The likelihood of recurrence is minimal or the specific causal conditions have not been determined.

The following table illustrates the relationship of Operational Impact to Frequency of Occurrence in the assessment of operational risk:

		OPERATIONAL IMPACT		
		MINOR	MAJOR	CRITICAL
FREQUENCY OF OCCURRENCE	ISOLATED	LOW	LOW/MEDIUM*	MEDIUM/HIGH*
	OCCASIONAL	LOW	MEDIUM	HIGH
	OFTEN	LOW/MEDIUM*	MEDIUM/HIGH*	HIGH

*** Only one risk rating will be assigned to an issue. It will be based on Team consensus.**

Comments: This category would include issues that warrant consideration and are not operational risk issues. Some examples of issues which may fall into this category are: positive comments on system performance, concerns with interfacing systems that are not currently under assessment, required operational capabilities not included in the system under assessment (these should have been addressed in the IOTRD), and resources.

System Assessment

Once the issues have been identified and rated for risk, the system will be assessed for Operational Readiness based on the assessment of the individual issues. The system will be assessed for Operational Readiness as follows:

- **Operationally Ready:**
 - **There are no high risk issues and the combined level of risk of all issues does not preclude operational use.**
- **Not Operationally Ready:**
 - **There is at least one high risk issue or the combined level of risk of all issues precludes operational use.**

IOT&E Results

Results from IOT&E will be documented in an IOT&E Report. The report will be distributed to the service organization and all ATO stakeholders at the Directorate and Vice President levels. The report will also be sent to the ATO COO. In the case of joint programs with the Department of Defense, the report will be sent to the appropriate Department of Defense offices.

The IOT&E Report will normally be briefed in the week following the report's completion. Briefings are scheduled at the Directorate and Vice President levels for all ATO stakeholders and the service organization. A briefing is also scheduled for key site managers. The briefing series may be tailored as appropriate for the program.

New Content: Test and Evaluation Process Guidelines: D.5 IOT&E Method of System Assessment

The assessment of the operational readiness of the system will be performed by the IOT&E team after IOT&E. The system will be assessed for operational readiness based on the operational issues associated with the COIs. The IOT&E team may not be able to fully evaluate all operational aspects of the system during IOT&E due to limitations that may be site-specific, part of the operational environment, or that otherwise prevent the collection of enough relevant information.

Issue Risk Assessment

The evaluation process begins by correlating the collected data from system test, field familiarization, and IOT&E with the COI/MOEs/MOSs to verify that all operational requirements have been assessed. There will be a data trail from the data elements/MOPs to the MOEs/MOSs, and in turn, to the corresponding COIs.

The IOT&E team will analyze the data to identify issues and categorize them as either operational risk issues or comments. Identified operational issues will then be assessed for operational risk using the process described below.

Operational Risk Issues: The risk ratings for these issues will be based on the consensus of the IOT&E team members and will be supported by data that will have been collected during the evaluation, and, if applicable, data collected during earlier testing. The level of risk will be determined by assessing both the operational impact and frequency of occurrence using the following definitions:

Operational Impacts

The operational impacts are defined as follows:

CRITICAL – A problem that will prevent, degrade, or interrupt operational service or jeopardize safety, and has no acceptable workaround.

MAJOR – A problem that will —

a) prevent, degrade, or interrupt operational service or jeopardize safety, but has an acceptable workaround; or

b) disable a support system function that is essential to operational or system performance analysis, and has no acceptable workaround.

MINOR – A problem that presents a level of operational impact not covered by the critical or major categories above.

Frequency of Occurrence

The frequency of occurrence is defined as follows:

OFTEN – A problem that repeatedly occurred while the system/service was operational within the NAS and is very likely to recur when the causal conditions exist.

OCCASIONAL – A problem that intermittently occurred while the system/service was operational within the NAS and is likely to recur when the causal conditions exist.

ISOLATED – A problem that rarely occurred while the system/service was operational within the NAS or only occurred during any type of operational testing. The likelihood of recurrence is minimal or the specific causal conditions have not been determined.

The following table illustrates the relationship of operational impact to frequency of occurrence in the assessment of operational risk:

		OPERATIONAL IMPACT		
		MINOR	MAJOR	CRITICAL
FREQUENCY OF OCCURRENCE	ISOLATED	LOW	LOW/MEDIUM*	MEDIUM/HIGH*
	OCCASIONAL	LOW	MEDIUM	HIGH
	OFTEN	LOW/MEDIUM*	MEDIUM/HIGH*	HIGH

*** Only one risk rating will be assigned to an issue. It will be based on Team consensus.**

Comments: This category would include issues that warrant consideration and are not operational risk issues. Some examples of issues which may fall into this category are: positive comments on system performance, concerns with interfacing systems that are not currently under assessment, required operational capabilities not included in the system under assessment (these should have been addressed in the IOTRD), and resources.

System Assessment

Once the issues have been identified and rated for risk, the system will be assessed for operational readiness based on the assessment of the individual issues. The system will be assessed for operational readiness as follows:

- Operationally Ready:
 - There are no high risk issues and the combined level of risk of all issues does not preclude operational use.
- Not Operationally Ready:
 - There is at least one high risk issue or the combined level of risk of all issues precludes operational use.

IOT&E Results

Results from IOT&E will be documented in an IOT&E report. The report will be distributed to the service organization and all ATO stakeholders at the Directorate and Vice President levels. The report will also be sent to the ATO COO. In the case of joint programs with the Department of Defense, the report will be sent to the appropriate Department of Defense offices.

The IOT&E report will normally be briefed in the week following the report's completion. Briefings are scheduled at the Directorate and Vice President levels for all ATO stakeholders and the service organization. A briefing is also scheduled for key site managers. The briefing series may be tailored as appropriate for the program.

Red Line Content: Test and Evaluation Process Guidelines:

ED.5 IOT&E Method of System Assessment

The assessment of the operational readiness of the system will be performed by the IOT&E Team after IOT&E. The system will be assessed for ~~Operational~~operational ~~Readiness~~readiness based on the operational issues associated with the COIs. -The IOT&E Team may not be able to fully evaluate all operational aspects of the system during IOT&E due to limitations that may be site-specific, part of the operational environment, or that otherwise prevent the collection of enough relevant information.

Issue Risk Assessment

The evaluation process begins by correlating the collected data from ~~System Test~~system test, ~~Field~~field ~~Familiarization~~familiarization, and IOT&E with the COI/MOEs/MOSs to verify that all operational requirements have been assessed. -There will be a data trail from the data elements/MOPs to the MOEs/MOSs, and in turn, to the corresponding COIs.

The IOT&E Teamteam will analyze the data to identify issues and categorize them as either Operational Riskoperational risk issues or comments. Identified operational issues will then be assessed for operational risk using the process described below.

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b) disable a support system function that is essential to operational or system performance analysis, and has no acceptable workaround.

MINOR- – A problem that presents a level of Operational Impactoperational impact not covered by the Criticalcritical or Majormajor categories above.

Frequency of Occurrence

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The following table illustrates the relationship of ~~Operational~~operational ~~Impact~~impact to ~~Frequency~~frequency of ~~Occurrence~~occurrence in the assessment of operational risk:

		OPERATIONAL IMPACT		
		MINOR	MAJOR	CRITICAL
FREQUENCY OF OCCURRENCE	ISOLATED	LOW	LOW/MEDIUM*	MEDIUM/HIGH*
	OCCASIONAL	LOW	MEDIUM	HIGH
	OFTEN	LOW/MEDIUM*	MEDIUM/HIGH*	HIGH

* Only one risk rating will be assigned to an issue. It will be based on Team consensus.

Comments: This category would include issues that warrant consideration and are not operational risk issues. -Some examples of issues which may fall into this category are: positive comments on system performance, concerns with interfacing systems that are not currently under assessment, required operational capabilities not included in the system under assessment (these should have been addressed in the IOTRD), and resources.

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The IOT&E ~~Report~~report will normally be briefed in the week following the report's completion. -Briefings are scheduled at the Directorate and Vice President levels for all ATO stakeholders and the service organization. -A briefing is also scheduled for key site managers. The briefing series may be tailored as appropriate for the program.

APPENDIX F - ACRONYMS AND DEFINITIONS

Old Content: Test and Evaluation Process Guidelines:

APPENDIX F - ACRONYMS AND DEFINITIONS New Content: Test and Evaluation Process Guidelines:

APPENDIX E - ACRONYMS AND DEFINITIONS Red Line Content: Test and Evaluation Process Guidelines:

APPENDIX ~~F~~E - ACRONYMS AND DEFINITIONS

F1.0 Overview

Old Content: Test and Evaluation Process Guidelines:

F1.0 Overview

This appendix lists the acronyms and organizational abbreviations used in the guidance document and corresponding definitions. The appendix also defines T&E terminology that is not defined elsewhere on FAST.

New Content: Test and Evaluation Process Guidelines:

E1.0 Overview

This appendix lists the acronyms and organizational abbreviations used in the guidance document and corresponding definitions. The appendix also defines T&E terminology that is not defined elsewhere on FAST.

Red Line Content: Test and Evaluation Process Guidelines:

~~F~~E1.0 Overview

This appendix lists the acronyms and organizational abbreviations used in the guidance document and corresponding definitions. -The appendix also defines T&E terminology that is not defined elsewhere on FAST.

F1.1 List of Acronyms

Old Content: Test and Evaluation Process Guidelines:

F1.1 List of Acronyms

AMS Acquisition Management System

CCD Configuration Control Decision

CDR Critical Design Review

CMTP Contractor Master Test Plan

COI Critical Operational Issue

COO Chief Operating Officer

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<u>COTS</u>	<u>Commercial Off-The-Shelf</u>
<u>CPP</u>	<u>Critical Performance Parameter</u>
<u>FAA</u>	<u>Federal Aviation Administration</u>
<u>FAST</u>	<u>FAA Acquisition System Toolset</u>
<u>HDR</u>	<u>Hardware Discrepancy Report</u>
<u>HW</u>	<u>Hardware</u>
<u>IOC</u>	<u>Initial Operating Capability</u>
<u>IOT&E</u>	<u>Independent Operational Test and Evaluation</u>
<u>IOTRD</u>	<u>IOT&E Readiness Declaration</u>
<u>ISD</u>	<u>In-Service Decision</u>
<u>ISM</u>	<u>In-Service Management</u>
<u>ISP</u>	<u>Implementation Strategy and Planning</u>
<u>JRC</u>	<u>Joint Resources Council</u>
<u>MOE</u>	<u>Measure of Effectiveness</u>
<u>MOP</u>	<u>Measure of Performance</u>
<u>MOS</u>	<u>Measure of Suitability</u>
<u>NAS</u>	<u>National Airspace System</u>
<u>NCP</u>	<u>NAS Change Proposal</u>
<u>NDI</u>	<u>Non-Developmental Item</u>
<u>OCD</u>	<u>Operational Capability Demonstration</u>
<u>OCT</u>	<u>Operational Capability Test</u>
<u>OMB</u>	<u>Office of Management and Budget</u>
<u>ORD</u>	<u>Operational Readiness Date</u>
<u>OSD</u>	<u>Operational Suitability Demonstration</u>
<u>OT</u>	<u>Operational Test</u>
<u>P³I</u>	<u>Pre-Planned Product Improvements</u>
<u>PAT</u>	<u>Production Acceptance Test</u>
<u>PDR</u>	<u>Preliminary Design Review</u>
<u>PRD</u>	<u>Program Requirements Document</u>
<u>PTR</u>	<u>Program Trouble Report</u>
<u>R&D</u>	<u>Research and Development</u>
<u>SAT</u>	<u>Site Acceptance Test</u>
<u>SI</u>	<u>Solution Implementation</u>
<u>SLMNS</u>	<u>Service-Level Mission Need Statement</u>
<u>SSD</u>	<u>System Support Directive</u>

SSM System Support Modification
SW Software

T&E Test and Evaluation
TEGS Test and Evaluation Gold Standard

VRTM Verification Requirements Traceability Matrix

WJHTC William J. Hughes Technical Center

New Content: Test and Evaluation Process Guidelines:
E1.1 List of Acronyms

APB Acquisition Program Baseline

AMS Acquisition Management System
CCD Configuration Control Decision
CDR Critical Design Review
CM Configuration Management
CMTP Contractor Master Test Plan
COI Critical Operational Issue

CONOPs Concept of Operations
COO Chief Operating Officer
COTS Commercial Off-The-Shelf
CPP Critical Performance Parameters
DR&A Data Reduction and Analysis
DT Development Test
FAA Federal Aviation Administration
FAST FAA Acquisition System Toolset
FAT Factory Acceptance Test
FF Field Familiarization
FQT Functional Quality Test
GFE Government Furnished Equipment
HDR Hardware Discrepancy Report
HF Human Factors
HW Hardware
IAR Interim Assessment Report
IDA Investment Decision Authority
IOC Initial Operating Capability
IOT&E Independent Operational Test and Evaluation
IOTRD IOT&E Readiness Declaration
ISD In-Service Decision
ISM In-Service Management
ISPD Implementation Strategy and Planning Document
ITT Integrated Test Team

<u>JRC</u>	<u>Joint Resources Council</u>
<u>MOE</u>	<u>Measure of Effectiveness</u>
<u>MOP</u>	<u>Measure of Performance</u>
<u>MOS</u>	<u>Measure of Suitability</u>
<u>NAS</u>	<u>National Airspace System</u>
<u>NCP</u>	<u>NAS Change Proposal</u>
<u>NDI</u>	<u>Non-Developmental Item</u>
<u>OCD</u>	<u>Operational Capability Demonstration</u>
<u>OCT</u>	<u>Operational Capability Test</u>
<u>OMB</u>	<u>Office of Management and Budget</u>
<u>ORD</u>	<u>Operational Readiness Date</u>
<u>OSD</u>	<u>Operational Suitability Demonstration</u>
<u>OT</u>	<u>Operational Test</u>
<u>P3I</u>	<u>Pre-Planned Product Improvements</u>
<u>PAT</u>	<u>Production Acceptance Test</u>
<u>PDR</u>	<u>Preliminary Design Review</u>
<u>PR</u>	<u>Program Requirements</u>
<u>PTR</u>	<u>Program Trouble Report</u>
<u>R&D</u>	<u>Research and Development</u>
<u>SAT</u>	<u>Site Acceptance Test</u>
<u>SI</u>	<u>Solution Implementation</u>
<u>SOW</u>	<u>Statement of Work</u>
<u>SSD</u>	<u>System Support Directive</u>
<u>SSM</u>	<u>System Support Modification</u>
<u>SW</u>	<u>Software</u>
<u>T&E</u>	<u>Test and Evaluation</u>
<u>TEGS</u>	<u>Test and Evaluation Gold Standard</u>
<u>TIM</u>	<u>Technical Interchange Meeting</u>
<u>TSB</u>	<u>Test Standards Board</u>
<u>TWG</u>	<u>Test Working Group</u>
<u>V&V</u>	<u>Validation and Verification</u>
<u>VRTM</u>	<u>Verification Requirements Traceability Matrix</u>
<u>WJHTC</u>	<u>William J. Hughes Technical Center</u>

Red Line Content: Test and Evaluation Process Guidelines:

~~FE~~1.1 List of Acronyms

AMS Acquisition Management System

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CCD Configuration Control Decision

CDR Critical Design Review

CM Configuration Management

CMTP Contractor Master Test Plan

COI Critical Operational Issue

CONOPs Concept of Operations

COO Chief Operating Officer

COTS Commercial Off-The-Shelf

CPP Critical Performance ~~Parameter~~Parameters

-

DR&A Data Reduction and Analysis

DT Development Test

-

FAA Federal Aviation Administration

FAST FAA Acquisition System Toolset

FAT Factory Acceptance Test

FF Field Familiarization

FQT Functional Quality Test

-

GFE Government Furnished Equipment

-

HDR Hardware Discrepancy Report

HF Human Factors

HW Hardware

-

IAR Interim Assessment Report

IOC Initial Operating Capability

IOT&E Independent Operational Test and Evaluation

IOTRD IOT&E Readiness Declaration

ISD In-Service Decision

ISM In-Service Management
ISP Implementation Strategy and Planning

ITT Integrated Test Team

-

JRC Joint Resources Council

-

MOE Measure of Effectiveness
MOP Measure of Performance
MOS Measure of Suitability

-

NAS National Airspace System
NCP NAS Change Proposal
NDI Non-Developmental Item

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OCD Operational Capability Demonstration
OCT Operational Capability Test
OMB Office of Management and Budget
ORD Operational Readiness Date
OSD Operational Suitability Demonstration
OT Operational Test

-

P³I Pre-Planned Product Improvements
PAT Production Acceptance Test
PDR Preliminary Design Review
PRD PR Program Requirements Document
PTR Program Trouble Report

-

R&D Research and Development

-

SAT Site Acceptance Test
SI Solution Implementation

~~SLMNS~~~~SOW~~ ~~Service-Level~~ ~~Mission Need~~~~Statement of~~ ~~Statement~~~~Work~~ ~~SSD~~

~~SSD~~ ~~System Support Directive~~

~~SSM~~ ~~System Support Modification~~

~~SW~~ ~~Software~~

-

~~T&E~~ ~~Test and Evaluation~~

~~TEGS~~ ~~Test and Evaluation Gold Standard~~

~~TIM~~ ~~Technical Interchange Meeting~~

~~TSB~~ ~~Test Standards Board~~

~~TWG~~ ~~Test Working Group~~

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~~V&V~~ ~~Validation and Verification~~

~~VRTM~~ ~~Verification Requirements Traceability Matrix~~

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~~WJHTC~~ ~~William J. Hughes Technical Center~~

F1.3 Definitions

Old Content: Test and Evaluation Process Guidelines:

F1.3 Definitions

Acceptance Testing	Formal testing conducted to determine whether a system satisfies its acceptance criteria and to enable the customer to determine whether to accept the system.
Analysis	Method of verification that compares hardware or software designs with known scientific and technical principles, technical data or procedures and practices to validate that the proposed design meets with technical requirements.
Anomaly or Failure	Inability of a software or hardware to meet its specified test or operational requirements.
Baseline	A specification or product that has been formally reviewed and agreed upon, that thereafter serves as

	the basis for further development, and that can be changed only through formal change control procedures.
Build Baseline	Software components that have been compiled and formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures.
Case File	A proposal recorded on FAA Form 1800-2 for any change to a baseline document or any deviation from national standards that needs technical concurrence. Prelude to an NCP.
Case File Number	A number assigned through MIS by the preparing organization in accordance with NAS-MD-001. (Example: CFOS500-VSCS-010 CF = Case File, OS500 = organization, VSCS = system, 010 = next number in sequence)
Computer Software Configuration Item (CSCI)	An aggregation of software that is designated for configuration management and treated as a single entity in the configuration management process.
Configuration	The arrangement of a computer system or network as defined by the nature, number, and the chief characteristics of its functional elements. The functional or physical characteristics (or both) of systems hardware/software.
Configuration Control	An element of configuration management, consisting of the evaluation, coordination, approval or disapproval, and implementation of changes to configuration items after formal establishment of their configuration identification.
Configuration Management	A discipline applying technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, record and report change processing and implementation status, and verify compliance with specified requirements.
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.
(COI) Resolved	A decision based on test data that the COI requirement has been met. (e.g., COI: Is the system safe? The COI is resolved if the answer is yes.)
Critical	A critical system performance requirement and its

Performance Parameter (CPP)	associated threshold and objective values. CPPs are specified in the Requirements Attachment (RD) and Exhibit 300 Program Baseline.
Development Test (DT)	A series of tests designed to verify that system technical and performance requirements specified in the contract and system specification have been met. Development Tests are usually performed by the contractor and witnessed by the FAA.
Field Familiarization	Tests conducted at each site by Air Traffic and Technical Operations personnel to verify that the site is ready to switch over to the new system.
Field Site Acceptance Test	Tests performed at operational sites to validate performance prior to operational use.
First Article System	A prototype system upgraded after production award.
First Article Test	Testing of the first subsystem built by the developer. Qualification testing and acceptance testing demonstrations to show compliance with the specification requirements and the SOW.
Function	The purpose for which something is designed or exists (a major element of a system baseline).
Initial Operating Capability (IOC)	IOC is the declaration by site personnel that the system is ready for conditional operational use in the NAS and denotes the end of Field Familiarization at that site.
Independent Operational Test and Evaluation (IOT&E)	A assessment of a new system's operational effectiveness and operational suitability performed by an IOT&E Team on systems designated for IOT&E by the COO.
Interface Control Document (ICD)	The documentation necessary to identify functional and physical characteristics between and within configuration items provided by developers used to resolve problems concerning the specified interfaces.
Joint Resources Council (JRC)	The FAA's body responsible for making corporatelevel decisions. Membership consists of Associate Administrators representing all lines of business of the agency, the FAA Acquisition Executive, the Director of the Office of Financial Services, and Legal Counsel.
Key Site	Field site(s) where OT, and IOT&E for designated programs, is conducted. A first operational NAS site where T&E activity is conducted to verify that HW/SW modification meets user needs. It is the actual environment where the equipment is used.
Measure of	First-level, qualitative decomposition of an

Effectiveness (MOE)	operational effectiveness component associated with a COI.
Measure of Performance (MOP)	Quantitative values that characterize MOEs or MOSs. These values are measurable by a test process.
Measure of Suitability (MOS)	First-level, qualitative decomposition of an operational suitability component associated with a COI.
NAS Change Proposal (NCP)	Proposed changes to the system baseline.
National Airspace System (NAS)	The common network of U.S. airspace; air navigation facilities, equipment and services; airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures; technical information; and manpower and material. Included are system components shared jointly with the military.
Needs and Requirements Defined	New needs identified during the In-Service phase of a system's lifecycle generally originate from the operational environment. Needs which cannot be satisfied at the local level or validated and entered into the national requirement process.
Operational Capability Test/Demonstration (OCT/OCD)	A test performed by the FAA to determine whether a COTS/NDI product meets stipulated NAS requirements.
Operational Effectiveness	The degree to which a product accomplishes its mission when used by representative personnel in the expected operational environment.
Operational Readiness Date (ORD)	The operational readiness date occurs at the end of the Operational Suitability Demonstration (OSD)
Operational Suitability	The degree to which a product intended for field use satisfies its availability, compatibility, transportability, interoperability, reliability maintainability, safety, human factors, logistics supportability, documentation, personnel, and training requirements.
Operational Suitability Demonstration (OSD)	When a system achieves IOC, it enters an OSD. The OSD is a time period during which the system is operated under intense scrutiny.
Operational Test (OT)	A series of tests designed to demonstrate that a new system is operationally effective and operationally suitable for use in the NAS and that all technical and

	performance requirements specified in the Exhibit 300 Program Baseline have been met.
Packaging	A proposition or an offer presented to a CCB for approval, consisting of several items (software or hardware) to be fixed or included in a system baseline.
Peer Review	A review of a product, following defined procedures, by peers of the producers of the product for the purpose of identifying defects and improvements.
Performance Measurements	Verify that the system is operating within performance requirements as outlined in performance criteria. Quantifies the system impact of new functionality.
Plan	A detailed scheme, program, or method worked out beforehand for the accomplishment of an object. A proposed or tentative project or purpose.
Preliminary Design	An informal design that precedes or introduces the main design.
Preliminary Design Review/Critical Design Review (PDR/CDR)	Used by the developers to finalize a new design and insure initial user “buy-in” to the design/development/implementation approach.
Procedure	Subordinate to a process. A set of activities or steps taken to achieve a given purpose. Any specific combination of machines, tools, methods, materials, and/or people employed to develop a work product. Could be used by multiple persons in one group either separately, interleaved, recursively, or concurrently. Some activities transform inputs into outputs needed for other activities.
Process	A description of a course of action to be taken to perform a given task, such as, the flow of a VSCS product from start to finish. Includes multiple persons; could cross multiple groups.
Product	The complete set, or any of the individual items of the set, of computer programs, procedures, and associated documentation and data designated for delivery to a customer or end user.
Production Acceptance Test (PAT)	Contractor-conducted testing performed on each end item before it leaves the factory to verify that the end item conforms to applicable specifications, is free from manufacturing defects, and is substantially identical to the qualified system.
Project	An undertaking requiring concerted effort, which is focused on developing and maintaining a specific

	product. Typically a project includes its own funding, cost, accounting, and delivery schedule.
Project Life Cycle	The period of time that begins when a project plan is conceived and ends when the product produced is no longer in use by the customer.
Program Trouble Report (PTR)	(Sometimes referred to as Problem Trouble Report) Method used to document and report a software anomaly that occurs on a system. It includes a full description of the problem, the operational impact, if any, and the method of recovery and or operational workaround used to recover from the problem.
Project Planning	Determining a method of action or procedure to implement a large or major undertaking, usually one involving considerable money, personnel, and equipment.
Quality	(1) The degree to which a system, component, or process meets specified requirements. (2) The degree to which a system, component, or process meets customer or user needs or expectations.
Quality Assurance	(1) A planned and systematic pattern of all actions necessary to provide adequate confidence that a work product conforms to established technical requirements. (2) A set of activities designed to evaluate the process by which work products are developed and/or maintained.
Requirements Traceability Matrix (RTM)	The project specification RTM details the contractor testing needed to ensure the designed hardware and/or software satisfies the functional and performance requirements in the FAA system/segment project specification.
Scope of Delivery Defined via Stakeholder/User Prioritization	The scope of the project is initially set prior to beginning the development phase and monitored throughout the project. Using the prioritized list (based on stakeholders) and estimated timeframes and costs, a determination is made as to which needs are packaged into the next system release and its proposed release date.
Site Acceptance Test (SAT)	Testing conducted at a field facility, by the vendor, that demonstrates that the system is installed and integrated with other site equipment and is operating properly.
Site Program Bulletin	A directive used to authorize field release of changes to existing software programs, new software packages, and associated documentation.
Stability Testing	Verification that the system operates properly over an

	extended time period (typically run continuously for 48 to 72 hours). To be realistic, a typical “load” on the system is usually applied.
Subsystem	A combination of sets, groups, etc., that performs an operational function within a system and is a major subdivision of the system.
System	A collection of components organized to accomplish a specific function or set of functions.
System Baseline	A set of hardware, software, and documentation configuration items that define a configuration that is adapted or suited to support the function for which the system is designed or exists.
System Development Plan	The collection of plans that describe the activities to be performed for the system release on a project. It governs the management of the activities to be performed.
System Requirement	A condition or capability that must be met or possessed by a system or system component to satisfy a condition or capability needed by a user to solve a problem.
System Requirements Review	A review conducted jointly by users and developers to insure that requirements are documented, understood and prioritized.
System Support Directive	A directive used to authorize field release of changes to existing hardware/software, new hardware/software, and associated documentation. The SSD replaces EEMs, SPBs, etc.
System Test	A series of tests, conducted under the direction of the service organization that are designed to verify that a NAS system meets its specified requirements. The most important subsets of System Test are: Development Test, Operational Test, Production Test, and Site Acceptance Test.
System Testing	A series of tests performed to ascertain the stability, suitability, and functionality of a system.
Task	(1) A sequence of instructions treated as a basic unit of work. (2) A well-defined unit of work in the process that provides management with a visible checkpoint into the status of the project. Tasks have readiness criteria (preconditions) and completion criteria (post-conditions).
Test	Method of verification that measures equipment’s performance under specific configurations and after the controlled application of known stimuli. Results are measured, compared against previous success

	criteria and then evaluated to determine the degree of compliance.
Test Environment	Simulated operational environment used during System Test to revalidate existing performance and verify new functionality/system fixes. Typical parameters/limitations when testing in a simulated operational environment include system size/configuration (# of peripherals, interfaces, etc.), system loading (#/types of stimulus put into system under test), etc.
Test Tools	Automated HW/SW support equipment that allows the re-verification of existing baseline performance and the T&E of new functions/fixes. The thoroughness of the tools and the amount of automation of the tools directly affect the level of verification that can be done in a reasonable timeframe.
Validation	The process of evaluating a system during or at the end of the development process to determine whether it satisfies specified requirements.
Verification	The process of evaluating a system to determine whether the products of a given development phase satisfy the conditions imposed at the start of that phase.

New Content: Test and Evaluation Process Guidelines:

E1.3 Definitions

Acceptance Testing	Formal testing conducted to determine whether a system satisfies its acceptance criteria and to enable the customer to determine whether to accept the system.
Analysis	Method of verification that compares hardware or software designs with known scientific and technical principles, technical data or procedures and practices to validate that the proposed design meets with technical requirements.
Anomaly or Failure	Inability of a software or hardware to meet its specified test or operational requirements.
Baseline	A specification or product that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures.
Build Baseline	Software components that have been compiled and formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that

	can be changed only through formal change control procedures.
Case File	A proposal recorded on FAA Form 1800-2 for any change to a baseline document or any deviation from national standards that needs technical concurrence. Prelude to an NCP.
Case File Number	A number assigned through MIS by the preparing organization in accordance with NAS-MD-001. (Example: CFOS500-VSCS-010 CF = Case File, OS500 = organization, VSCS = system, 010 = next number in sequence)
Computer Software Configuration Item (CSCI)	An aggregation of software that is designated for configuration management and treated as a single entity in the configuration management process.
Configuration	The arrangement of a computer system or network as defined by the nature, number, and the chief characteristics of its functional elements. The functional or physical characteristics (or both) of systems hardware/software.
Configuration Control	An element of configuration management, consisting of the evaluation, coordination, approval or disapproval, and implementation of changes to configuration items after formal establishment of their configuration identification.
Configuration Management	A discipline applying technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, record and report change processing and implementation status, and verify compliance with specified requirements.
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.
(COI) Resolved	A decision based on test data that the COI requirement has been met. (e.g., COI: Is the system safe? The COI is resolved if the answer is yes.)
Critical Performance Parameter (CPP)	A critical system performance requirement and its associated threshold and objective values. CPPs are specified in the Program Requirements Document.
Development Test (DT)	A series of tests designed to verify that system technical and performance requirements specified in the contract and system specification have been met. Development tests are usually performed by the

	contractor and witnessed by the FAA.
Field Familiarization	Tests conducted at each site by Air Traffic and Technical Operations personnel to verify that the site is ready to switch over to the new system.
Field Site Acceptance Test	Tests performed at operational sites to validate performance prior to operational use.
First Article System	A prototype system upgraded after production award.
First Article Test	Testing of the first subsystem built by the developer. Qualification testing and acceptance testing demonstrations to show compliance with the specification requirements and the SOW.
Function	The purpose for which something is designed or exists (a major element of a system baseline).
Initial Operating Capability (IOC)	IOC is the declaration by site personnel that the system is ready for conditional operational use in the NAS and denotes the end of field familiarization at that site.
Independent Operational Test and Evaluation (IOT&E)	A assessment of a new system's operational effectiveness and operational suitability performed by an IOT&E team on systems designated for IOT&E by the COO.
Interface Control Document (ICD)	The documentation necessary to identify functional and physical characteristics between and within configuration items provided by developers used to resolve problems concerning the specified interfaces.
Joint Resources Council (JRC)	The FAA's body responsible for making corporate level decisions. Membership consists of Associate Administrators representing all lines of business of the agency, the FAA Acquisition Executive, the Director of the Office of Financial Services, and Legal Counsel.
Key Site	Field site(s) where OT, and IOT&E for designated programs, is conducted. A first operational NAS site where T&E activity is conducted to verify that HW/SW modification meets user needs. It is the actual environment where the equipment is used.
Measure of Effectiveness (MOE)	First-level, qualitative decomposition of an operational effectiveness component associated with a COI.
Measure of Performance (MOP)	Quantitative values that characterize MOEs or MOSs. These values are measurable by a test process.
Measure of	First-level, qualitative decomposition of an

Suitability (MOS)	operational suitability component associated with a COI.
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Needs and Requirements Defined	New needs identified during in-service management of a product's lifecycle generally originate from the operational environment. Needs which cannot be satisfied at the local level or validated and entered into the national requirement process.
Operational Capability Test/Demonstration (OCT/OCD)	A test performed by the FAA to determine whether a COTS/NDI product meets stipulated NAS requirements.
Operational Effectiveness	The degree to which a product accomplishes its mission when used by representative personnel in the expected operational environment.
Operational Readiness Date (ORD)	The operational readiness date occurs at the end of the operational suitability demonstration (OSD)
Operational Suitability	The degree to which a product intended for field use satisfies its availability, compatibility, transportability, interoperability, reliability maintainability, safety, human factors, logistics supportability, documentation, personnel, and training requirements.
Operational Suitability Demonstration (OSD)	When a system achieves IOC, it enters an OSD. The OSD is a time period during which the system is operated under intense scrutiny.
Operational Test (OT)	A series of tests designed to demonstrate that a new system is operationally effective and operationally suitable for use in the NAS and that all technical and performance requirements specified in the Acquisition Program Baseline.
Packaging	A proposition or an offer presented to a CCB for approval, consisting of several items (software or hardware) to be fixed or included in a system baseline.

Peer Review	A review of a product, following defined procedures, by peers of the producers of the product for the purpose of identifying defects and improvements.
Performance Measurements	Verify that the system is operating within performance requirements as outlined in performance criteria. Quantifies the system impact of new functionality.
Plan	A detailed scheme, program, or method worked out beforehand for the accomplishment of an object. A proposed or tentative project or purpose.
Preliminary Design	An informal design that precedes or introduces the main design.
Preliminary Design Review/Critical Design Review (PDR/CDR)	Used by the developers to finalize a new design and insure initial user “buy-in” to the design/development/implementation approach.
Procedure	Subordinate to a process. A set of activities or steps taken to achieve a given purpose. Any specific combination of machines, tools, methods, materials, and/or people employed to develop a work product. Could be used by multiple persons in one group either separately, interleaved, recursively, or concurrently. Some activities transform inputs into outputs needed for other activities.
Process	A description of a course of action to be taken to perform a given task from start to finish.
Product	The complete set, or any of the individual items of the set, of computer programs, procedures, and associated documentation and data designated for delivery to a customer or end user.
Production Acceptance Test (PAT)	Contractor-conducted testing performed on each end item before it leaves the factory to verify that the end item conforms to applicable specifications, is free from manufacturing defects, and is substantially identical to the qualified system.
Project	An undertaking requiring concerted effort, which is focused on developing and maintaining a specific product. Typically a project includes its own funding, cost, accounting, and delivery schedule.
Project Lifecycle	The period of time that begins when a project plan is conceived and ends when the product produced is no longer in use by the customer.
Program Trouble Report (PTR)	(Sometimes referred to as problem trouble report) Method used to document and report a software anomaly that occurs on a system. It includes a full

	description of the problem, the operational impact, if any, and the method of recovery and or operational workaround used to recover from the problem.
Project Planning	Determining a method of action or procedure to implement a large or major undertaking, usually one involving considerable money, personnel, and equipment.
Quality	(1) The degree to which a system, component, or process meets specified requirements. (2) The degree to which a system, component, or process meets customer or user needs or expectations.
Quality Assurance	(1) A planned and systematic pattern of all actions necessary to provide adequate confidence that a work product conforms to established technical requirements. (2) A set of activities designed to evaluate the process by which work products are developed and/or maintained.
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Stability Testing	Verification that the system operates properly over an extended time period (typically run continuously for 48 to 72 hours). To be realistic, a typical "load" on the system is usually applied.
Subsystem	A combination of sets, groups, etc., that performs an operational function within a system and is a major subdivision of the system.
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Test	Method of verification that measures equipment's performance under specific configurations and after the controlled application of known stimuli. Results are measured, compared against previous success criteria and then evaluated to determine the degree of compliance.
Test Environment	Simulated operational environment used during system test to revalidate existing performance and verify new functionality/system fixes. Typical parameters/limitations when testing in a simulated operational environment include system size/configuration (# of peripherals, interfaces, etc.), system loading (#/types of stimulus put into system under test), etc.
Test Tools	Automated HW/SW support equipment that allows the re-verification of existing baseline performance and the T&E of new functions/fixes. The thoroughness of the tools and the amount of automation of the tools directly affect the level of verification that can be done in a reasonable timeframe.
Validation	Validation demonstrates whether a product or product component will fulfill its specified purpose when placed in any aspect of its intended environment such as operation, training, manufacturing, maintenance, or support services. The methods employed to accomplish validation can be applied to work products as well as to the product or product components.
Verification	Verification ensures that work products (i.e., requirements, designs, and prototypes) meet their specified requirements. Verification is inherently an

	incremental process since it occurs throughout the development of the product and work products – beginning with initial requirements, progressing through subsequent changes, and culminating in verification of the completed product.
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Red Line Content: Test and Evaluation Process Guidelines:

F1E1.3 Definitions

Acceptance Testing	Formal testing conducted to determine whether a system satisfies its acceptance criteria and to enable the customer to determine whether to accept the system.
Analysis	Method of verification that compares hardware or software designs with known scientific and technical principles, technical data or procedures and practices to validate that the proposed design meets with technical requirements.
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(COI) Resolved	A decision based on test data that the COI requirement has been met. (e.g., COI: Is the system safe? The COI is resolved if the answer is yes.)
Critical Performance Parameter (CPP)	A critical system performance requirement and its associated threshold and objective values. CPPs are specified in the <u>Program</u> Requirements Attachment (<u>RDPR</u>) and Exhibit 300 Program Baseline.
Development Test (DT)	A series of tests designed to verify that system technical and performance requirements specified in the contract and system specification have been met. -Development Tests <u>tests</u> are usually performed by the contractor and witnessed by the FAA.
Field Familiarization	Tests conducted at each site by Air Traffic and Technical Operations personnel to verify that the site is ready to switch over to the new system.
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Function	The purpose for which something is designed or exists (a major element of a system baseline).
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Independent Operational Test and Evaluation (IOT&E)	A assessment of a new system's operational effectiveness and operational suitability performed by an IOT&E Team <u>team</u> on systems designated for IOT&E by the COO.
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Needs and Requirements Defined	New needs identified during the Inin- <u>Service phase</u> <u>service management</u> of a system <u>product</u> 's lifecycle generally originate from the operational environment. -Needs which cannot be satisfied at the local level or validated and entered into the national requirement process.
Operational Capability	A test performed by the FAA to determine whether a COTS/NDI product meets stipulated NAS

Test/Demonstration (OCT/OCD)	requirements.
Operational Effectiveness	The degree to which a product accomplishes its mission when used by representative personnel in the expected operational environment.
Operational Readiness Date (ORD)	The operational readiness date occurs at the end of the Operational Suitability Demonstration <u>operational suitability demonstration</u> (OSD)
Operational Suitability	The degree to which a product intended for field use satisfies its availability, compatibility, transportability, interoperability, reliability maintainability, safety, human factors, logistics supportability, documentation, personnel, and training requirements.
Operational Suitability Demonstration (OSD)	When a system achieves IOC, it enters an OSD. -The OSD is a time period during which the system is operated under intense scrutiny.
Operational Test (OT)	A series of tests designed to demonstrate that a new system is operationally effective and operationally suitable for use in the NAS and that all technical and performance requirements specified in the -Exhibit 300 Program Baseline have been met.
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	combination of machines, tools, methods, materials, and/or people employed to develop a work product. -Could be used by multiple persons in one group either separately, interleaved, recursively, or concurrently. -Some activities transform inputs into outputs needed for other activities.
Process	A description of a course of action to be taken to perform a given task, such as, the flow of a VSCS product from start to finish. Includes multiple persons; could cross multiple groups.
Product	The complete set, or any of the individual items of the set, of computer programs, procedures, and associated documentation and data designated for delivery to a customer or end user.
Production Acceptance Test (PAT)	Contractor-conducted testing performed on each end item before it leaves the factory to verify that the end item conforms to applicable specifications, is free from manufacturing defects, and is substantially identical to the qualified system.
Project	An undertaking requiring concerted effort, which is focused on developing and maintaining a specific product. Typically a project includes its own funding, cost, accounting, and delivery schedule.
Project Life Cycle <u>Lifecycle</u>	The period of time that begins when a project plan is conceived and ends when the product produced is no longer in use by the customer.
Program Trouble Report (PTR)	(Sometimes referred to as Problem Trouble Report <u>problem trouble report</u>) Method used to document and report a software anomaly that occurs on a system. -It includes a full description of the problem, the operational impact, if any, and the method of recovery and or operational workaround used to recover from the problem.
Project Planning	Determining a method of action or procedure to implement a large or major undertaking, usually one involving considerable money, personnel, and equipment.
Quality	(1) The degree to which a system, component, or process meets specified requirements. -(2) The degree to which a system, component, or process meets customer or user needs or expectations.
Quality Assurance	(1) A planned and systematic pattern of all actions necessary to provide adequate confidence that a work product conforms to established technical requirements. -(2) A set of activities designed to

	evaluate the process by which work products are developed and/or maintained.
<p>Requirements Traceability Matrix (RTM) The project specification RTM details the contractor testing needed to ensure the designed hardware and/or software satisfies the functional and performance requirements in the FAA system/segment project specification. Scope of Delivery Defined via Stakeholder/User Prioritization The scope of the project is initially set prior to beginning the development phase and monitored throughout the project. Using the prioritized list (based on stakeholders) and estimated timeframes and costs, a determination is made as to which needs are packaged into the next system release and its proposed release date.</p> <p>Site Acceptance Test (SAT)</p>	<p>Testing conducted at a field facility, by the vendor, that demonstrates that the system is installed and integrated with other site equipment and is operating properly.</p>

Site Program Bulletin	A directive used to authorize field release of changes to existing software programs, new software packages, and associated documentation.
Stability Testing	Verification that the system operates properly over an extended time period (typically run continuously for 48 to 72 hours). To be realistic, a typical “load” on the system is usually applied.
Subsystem	A combination of sets, groups, etc., that performs an operational function within a system and is a major subdivision of the system.
System	A collection of components organized to accomplish a specific function or set of functions.
System Baseline	A set of hardware, software, and documentation configuration items that define a configuration that is adapted or suited to support the function for which the system is designed or exists.
System Development Plan	The collection of plans that describe the activities to be performed for the system release on a project. -It governs the management of the activities to be performed.
System Requirement	A condition or capability that must be met or possessed by a system or system component to satisfy a condition or capability needed by a user to solve a problem.
System Requirements Review	A review conducted jointly by users and developers to insure that requirements are documented, understood and prioritized.
System Support Directive	A directive used to authorize field release of changes to existing hardware/software, new hardware/software, and associated documentation. The SSD replaces EEMs, SPBs, etc.
System Test A series of tests, conducted under the direction of the service organization that are designed to verify that a NAS system meets its specified requirements. The most important subsets of System Test are:	(1) A sequence of instructions treated as a basic unit of work. (2) A well-defined unit of work in the process that provides management with a visible checkpoint into the status of the project. -Tasks have readiness criteria (preconditions) and completion criteria (post-conditions).

Development Test, Operational Test, Production Test, and Site Acceptance Test. System Testing A series of tests performed to ascertain the stability, suitability, and functionality of a system. Task	
Test	Method of verification that measures equipment's performance under specific configurations and after the controlled application of known stimuli. Results are measured, compared against previous success criteria and then evaluated to determine the degree of compliance.
Test Environment	Simulated operational environment used during System Test <i>system test</i> to revalidate existing performance and verify new functionality/system fixes. Typical parameters/limitations when testing in a simulated operational environment include system size/configuration (# of peripherals, interfaces, etc.), system loading (#/types of stimulus put into system under test), etc.
Test Tools	Automated HW/SW support equipment that allows the re-verification of existing baseline performance and the T&E of new functions/fixes. The thoroughness of the tools and the amount of automation of the tools directly affect the level of verification that can be done in a reasonable timeframe.
Validation	The Validation process <i>demonstrates whether a product or product component will fulfill its specified purpose when placed in any aspect of evaluating a system its intended environment during such as operation, training, manufacturing, maintenance, or at support the services. The end of the development methods employed to accomplish process validation can be applied to determine whether it satisfies specified work products as well as requirements to the product or product components.</i>
Verification	The <i>Verification ensures that work products (i.e.,</i>

	<p><u>requirements, designs, and prototypes) meet their specified requirements. Verification is inherently an incremental process of evaluating a system to determine whether since it occurs throughout the development of the product and work products of a given development beginning with initial phase requirements, satisfy the conditions progressing through subsequent imposed changes, at the and culminating start in verification of that the phase completed product.</u></p>
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BACKGROUND

Old Content: Test and Evaluation Process Guidelines: BACKGROUND

On April 1, 1996, the Federal Aviation Administration adopted an Acquisition Management System (AMS) that relies on teamwork and team competency to manage the development and acquisition of systems and other products for the National Airspace System (NAS). The AMS minimizes policy and relies on the prudent application of guidance, best practices, and lessons learned from previous and ongoing investment programs.

The AMS empowers service organizations to decide how NAS systems will be acquired and how requirements will be verified or tested. These decisions are subject to minimal oversight outside service organization management structures. The service organizations fully integrate the acquiring and user organizations into a singular partnership structure that can make both corporate and program decisions. Its purpose is to build quality and achieve consensus using cross-functional teams supported by proven guidance, structured templates, and best practices as learned from the most successful investment programs.

This guidance document provides a sound foundation for planning and executing Test and Evaluation activities appropriate to each individual investment program.

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Section 1 : PURPOSE

Old Content: Test and Evaluation Process Guidelines:
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This document provides Test and Evaluation (T&E) guidance in support of the Federal Aviation Administration (FAA) Acquisition Management System (AMS). This document will be updated throughout its lifetime, as better practices are identified and new lessons are learned. Document users are encouraged to submit comments, lessons learned, and any data that may improve this document to the Acquisition Planning and Policy Division. The latest version of this document, and all referenced AMS documents, are available in the FAA Acquisition System Toolset (FAST). FAST can be found on the internet at <http://fast.faa.gov>

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Section 3.1.2 : Final Investment Analysis

Old Content: Test and Evaluation Process Guidelines:

Section 3.1.2 : Final Investment Analysis

Final Investment Analysis focuses on detailed planning for the selected solution for implementation. A tailored test strategy is developed and included in Part 1 of the ISP. Implementing the test strategy is described in Part 2 of the ISP. An Operational Capability Test (OCT) or Operational Capability Demonstration (OCD) may be conducted to verify requirements or select a particular COTS/NDI product. An OCT/OCD should address maintainability and human factors requirements; the information obtained may allow a reduction in the required testing. Vendor data may be used to reduce FAA test efforts for commercial products. (Plans to use vendor test data in place of FAA tests and the rationale for doing so should be identified in the ISP.)

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Section 3.2.1.1 : SI Needs and Requirements

Old Content: Test and Evaluation Process Guidelines:
Section 3.2.1.1 : SI Needs and Requirements

Early SI phase test activities focus on the definition of test-related program needs and requirements. This definition provides the basis for developing the schedule, resources, and scope of all testing activities throughout the acquisition management lifecycle. The key documents and elements that require inputs from the test activity are the Exhibit 300 Program Baseline, COIs/CPPs, Statement of Work, and specification. These test activities address requirements testability, definition of test requirements and strategies, definition of test tools, assessment of feasibility of candidate solutions, and support of contract award.

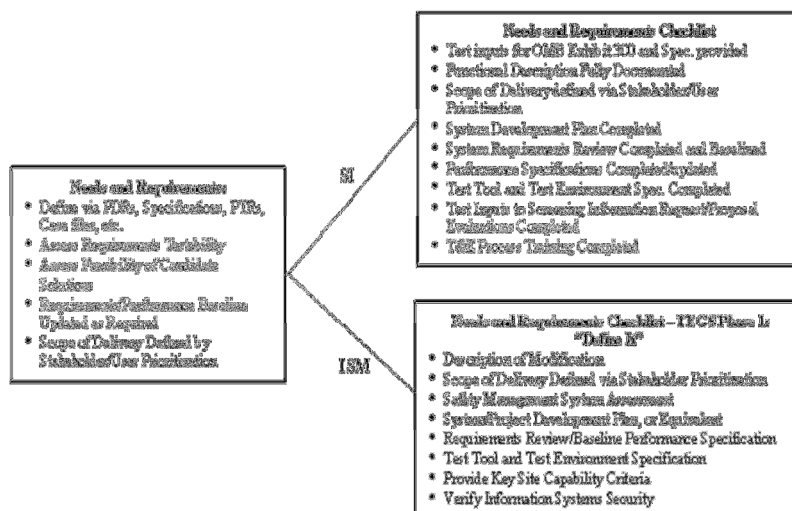


Figure 3.2-3: SI/ISM Needs and Requirements Checklist

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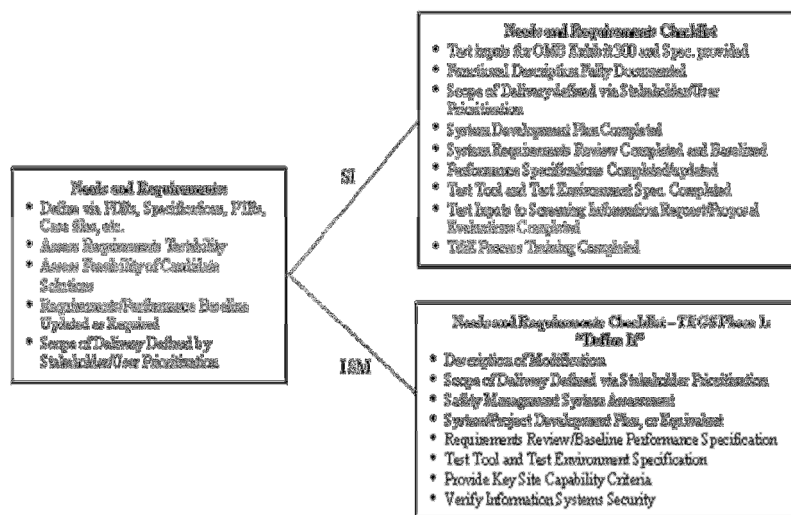


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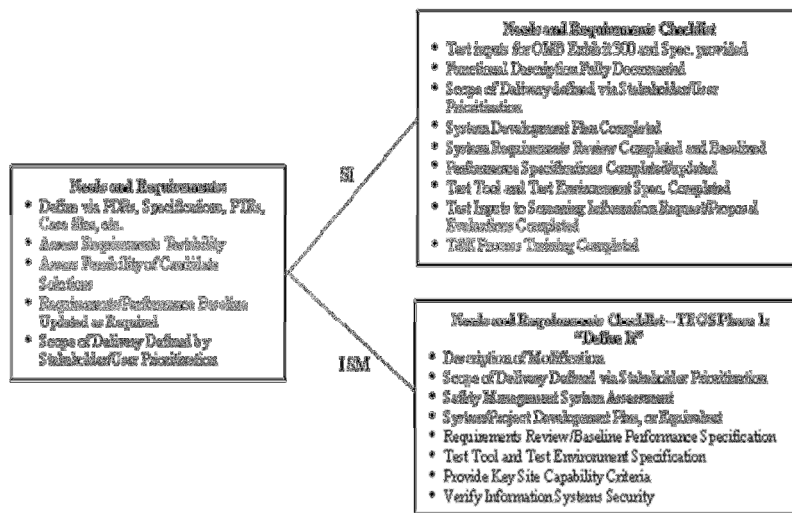


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Section 3.2.1.2 : ISM Needs and Requirements (TEGS Phase 1:

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.1.2 : ISM Needs and Requirements (TEGS Phase 1:

Needs identified during the ISM phase of a system's lifecycle originate from the operational environment while the system is sustained in an operational state. Case files (or new needs) can also be initiated by the operational support activity. These needs are subjected to various levels of screening and validation at the local level and throughout the FAA. Needs that cannot be satisfied at the local level are validated and entered into the national requirements process.

Due to the complex nature of the NAS, operators and maintainers may encounter system problems that require a change to the system, the baseline, or an adaptable parameter. This is identified via a Program Trouble Report (PTR), Hardware Discrepancy Report (HDR), or an equivalent. The PTR documents the need for the change, and the identified problem is researched to determine if the system is actually operating within its established baseline. Changes to the baseline are normally handled via the NCP/case file. The NCP process can be initiated at any level and may address changes of any magnitude. If the system were determined to be operating within its baseline, the PTR would be closed, and the originator would be advised that a system baseline change would be necessary to address the identified need.

When an NCP is approved, the implementing service organization receives a Configuration Control Decision (CCD). A functional description is written to describe how the CCD will be implemented. The functional description includes, at a minimum, a statement of the problem, expected outcomes, description of interfaces, and subsystem performance

parameters. Unique test criteria/scenarios will be identified and applied later in the ISM test process. The creation of a specific method of testing a requirement may be deferred until the design (Preliminary Design Review (PDR)/Critical Design Review (CDR) and Peer Review) is formulated. It is the responsibility of service organizations to ensure the functional description is structured so that requirements are verifiable.

The Test and Evaluation Gold Standard and Implementation Guide defines those activities to be addressed during ISM Needs and Requirements (TEGS Phase 1: “Define It”). A system development plan is developed to plan and track the system throughout its lifecycle. It defines the purpose, scope, organizational roles and responsibilities, estimates, resources, schedules, known risks, test environment, and test tools.

System requirements are evaluated through the System Requirements Review. This review will ensure that the requirements are clearly understood. It will also identify any deviations from the specifications, which are documented and addressed in the Baseline Performance Specification. Prior to moving into the Design and Development phase, the test tool and test environment specification documentation is complete, thereby ensuring that necessary tools and configurations are available to test effectively. Key site (back-up and primary) selection activities will be initiated based on requirements to be tested, HW/SW configuration, and/or availability of the system in the operational environment.

All proposed changes to the NAS should be evaluated to ensure they do not adversely affect the safety or security of the system.

New Content: Test and Evaluation Process Guidelines:
Section 3.2.1.2 : ISM Needs and Requirements (TEGS Phase 1:

Needs identified during ISM originate from the operational environment while the asset is sustained in an operational state. Case files (or new needs) can also be initiated by the operational support activity. These needs are subjected to various levels of screening and validation at the local level and throughout the FAA. Needs that cannot be satisfied at the local level are validated and entered into the national requirements process.

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Section 3.2.2 : Design and Development

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.2 : Design and Development

Figure 3.2-4 identifies associated processes and criteria for the Design and Development activities within the SI and ISM phases of the AMS. The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria.

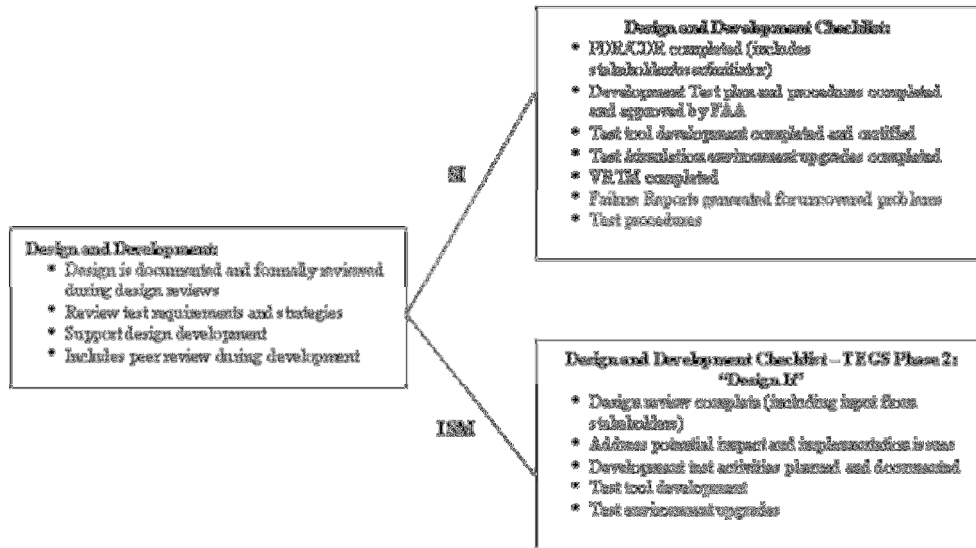


Figure 3.2-4: Design and Development Checklist

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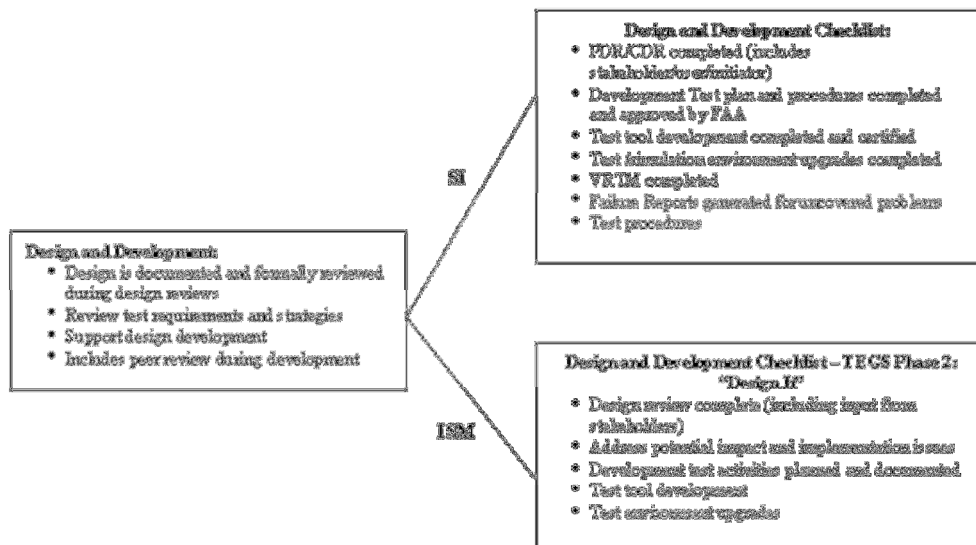


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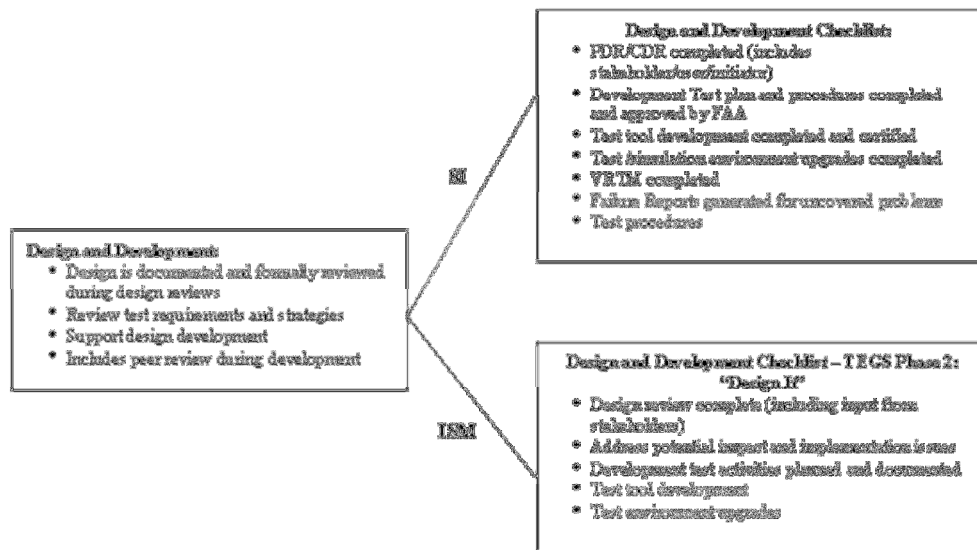


Figure 3.2-4: Design and Development Checklist

Section 3.2.2.1 : SI Design and Development

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Section 3.2.2.1 : SI Design and Development**

Most large acquisitions are designed and developed by a prime contractor and monitored by the FAA. The contractor conducts the PDR and CDR. At both reviews, the contractor presents the planned test strategy to the FAA. The contractor will then develop test documentation for approval by the FAA. It will consist of the test plans and procedures that will be used by the contractor during the conduct of Development Test. FAA test personnel carefully review these documents and all other pertinent documents to ensure preparations for Development Test are being addressed properly. As the design phase continues, other test activities associated with Development Test are also conducted by the contractor and approved by the FAA. They include development of test tools, establishment of the test environment, simulation of external interfaces, development of the Verification Requirements Traceability Matrix (VRTM), and issuance of initial failure reports and final test reports.

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Section 3.2.2.2 : ISM Design and Development (TEGS Phase 2: "Design It")

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.2.2 : ISM Design and Development (TEGS Phase 2: "Design It")

The primary test-related activities that occur during the Design and Development phase are detailed test planning, PDR, and CDR. These reviews are used to finalize design, ensure initial user agreement, and present proposed test strategies. The service organization coordinates the appropriate user and stakeholder involvement in PDR/CDR activities based on the complexity and impact of the functional changes.

Detailed test planning includes the development of test plans and creation of any needed test tools and test environments. The thoroughness of these test tools directly affects the level of verification that can be accomplished in a reasonable timeframe. The test tools and test

environment should allow for maximum verification of the system prior to operational use. The Test and Evaluation Gold Standard and Implementation Guide defines the activities addressed during ISM Design and Development (TEGS Phase 2: “Design It”).

New Content: Test and Evaluation Process Guidelines:

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Section 3.2.3 : Development Test

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.3 : Development Test

Figure 3.2-5 identifies associated processes and criteria for Development Test activities within the SI and ISM phases of the AMS. The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria.



Figure 3.2-5: SI/ISM Development Test Checklist

New Content: Test and Evaluation Process Guidelines:
Section 3.2.3 : Development Test

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Section 3.2.3 : Development Test

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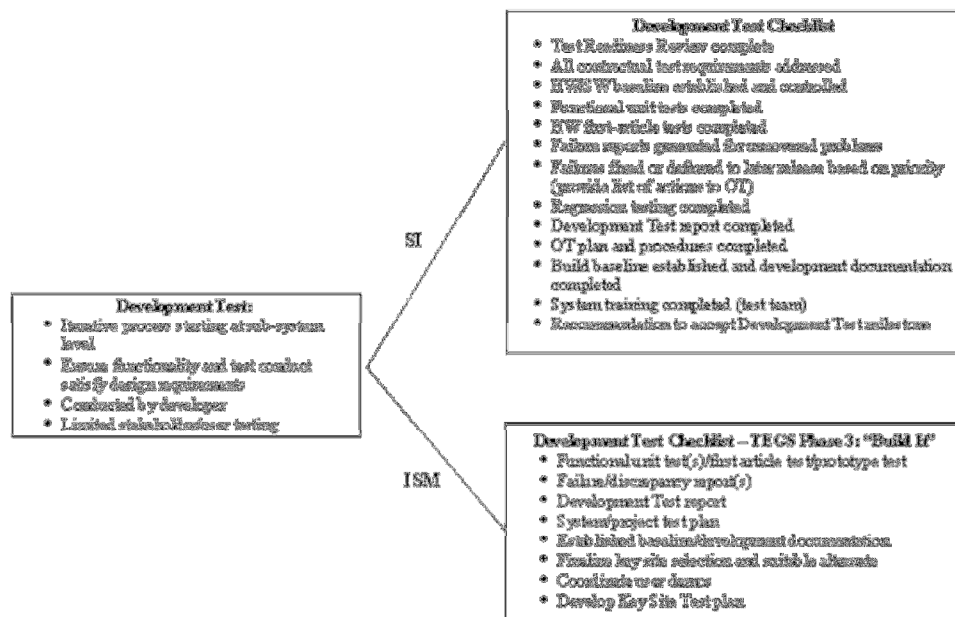


Figure 3.2-5: SI/ISM Development Test Checklist

Section 3.2.3.2 : ISM Development Test (TEGS Phase 3: "Build It")

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.3.2 : ISM Development Test (TEGS Phase 3: "Build It")

ISM Development Test is performed to verify the modification meets specified requirements and interrelated functions are not adversely affected. These test activities include functional unit tests and/or first-article tests that ensure the modification works as designed and is in compliance with the specification requirement. The service organization, users, and stakeholders determine if demonstrations are required to ensure the design meets user needs. At the completion of Development Test, a build baseline is established. The development of functional certification procedures for the packaged system will commence and be finalized in later test phases. The Test and Evaluation Gold Standard and Implementation Guide defines the activities to be addressed during ISM Development Test (TEGS Phase 3: "Build It").

New Content: Test and Evaluation Process Guidelines:

Section 3.2.3.2 : ISM Development Test (TEGS Phase 3):

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Red Line Content: Test and Evaluation Process Guidelines:

Section 3.2.3.2 : ISM Development Test (TEGS Phase 3): ~~"Build It"~~

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Section 3.2.4 : SI Operational Test and ISM System Test

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.4 : SI Operational Test and ISM System Test

Figure 3.2-6 identifies processes and criteria for the SI Operational Test and ISM System Test activities. The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria.

New Content: Test and Evaluation Process Guidelines:

Section 3.2.4 : SI Operational Test and ISM System Test

Figure 3.2-6 identifies processes and criteria for the SI operational test and ISM system test activities. The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria.

Red Line Content: Test and Evaluation Process Guidelines:

Section 3.2.4 : SI Operational Test and ISM System Test

Figure 3.2-6 identifies processes and criteria for the SI ~~Operational Test~~ operational test and ISM ~~System Test~~ system test activities. -The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria.

Section 3.2.4.1 : SI Operational Test

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.4.1 : SI Operational Test

The primary objective of OT is to demonstrate that a new system is operationally effective and operationally suitable for use in the NAS and that the NAS infrastructure is ready to accept the system. These tests focus on demonstrating that operational requirements have been met and all COIs and CPPs have been satisfied. OT is conducted at WJHTC or a field site using field personnel.

The major components of OT are integration tests, performance tests, effectiveness tests, and suitability tests. Integration testing performed during OT verifies that the system interfaces with existing elements of the NAS and the NAS can operate with the new subsystem at the required performance levels. Interface testing with future NAS elements may be provided through the use of simulators, where warranted.

Effectiveness testing performed during OT evaluates the degree to which a product accomplishes its mission when used by representative personnel in the expected operational environment. This testing includes capacity and NAS loading, degraded mode operations, safety, security, and transition switchover. Field personnel often operate the equipment for

some of these tests because they are the most representative operators; it also helps them become familiar with the system. This approach reduces the learning curve and minimizes disruption during system installation in the field. Effectiveness and suitability T&E may continue at the key site (or key sites) if a complete assessment cannot be accomplished at WJHTC. OT effectiveness testing also assesses COIs.

OT suitability testing evaluates the degree to which a product intended for field use satisfies its availability, compatibility, interoperability, reliability, maintainability, safety, and human factors requirements. In addition, logistics supportability, documentation, certification criteria, system installation, and operating procedures, and transition and training requirements, are validated. OT suitability testing also includes an assessment of the COIs.

For designated programs, after the successful conclusion of OT, the Vice President of the implementing service organization declares the system ready for IOT&E via the IOT&E Readiness Declaration (IOTRD). The IOTRD addresses the IOT&E prerequisites/requirements as detailed in the T&E section of the ISP. (See Appendix C-11 for a sample IOTRD template.)

New Content: Test and Evaluation Process Guidelines:
Section 3.2.4.1 : SI Operational Test

The primary objective of OT is to demonstrate that a new product is operationally effective and operationally suitable for use in the NAS and that the NAS infrastructure is ready to accept the product. These tests focus on demonstrating that operational requirements have been met and all COIs and CPPs have been satisfied. OT is conducted at WJHTC or a field site using field personnel.

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Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.4.1 : SI Operational Test

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Section 3.2.4.2 : ISM System Test (TEGS Phase 4):

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.4.2 : ISM System Test (TEGS Phase 4):

ISM System Test is conducted to ensure the modification is ready for use in the NAS. The major components of the ISM System Test are integration tests, operational effectiveness tests, and operational suitability tests. System Test is performed independent of the developer, under conditions that simulate the operational environment as closely as possible. The user community will participate in operational suitability test activities during this phase as required. Features/performance that cannot be fully verified during this phase of T&E are deferred to the Key Site Test. Test procedures to be used during the Key Site Test and Field Familiarization are refined during this phase of testing.

ISM integration test includes baseline performance and validation of new functionality and existing system functionality. It also verifies that the modified system interfaces with the existing elements of the NAS as specified by the Interface Control Document. Performance measurements are taken to verify the system is operating in accordance with established baselines.

The ISM operational effectiveness testing evaluates the degree to which the modified system accomplishes its mission. This testing includes capacity and loading, degraded mode operations, safety, security, and system and support system regression. Field personnel often operate the equipment for some of these tests because they are the most representative operators; it also helps them become familiar with the system.

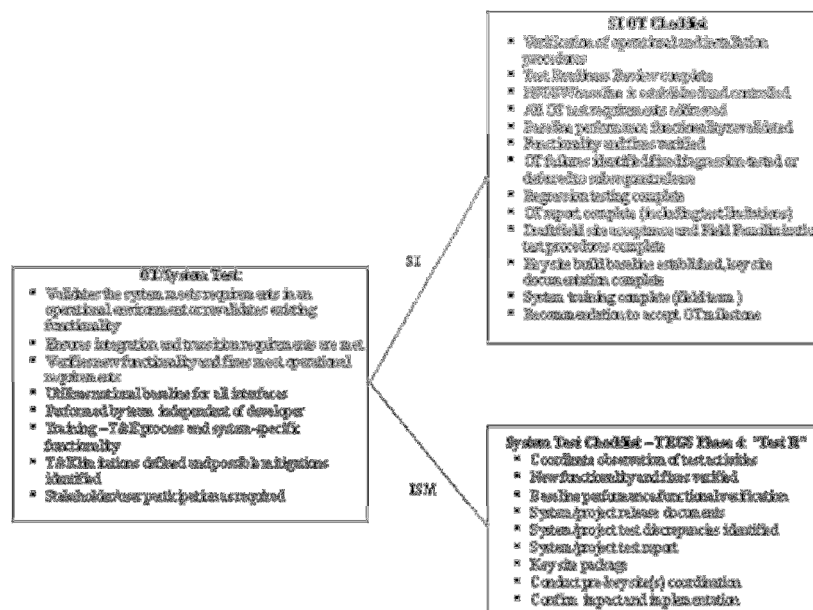


Figure 3.2-6: SI Operational Test and ISM System Test Checklist

ISM operational suitability testing evaluates the degree to which the new modification satisfies its availability, compatibility, interoperability, reliability, maintainability, safety, and human factors requirements. In addition, logistics supportability, documentation, certification criteria, and training requirements are validated. The service organization often conducts ISM suitability tests with support from the stakeholders.

When abnormalities are identified during ISM System Test, a determination is made by the service organization, users, and stakeholders to either fix the anomaly prior to release or defer it to a future release. These decisions are documented in the System Test report. The results of the ISM System Test activities, including test limitations, are documented in Appendix 1 of the System Support Modification (SSM). Effectiveness and suitability T&E may be continued at the key site(s) if a complete assessment cannot be accomplished at WJHTC.

Coordination with management and national union leadership regarding impact and implementation issues related to the modification should be finalized during this phase.

The Test and Evaluation Gold Standard and Implementation Guide defines those activities to be addressed during ISM System Test (TEGS Phase 4: "Test It").

New Content: Test and Evaluation Process Guidelines:
Section 3.2.4.2 : ISM System Test (TEGS Phase 4):

ISM system test is conducted to ensure the modification is ready for use in the NAS. The major components of the ISM system test are integration tests, operational effectiveness tests, and operational suitability tests. System test is performed independent of the developer, under conditions that simulate the operational environment as closely as possible. The user community will participate in operational suitability test activities during this phase as required. Features/performance that cannot be fully verified during this phase of T&E are deferred to the key site test. Test procedures to be used during the key site test and field familiarization are refined during this phase of testing.

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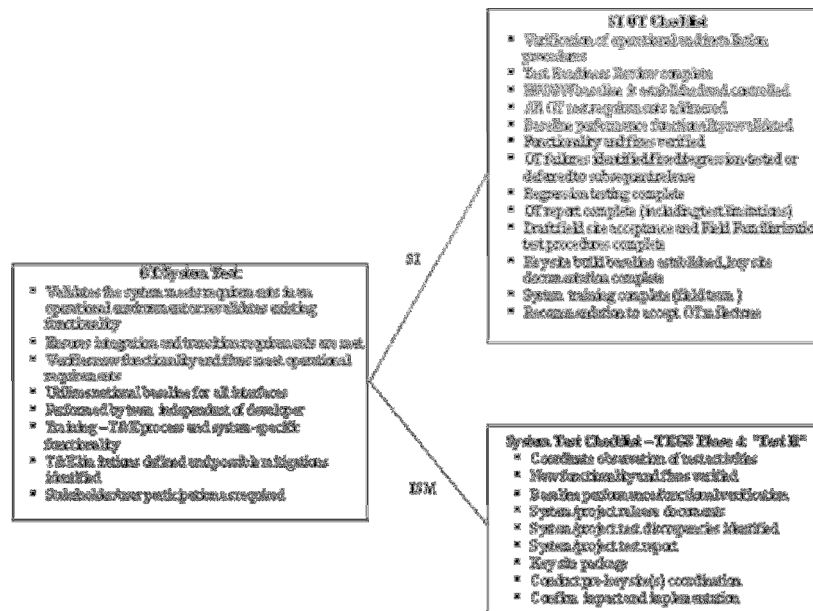


Figure 3.2-6: SI Operational Test and ISM System Test Checklist

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Coordination with management and national union leadership regarding impact and implementation issues related to the modification should be finalized during this phase.

The Test and Evaluation Gold Standard and Implementation Guide defines those activities to be addressed during ISM system test (TEGS Phase 4: "Test It").

Red Line Content: Test and Evaluation Process Guidelines:
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Coordination with management and national union leadership regarding impact and implementation issues related to the modification should be finalized during this phase.

The Test and Evaluation Gold Standard and Implementation Guide defines those activities to be addressed during ISM ~~System Test~~system test (TEGS Phase 4: "Test It").

Section 3.2.5 : Site Tests

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.5 : Site Tests

Figure 3.2-7 identifies associated processes and criteria for the site test activities within the SI and ISM phases of the AMS. The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria.

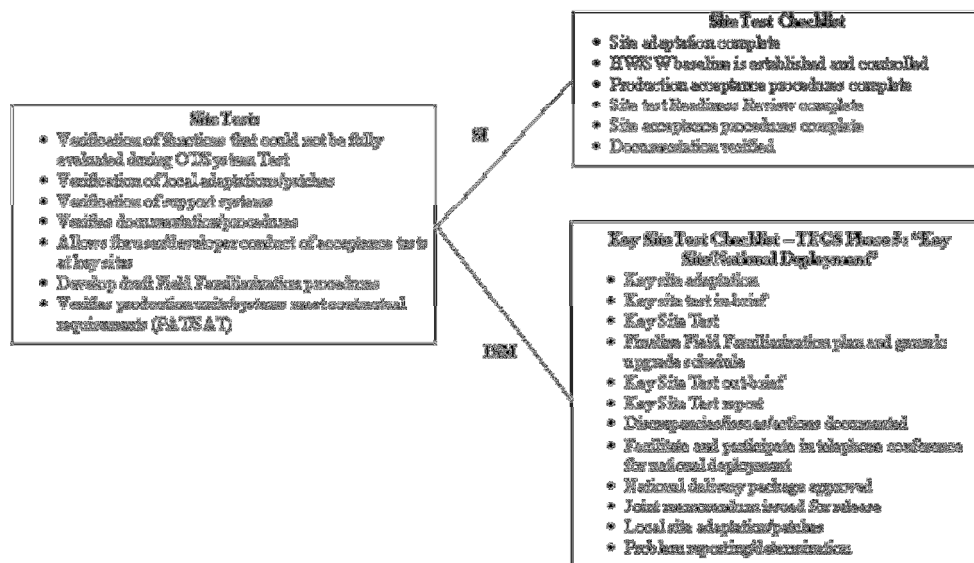


Figure 3.2-7: SI/ISM Site Test Checklist

New Content: Test and Evaluation Process Guidelines:

Section 3.2.5 : Site Tests

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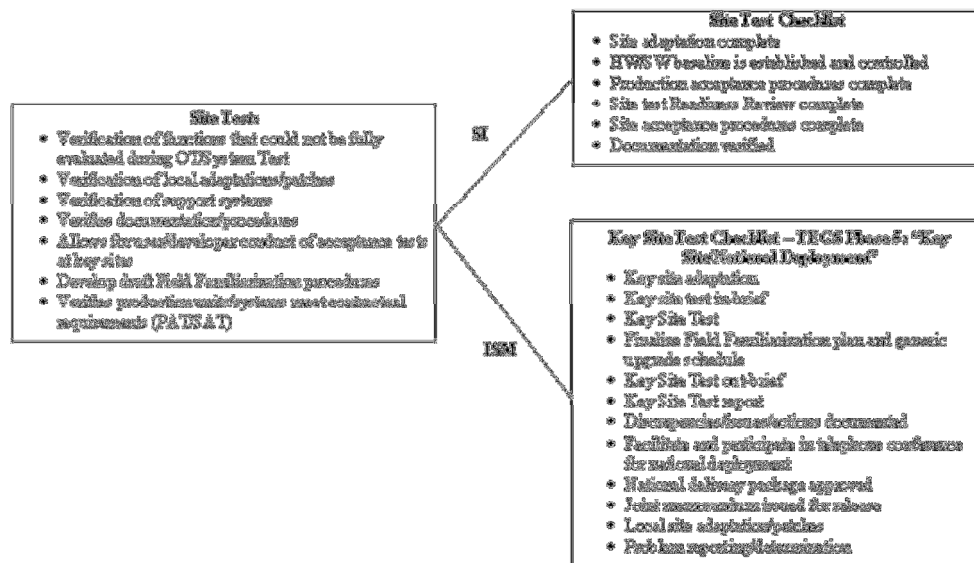


Figure 3.2-7: SI/ISM Site Test Checklist

**Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.5 : Site Tests**

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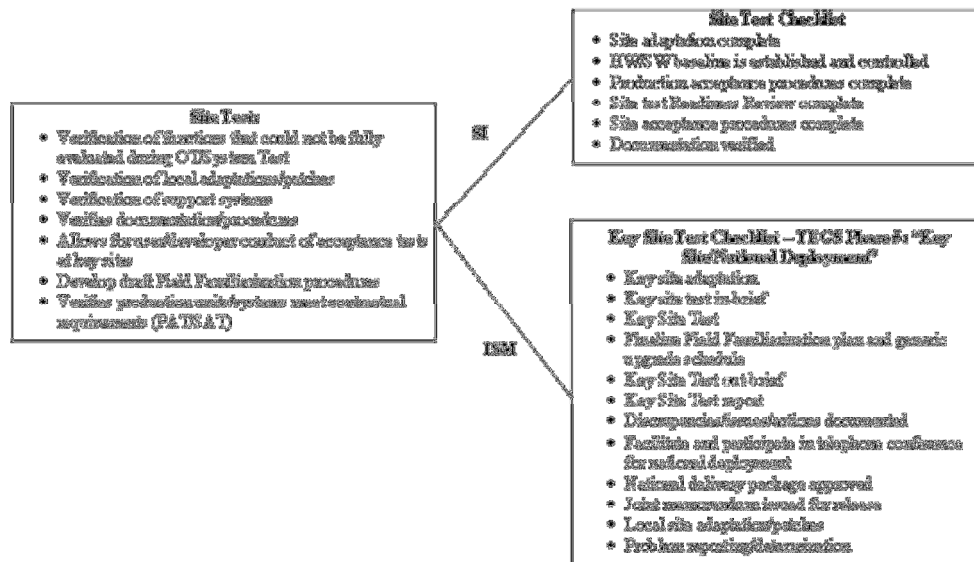


Figure 3.2-7: SI/ISM Site Test Checklist

Section 6.1.1 : Attachment 1: Program Requirements

Old Content: Test and Evaluation Process Guidelines:
Section 6.1.1 : Attachment 1: Program Requirements

The PR (Exhibit 300 Program Baseline: Attachment 1) establishes the performance baseline and operational framework required by the sponsoring line of business. Air Traffic Organization Vice Presidents (or non-Air Traffic Organization Directors of organizations with the mission need) and the operating service organization(s) approve the PR Attachment and all changes to it. The PR Attachment identifies the operational requirements and COIs that must be resolved as a basis for the ISD. The FAST template for the PR Attachment provides detailed information on the document's T&E content.

New Content: Test and Evaluation Process Guidelines:
Section 6.1.1 : Program Requirements Document

The Program Requirements establishes the performance baseline and operational framework required by the sponsoring line of business. Air Traffic Organization Vice Presidents (or non-Air Traffic Organization Directors of organizations with the mission need) and the operating service organization(s) approve the PRD and all changes to it. The PRD identifies the operational requirements and COIs that must be resolved as a basis for the ISD. The FAST template for the PRD provides detailed information on the document's T&E content.

Red Line Content: Test and Evaluation Process Guidelines:
Section 6.1.1 : ~~Attachment 1~~: Program Requirements Document

The Program ~~PR~~Requirements document (Exhibit 300 Program Baseline: Attachment 1) establishes the performance baseline and operational framework required by the sponsoring line of business. -Air Traffic Organization Vice Presidents (or non-Air Traffic Organization Directors of organizations with the mission need) and the operating service organization(s) approve the PR ~~Attachment~~attachment and all changes to it. -The PR ~~Attachment~~attachment identifies the operational requirements and COIs that must be resolved as a basis for the ISD. -The FAST template for the PR ~~Attachment~~attachment provides detailed information on the document's T&E content.

Section 6.3.1 : Description of Modification

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.1 : Description of Modification

A Description of Modification describes the requested change to the system/project baseline. The description establishes a foundation used to verify requirements during development and system testing. The specific method of verifying a requirement may be deferred or changed until the design is formulated.

While documenting the description of the change and expected outcomes, consideration should be given to specific testing criteria/scenarios to be applied later in formal testing. Stakeholders (e.g., development and test) should be involved to ensure the description is structured so that requirements are verifiable.

Consideration should be given to the following items when developing a Description of Modification:

- Identification of the change (CCD number, case file number, PTR/HDR number, etc.)
- Statement of the problem or issue being addressed
- Description of the change and expected outcomes to be generated
- Listing of equipment and human interfaces
- Any system performance parameters affected (expected results/impact)

New Content: Test and Evaluation Process Guidelines:

Section 6.3.1 : Description of Modification

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Red Line Content: Test and Evaluation Process Guidelines:
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Section 6.3.2 : System/Project Development Plan
Old Content: Test and Evaluation Process Guidelines:
Section 6.3.2 : System/Project Development Plan

To plan and track progress throughout the lifecycle of the intended modification, a system/project development plan, or equivalent, should be documented and baselined in this phase.

Consideration should be given to the following items when developing a system/project development plan:

- Purpose and scope
- Description of Modification

- Task definition
- Lifecycle approach used to develop or maintain the system/project
- Organization roles and responsibilities
- Estimates and basis of estimates
- Schedule for the system/project (start date, milestones, review points, finish date)
- Critical computer resources
- Facilities and tools to support the project
- Risk management (assessment of risk)
- Status reporting

New Content: Test and Evaluation Process Guidelines:

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- Facilities and tools to support the project
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Section 6.3.3 : Test Tool and Test Environment Specification

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.3 : Test Tool and Test Environment Specification

The tools and configurations required to test effectively are documented in the test tool and test environment specification documents. This specification also identifies any tools that should be upgraded to support the test effort. It is important to identify the test tools early to properly support the tests in future phases. In addition, the test environment (including specific requirements to simulate the field environment), and lab requirements should be defined and documented.

New Content: Test and Evaluation Process Guidelines:

Section 6.3.3 : Test Tool and Test Environment Specification

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Red Line Content: Test and Evaluation Process Guidelines:

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Section 6.3.4 : Development Test Activities Planned and Documented

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.4 : Development Test Activities Planned and Documented

Development Test activities planned and documented identifies test activities, resource requirements, schedules/milestones, and describes the technical and performance requirements evaluated during the “Build It” phase. The developer is responsible for ensuring a Development Test plan is completed prior to entering the “Build It” phase of the modification. This plan may be a stand-alone document or included as part of the system/project test plan.

Consideration should be given to the following items when planning and documenting Development Test activities:

- Task definition and scope (including Development Test plan, goals, and objectives, as well as a description of the tests to be conducted)
- Organization roles and responsibilities
- Schedule and resource needs (document in detail the rationale that validates resources needed)
- Testing tasks describing how the testing will take place and evaluation criteria (e.g., how is it determined the test is successful?) risks and contingencies
- Test deliverables (e.g., test documents and test data/results of the test)

New Content: Test and Evaluation Process Guidelines:

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-

Section 6.3.5 : Failure/Discrepancy Reports

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.5 : Failure/Discrepancy Reports

Reports are issued for all problems discovered during the “Build It” phase. These reports can be in the form of failure reports, discrepancy reports, or the equivalent, and should include identified problems and the associated resolution. Failures or discrepancies are tracked until dispositions are documented for each. Any failures or discrepancies in test tool development should also be noted. Stakeholders may be involved to determine the priority of any deferred failures or discrepancies.

Consideration should be given to the following items when developing a failure/discrepancy report:

- Project or system identification
- Requirement impacted
- Description of failure/discrepancy and associated resolution
- Severity of the problem
- Impact of the problem

New Content: Test and Evaluation Process Guidelines:

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Red Line Content: Test and Evaluation Process Guidelines:
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- Impact of the problem

Section 6.3.6 : Development Test Report

Old Content: Test and Evaluation Process Guidelines:
Section 6.3.6 : Development Test Report

At the conclusion of test activities, a Development Test report, or the equivalent, is created. This report documents the tests performed and the results and data collected, as well as data reduction and analysis. Any conclusions or recommendations drawn from the test data are also included in the report. A Project/Team Lead or Manager should review the Development Test report.

Consideration should be given to the following items when creating a Development Test report:

- Modification and release identification
- Description of test conducted
- Schedule, location, and participants
- Data collection and analysis method
- Test results, conclusions, and recommendations

New Content: Test and Evaluation Process Guidelines:
Section 6.3.6 : Development Test Report

At the conclusion of test activities, a development test report, or the equivalent, is created. This report documents the tests performed and the results and data collected, as well as data reduction and analysis. Any conclusions or recommendations drawn from the test data are also included in the report. A project/team lead or manager should review the development test report.

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Red Line Content: Test and Evaluation Process Guidelines:
Section 6.3.6 : Development Test Report

At the conclusion of test activities, a ~~Development Test~~development test report, or the equivalent, is created. -This report documents the tests performed and the results and data collected, as well as data reduction and analysis. -Any conclusions or recommendations drawn from the test data are also included in the report. -A ~~Project~~project/~~Team~~team ~~Lead~~lead or ~~Manager~~manager should review the ~~Development Test~~development test report.

Consideration should be given to the following items when creating a ~~Development~~development ~~Test~~test report:

- Modification and release identification
- Description of test conducted
- Schedule, location, and participants
- Data collection and analysis method
- Test results, conclusions, and recommendations

Section 6.3.7 : System/Project Test Plan

Old Content: Test and Evaluation Process Guidelines:
Section 6.3.7 : System/Project Test Plan

A system/project test plan, or equivalent, contains information such as test strategies and resource requirements, as well as a description of the tests to be performed during System Test.

Consideration should be given to the following items when developing a system/project test plan:

- *Task definition and scope (including system/project test goals and objectives, as well as a description of the tests to be conducted)*
- *Organization roles and responsibilities for test*
- *Schedule and staffing needs*
- *Testing tasks and evaluation criteria (e.g., requirements under test)*
- *Risks and contingencies*
- *Test deliverables (e.g., test documents and test data/results of the test)*

New Content: Test and Evaluation Process Guidelines:
Section 6.3.7 : System/Project Test Plan

A system/project test plan, or equivalent, contains information such as test strategies and resource requirements, as well as a description of the tests to be performed during system test.

Consideration should be given to the following items when developing a system/project test plan:

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- *Risks and contingencies*
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Red Line Content: Test and Evaluation Process Guidelines:
Section 6.3.7 : System/Project Test Plan

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Consideration should be given to the following items when developing a system/project test plan:

- *Task definition and scope (including system/project test goals and objectives, as well as a description of the tests to be conducted)*
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- *Schedule and staffing needs*

- Testing tasks and evaluation criteria (e.g., requirements under test)
- Risks and contingencies
- Test deliverables (e.g., test documents and test data/results of the test)

Section 6.3.8 : Baseline Established/Development Documentation

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.8 : Baseline Established/Development Documentation

A baseline for the modification that incorporates changes is established at the end of the “Build It” phase. All changes to the baseline should follow the Configuration Management practices of the respective organization. In addition, development documentation is completed before performing System Test. This documentation includes system documentation, such as specifications, National Airspace System Maintenance Documents, design data, plans, and any additional documentation required for the system/project.

New Content: Test and Evaluation Process Guidelines:

Section 6.3.8 : Baseline Established/Development Documentation

A baseline for the modification that incorporates changes is established at the end of the “Build It” phase. All changes to the baseline should follow the configuration management practices of the respective organization. In addition, development documentation is completed before performing system test. This documentation includes system documentation, such as specifications, National Airspace System maintenance documents, design data, plans, and any additional documentation required for the system/project.

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Section 6.3.9 : Develop Key Site Test Plan

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.9 : Develop Key Site Test Plan

If applicable, a key site test plan should be developed using defined capability criteria. Appropriate personnel should coordinate with the appropriate organization to

determine the level of testing required at the key site. Planned activities should be documented and may include the following:

- *Modification and release information*
- *Organization roles and responsibilities*
- *Schedule of activities*
- *An overview of modification installation procedures*
- *Description of tests to be conducted*
- *Data collection and analysis methods*

New Content: Test and Evaluation Process Guidelines:

Section 6.3.9 : Develop Key Site Test Plan

If applicable, a key site test plan should be developed using defined capability criteria. Appropriate personnel should coordinate with the appropriate organization to determine the level of testing required at the key site. Planned activities should be documented and may include the following:

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Red Line Content: Test and Evaluation Process Guidelines:

Section 6.3.9 : Develop Key Site Test Plan

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- *An overview of modification installation procedures*
- *Description of tests to be conducted*
- *Data collection and analysis methods*

Section 6.3.10 : Baseline Performance/Functional Verification

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.10 : Baseline Performance/Functional Verification

The integration tests conducted in this phase include baseline performance and functional verification. The revalidation of a system is extensive and may include the following testing:

- Performance measurements
- Computer-Human Interface/Command and Control testing
- Interface tests
- Degraded operations testing
- System stability testing
- Support system regression testing
- Verify information systems security requirements have been met
- Verify Safety Management System requirements have been met

New Content: Test and Evaluation Process Guidelines:

Section 6.3.10 : Baseline Performance/Functional Verification

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- Interface tests
- Degraded operations testing
- System stability testing
- Support system regression testing
- Verify information systems security requirements have been met
- Verify ~~Safety~~safety ~~Management System~~management system requirements have been met

Section 6.3.11 : System/Project Release Documents

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.11 : System/Project Release Documents

Releases that change a system/project baseline are delivered via the SSM, which should be validated prior to delivery to field sites to ensure that procedures are accurate. The SSM template includes specifications that describe its contents and format. The SSM template includes Appendix I, which contains information including purpose, scope, results, and test limitations. If Key Site Test will be performed, an SSM should be developed and re-validated at the key site prior to finalizing the SSM for national delivery.

It is recommended the following information be included (if applicable), in Appendix I, if it is not included in the content of the SSM:

- The sequence in which to connect hardware and install software in order for the release to work properly
- Known discrepancies that are defined as problems discovered against the release and not fixed prior to delivery
- Identification of the system(s) and/or version(s) that this release was tested during System Test (e.g., DSR BCC22, DARC DVP04, CARTS R32, ARSR4, RMM XCD1046)
- Identification of the key site facility and of system(s) and/or version(s) that this release was tested during Key Site Test
- Key site lessons learned

New Content: Test and Evaluation Process Guidelines:

Section 6.3.11 : System/Project Release Documents

Releases that change a system/project baseline are delivered via the SSM, which should be validated prior to delivery to field sites to ensure that procedures are accurate. The SSM template includes specifications that describe its contents and format. The SSM template includes Appendix I, which contains information including purpose, scope, results, and test limitations. If a key site test will be performed, an SSM should be developed and re-validated at the key site prior to finalizing the SSM for national delivery.

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Red Line Content: Test and Evaluation Process Guidelines:
Section 6.3.11 : System/Project Release Documents

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 - Identification of the key site facility and of system(s) and/or version(s) that this release was tested during ~~Key~~ key ~~Site Test~~ site test
 - Key site lessons learned
-

Section 6.3.13 : Key Site Package (if applicable)

Old Content: Test and Evaluation Process Guidelines:
Section 6.3.13 : Key Site Package (if applicable)

Portions of the operational suitability test are both national and local in scope. The appropriate organization will prepare the key site operational suitability test procedures, which should include a comprehensive, plain language description of all components of the delivery. It should also include a description of potential operational impact derived from a review of applicable orders, directives and key site-specific procedures. Site participation is limited to providing expertise on site procedures and directives. The procedures could be developed independent of site personnel.

The appropriate organization should coordinate the:

- Generation and/or modification of required test plans
- Preparation and inspection of site deliverables
- Performance of a key site dry run on the key site executable deliverables
- Modification of documentation that will be coordinated and forwarded to selected key site and regional personnel (Redlined documents are forwarded if documents have not been finalized.)

- Development of a checklist of the items needed at the key site for the testing and troubleshooting of software and hardware
- Items, if not available at the key site, to be shipped prior to, or carried to, the key site facility

New Content: Test and Evaluation Process Guidelines:
Section 6.3.13 : Key Site Package (if applicable)

Portions of the operational suitability test are both national and local in scope. The appropriate organization will prepare the key site operational suitability test procedures, which should include a comprehensive, plain language description of all components of the delivery. It should also include a description of potential operational impact derived from a review of applicable orders, directives and key site-specific procedures. Site participation is limited to providing expertise on site procedures and directives. The procedures could be developed independent of site personnel.

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Red Line Content: Test and Evaluation Process Guidelines:
Section 6.3.13 : Key Site Package (if applicable)

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 - Items, if not available at the key site, to be shipped prior to, or carried to, the key site facility
-

Section 6.3.15 : Key Site Test Report

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.15 : Key Site Test Report

The development/test organization will modify its delivery documentation to include information in the fallback section of the SSM to communicate the results of all test activities. This should include information regarding test limitations, anomalies, known degradations to ATC and maintenance, and procedures for regression to the previous operational baseline. The development/test organization should ensure the delivery package is complete prior to release. Ensure outstanding discrepancies/issues relative to Key Site Test are captured. Any action items should be documented and assigned for disposition.

New Content: Test and Evaluation Process Guidelines:

Section 6.3.15 : Key Site Test Report

The development/test organization will modify its delivery documentation to include information in the fallback section of the SSM to communicate the results of all test activities. This should include information regarding test limitations, anomalies, known degradations to ATC and maintenance, and procedures for regression to the previous operational baseline. The development/test organization should ensure the delivery package is complete prior to release. Ensure outstanding discrepancies/issues relative to the key site test are captured. Any action items should be documented and assigned for disposition.

Red Line Content: Test and Evaluation Process Guidelines:

Section 6.3.15 : Key Site Test Report

The development/test organization will modify its delivery documentation to include information in the fallback section of the SSM to communicate the results of all test activities. -This should include information regarding test limitations, anomalies, known degradations to ATC and maintenance, and procedures for regression to the previous operational baseline. -The development/test organization should ensure the delivery package is complete prior to release. Ensure outstanding discrepancies/issues relative to ~~Key~~the key Site Testsite test are captured. Any action items should be documented and assigned for disposition.

Section 6.3.16 : Discrepancies/Issues/Actions Documented

Old Content: Test and Evaluation Process Guidelines:

Section 6.3.16 : Discrepancies/Issues/Actions Documented

Ensure outstanding discrepancies/issues/actions relative to the modification/release are captured. Any action items should be documented and assigned for disposition. All activities with status codes of yellow, red, or blue require annotation in the respective remarks column on the Gold Standard Matrix.

New Content: Test and Evaluation Process Guidelines:

Section 6.3.16 : Discrepancies/Issues/Actions Documented

Ensure outstanding discrepancies/issues/actions relative to the modification/release are captured. Any action items should be documented and assigned for disposition. All activities with status codes of yellow, red, or blue require annotation in the respective remarks column on the Gold Standard Matrix.

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Section 4 : RESEARCH AND DEVELOPMENT PROTOTYPE TEST ACTIVITIES

Old Content: Test and Evaluation Process Guidelines:

Section 4 : RESEARCH AND DEVELOPMENT PROTOTYPE TEST ACTIVITIES

Research and Development (R&D) programs provide the management process with valuable input. Empirical information from modeling, simulations, tests of R&D prototypes, and manufacturer tests of COTS equipment may validate new operational concepts, clarify requirements trade-offs, or verify the benefit of inserting new technology into the NAS. As this information becomes available, it contributes to, and often triggers, Mission Analysis and Investment Analysis. R&D prototype development and test adheres to the same fundamental paradigms as a full-scale system acquisition: early user involvement, proper planning, sound engineering, rigorous testing, and comprehensive analysis.

New Content: Test and Evaluation Process Guidelines:

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Section 3.2.5.2 : ISM Key Site Test (TEGS Phase 5: "Key Site/National Deployment")

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.5.2 : ISM Key Site Test (TEGS Phase 5: "Key Site/National Deployment")

The ISM Key Site Test is conducted at an operational NAS facility to verify the modification meets user needs. These test activities also allow for verification of requirements that could not be fully evaluated during the ISM System Test. The operating service organization and regional office make the key site selection that is documented in a joint memorandum. The selection is based on the facility that has the equipment and interfaces to fully test and implement the modification. Delivery documentation is verified to ensure it can be followed at subsequent sites without assistance.

Each site has unique parameters for equipment, interfaces, and airspace that should be configured or adapted before tests can be performed. Site personnel are responsible for site adaptation updates and changes for the modification being released. Key Site Test activities begin with a Key Site Test Readiness Review, which includes test overview, review of operational and support SW, test procedure information, and the review of any known problems or concerns that may affect the test. Key Site Test anomalies are noted and documented for improvement.

Key Site Test results are documented in the Key Site Test report. When abnormalities are identified during ISM Key Site Test, the service organization, users, and stakeholders will determine whether to fix the anomaly prior to release or defer it to a future release. Any problems will be noted and documented in Appendix 1 of the SSM prior to national

release. Test procedures to be used by downstream sites to conduct Field Acceptance Test and Field Familiarization are finalized during this phase of testing. At the conclusion of all scheduled activities, a national telephone conference will be held to brief key site events that have occurred. If applicable, a joint memorandum for national release is formulated and forwarded to responsible parties. Successful completion of Key Site Test allows national delivery of the modification.

The Test and Evaluation Gold Standard and Implementation Guide defines the activities to be addressed during ISM Key Site Test (TEGS Phase 5: "Key Site/National Deployment").

New Content: Test and Evaluation Process Guidelines:

Section 3.2.5.2 : ISM Key Site Test (TEGS Phase 5):

The ISM key site test is conducted at an operational NAS facility to verify the modification meets user needs. These test activities also allow for verification of requirements that could not be fully evaluated during the ISM system test. The operating service organization and regional office make the key site selection which is documented in a joint memorandum. The selection is based on the facility that has the equipment and interfaces to fully test and implement the modification. Delivery documentation is verified to ensure it can be followed at subsequent sites without assistance.

Each site has unique parameters for equipment, interfaces, and airspace that should be configured or adapted before tests can be performed. Site personnel are responsible for site adaptation updates and changes for the modification being released. Key site test activities begin with a key site test readiness review, which includes test overview, review of operational and support SW, test procedure information, and the review of any known problems or concerns that may affect the test. Key site test anomalies are noted and documented for improvement.

Key site test results are documented in the key site test report. When abnormalities are identified, the service organization, users, and stakeholders determine whether to fix the anomaly prior to release or defer it to a future release. Any problems will be noted and documented in Appendix 1 of the SSM prior to national release. Test procedures to be used by downstream sites to conduct field acceptance test and field familiarization are finalized during this phase of testing. At the conclusion of all scheduled activities, a national telephone conference will be held to brief key site events that have occurred. If applicable, a joint memorandum for national release is formulated and forwarded to responsible parties. Successful completion of key site test allows national delivery of the modification.

The Test and Evaluation Gold Standard and Implementation Guide defines the activities to be addressed during ISM key site test (TEGS Phase 5: "Key Site/National Deployment").

Red Line Content: Test and Evaluation Process Guidelines:

Section 3.2.5.2 : ISM Key Site Test (TEGS Phase 5): ~~"Key Site/National Deployment"~~

The ISM ~~Key Site Test~~ key site test is conducted at an operational NAS facility to verify the modification meets user needs. -These test activities also allow for verification of requirements that could not be fully evaluated during the ISM ~~System Test~~ system test. -The operating service organization and regional office make the key site selection ~~that~~ which is documented in a joint memorandum. -The selection is based on the facility that has the equipment and interfaces to fully test and implement the modification. -Delivery documentation is verified to ensure it can be followed at subsequent sites without assistance.

Each site has unique parameters for equipment, interfaces, and airspace that should be configured or adapted before tests can be performed. -Site personnel are responsible for site adaptation updates and changes for the modification being released. -Key ~~Site Test~~ site test activities begin with a ~~Keykey Site Test Readiness Review~~ site test readiness review, which includes test overview, review of operational and support SW, test procedure information, and the review of any known problems or concerns that may affect the test. -Key ~~Site Test~~ site test anomalies are noted and documented for improvement.

Key ~~Site Test~~ test results are documented in the ~~Keykey Site Test~~ site test report. -When abnormalities are identified ~~during ISM Key Site Test~~, the service organization, users, and stakeholders ~~will~~ determine whether to fix the anomaly prior to release or defer it to a future release. -Any problems will be noted and documented in Appendix 1 of the SSM prior to national release. -Test procedures to be used by downstream sites to conduct ~~Field Acceptance Test~~ field acceptance test and ~~Fieldfield Familiarization~~ familiarization are finalized during this phase of testing. -At the conclusion of all scheduled activities, a national telephone conference will be held to brief key site events that have occurred. -If applicable, a joint memorandum for national release is formulated and forwarded to responsible parties. Successful completion of ~~Key Site Test~~ key site test allows national delivery of the modification.

The Test and Evaluation Gold Standard and Implementation Guide defines the activities to be addressed during ISM ~~Keykey Site Test~~ site test (TEGS Phase 5: "Key Site/National Deployment").

Section 3.2.6 : Independent Operational Test and Evaluation

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.6 : Independent Operational Test and Evaluation

Figure 3.2-8 identifies associated processes and criteria for the IOT&E activities within the SI or ISM phase of the AMS. The processes and checklist criteria can be used to plan high-level T&E activities and to define initial entry and exit criteria. IOT&E is a full system-level evaluation conducted in an operational environment to confirm the operational readiness of a system to be part of the NAS. Therefore, IOT&E is performed on systems that have achieved Initial Operating Capability (IOC) at an operational field facility (the key site). Data collection for IOT&E may begin prior to IOC if there are concerns about:

- HW/SW installation
- Transition between the system under evaluation and any legacy systems

Data collected prior to IOC supplements formal data collection during IOT&E. After IOC, the system undergoing IOT&E is an operational component of the NAS and must be operated and maintained by its intended users as designed for actual NAS operations. The results of IOT&E are used to support the ISD or other decisions regarding the operational use and deployment of systems.

The COO, through the Vice President of Safety Services, designates programs for IOT&E. Factors considered in designating programs include complexity, operational criticality, lifecycle cost, interoperability, and risk. An IOT&E is conducted by an IOT&E Team that includes members from Air Traffic and Technical Operations and is led by a Program Manager from the Office of IOT&E. The strategy, resources, and schedule for IOT&E are documented in the T&E section of Exhibit 300 Program Baseline, Attachment 3: Implementation Strategy and Planning. The Office of IOT&E co-approves the T&E Section of the ISP for designated programs.

After formation, IOT&E Teams are involved in monitoring key test events conducted earlier in the SI or ISM phases to identify areas of operational risk. Identified risks are communicated to the service organization and may affect the scope of IOT&E. At the conclusion of System Test activities, the Vice President of the implementing service organization declares the system ready for IOT&E via delivery of the IOTRD to the Vice President of Safety Services. Upon receipt of the IOTRD, and at the discretion of the Vice President of Safety Services, the IOT&E Team commences IOT&E at the key site(s). At the conclusion of the IOT&E, the IOT&E Team makes a determination of the system's operational readiness based on the operational risk associated with any identified issues. IOT&E results are briefed to the key site managers, the service organization, and Air Traffic Organization stakeholders at the Directorate and Vice President levels.

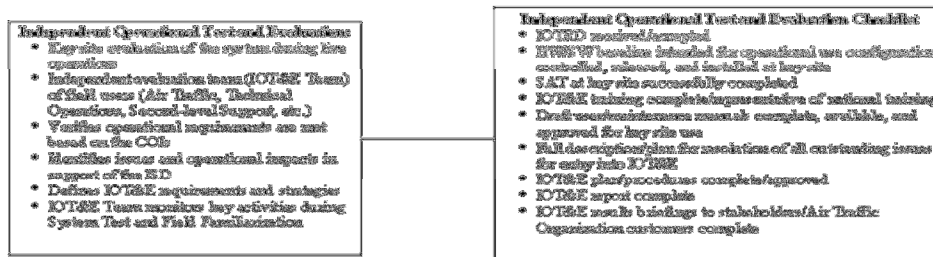


Figure 3.2-8: IOT&E Checklist

New Content: Test and Evaluation Process Guidelines:
Section 3.2.6 : Independent Operational Test and Evaluation

Figure 3.2-8 identifies associated processes and criteria for IOT&E activities within the SI or ISM phase of AMS. The processes and checklist criteria can be used to plan high-level T&E activities and to define initial entry and exit criteria. IOT&E is a full system-level evaluation conducted in an operational environment to confirm the operational readiness of a system to be part of the NAS. Therefore, IOT&E is performed on systems that have achieved initial operating capability (IOC) at an operational field facility (the key site). Data collection for IOT&E may begin prior to IOC if there are concerns about:

- HW/SW installation
- Transition between the system under evaluation and any legacy systems

Data collected prior to IOC supplements formal data collection during IOT&E. After IOC, the system undergoing IOT&E is an operational component of the NAS and must be operated and maintained by its intended users as designed for actual NAS operations. The results of IOT&E are used to support the ISD or other decisions regarding the operational use and deployment of systems.

The COO, through the Vice President of Safety Services, designates programs for IOT&E. Factors considered in designating programs include complexity, operational criticality, lifecycle cost, interoperability, and risk. An IOT&E is conducted by an IOT&E team that includes members from Air Traffic and Technical Operations and is led by a program manager from the Office of IOT&E. The strategy, resources, and schedule for IOT&E are documented in the T&E section of Exhibit 300 Program Baseline, Attachment 3: Implementation Strategy and Planning. The Office of IOT&E co-approves the T&E Section of the ISP for designated programs.

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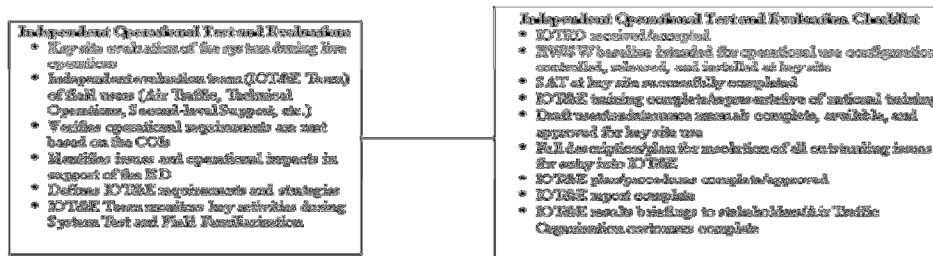


Figure 3.2-8: IOT&E Checklist

**Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.6 : Independent Operational Test and Evaluation**

Figure 3.2-8 identifies associated processes and criteria for the IOT&E activities within the SI or ISM phase of the AMS. -The processes and checklist criteria can be used to plan high-level T&E activities and to define initial entry and exit criteria. -IOT&E is a full system-level evaluation conducted in an operational environment to confirm the operational readiness of a system to be part of the NAS. -Therefore, IOT&E is performed on systems that have achieved Initial Operating Capability initial operating capability (IOC) at an operational field facility (the key site). -Data collection for IOT&E may begin prior to IOC if there are concerns about:

- **HW/SW installation**
- **Transition between the system under evaluation and any legacy systems**

Data collected prior to IOC supplements formal data collection during IOT&E. -After IOC, the system undergoing IOT&E is an operational component of the NAS and must be operated and maintained by its intended users as designed for actual NAS operations. -The results of IOT&E are used to support the ISD or other decisions regarding the operational use and deployment of systems.

The COO, through the Vice President of Safety Services, designates programs for IOT&E. Factors considered in designating programs include complexity, operational criticality, lifecycle cost, interoperability, and risk. -An IOT&E is conducted by an IOT&E Team team that includes members from Air Traffic and Technical Operations and is led by a Program Manager manager from the Office of IOT&E. -The strategy, resources, and schedule for IOT&E are documented in the T&E section of Exhibit 300 Program Baseline, Attachment 3: Implementation Strategy and Planning. -The Office of IOT&E co-approves the T&E Section of the ISP for designated programs.

After formation, IOT&E Teams teams are involved in monitoring key test events conducted earlier in the SI or ISM phases to identify areas of operational risk. -Identified risks are communicated to the service organization and may affect the scope of IOT&E. -At the conclusion of System Test system test activities, the Vice President of the implementing service organization declares the system ready for IOT&E via delivery of the IOTRD to the Vice

President of Safety Services. -Upon receipt of the IOTRD, and at the discretion of the Vice President of Safety Services, the IOT&E Team commences IOT&E at the key site(s). -At the conclusion of the IOT&E, the IOT&E Team makes a determination of the system's operational readiness based on the operational risk associated with any identified issues. -IOT&E results are briefed to the key site managers, the service organization, and Air Traffic Organization stakeholders at the Directorate and Vice President levels.

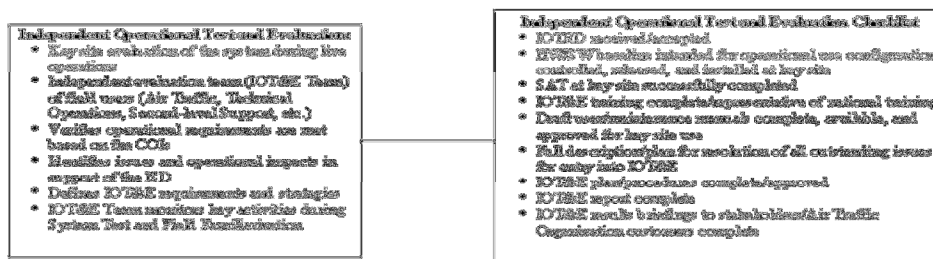


Figure 3.2-8: IOT&E Checklist

Section 3.2.7 : Field Acceptance and Field Familiarization Tests

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.7 : Field Acceptance and Field Familiarization Tests

Figure 3.2-9 identifies associated processes and criteria for the Field Acceptance Test and Field Familiarization activities within the SI and ISM phases of the AMS. The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria. After the SSM has been delivered, the site will perform site adaptation and testing (if applicable) prior to implementation into the NAS. (Refer to 3.2.5.2 (TEGS Phase 5: Key Site/National Deployment))

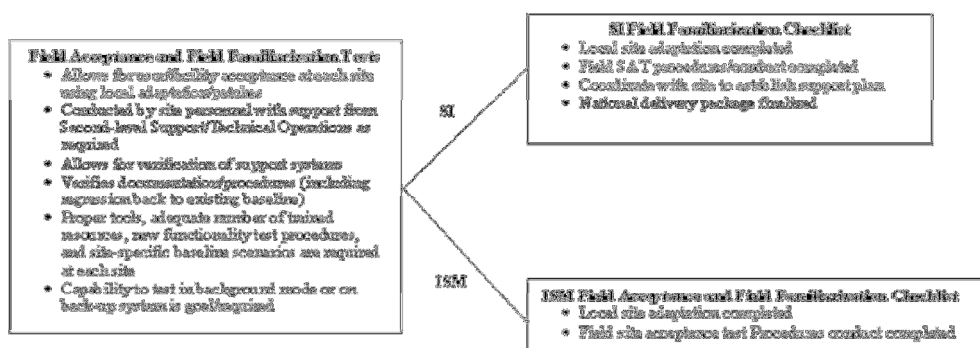


Figure 3.2-9: SI/ISM Field Familiarization Checklist

New Content: Test and Evaluation Process Guidelines:
Section 3.2.7 : Field Acceptance and Field Familiarization Tests

Figure 3.2-9 identifies associated processes and criteria for the field acceptance test and field familiarization activities within the SI and ISM phases of the AMS. The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria. After the SSM has been delivered, the site performs site adaptation and testing (if applicable) prior to implementation into the NAS. (Refer to 3.2.5.2 (TEGS Phase 5: Key Site/National Deployment))

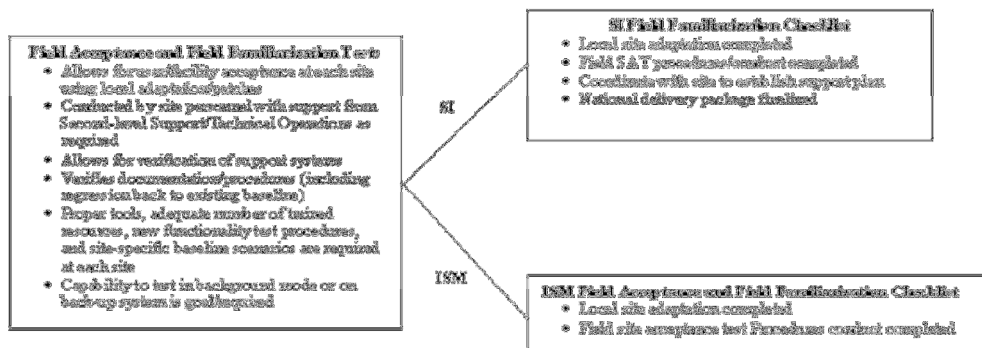


Figure 3.2-9: SI/ISM Field Familiarization Checklist

Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.7 : Field Acceptance and Field Familiarization Tests

Figure 3.2-9 identifies associated processes and criteria for the ~~Field Acceptance Test~~ field acceptance test and ~~Fieldfield Familiarization~~ familiarization activities within the SI and ISM phases of the AMS. -The processes and checklist criteria can be used to plan high-level T&E activities and support the development of entry and exit criteria. -After the SSM has been delivered, the site ~~will perform~~ performs site adaptation and testing (if applicable) prior to implementation into the NAS. -(Refer to 3.2.5.2 (TEGS Phase 5: Key Site/National Deployment))

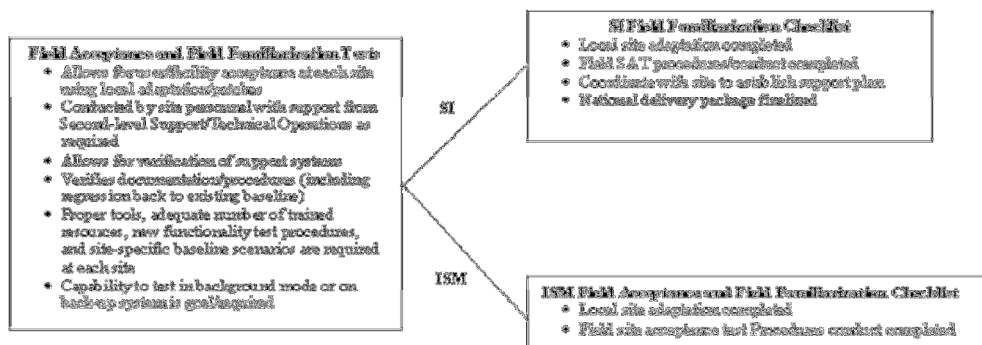


Figure 3.2-9: SI/ISM Field Familiarization Checklist

Section 3.2.7.1 : SI Field Familiarization Tests

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.7.1 : SI Field Familiarization Tests

Field Familiarization is conducted by Air Traffic and Technical Operations field personnel at each site to which the new system is delivered. New system implementation is depicted in Figure 3.2-10. Field Familiarization is performed after OT has been completed. Its primary objective is to verify the site is ready to switch to the new system. This includes ensuring:

- The new system has been properly installed
- The new system interfaces with the existing NAS
- Operational procedures and system documentation are in place
- Proper logistics and support are available
- Site personnel are trained and ready to use the new system

Prior to conduct, the Field Familiarization test approach is be documented by the key site and subsequent sites to facilitate test conduct. Lessons learned are documented and shared with waterfall sites. As shown in Figure 3.2-10, Field Familiarization testing is conducted at each site after the system has successfully completed installation, check-out testing, and SAT. Field Familiarization follows Contract Acceptance Inspection and leads to the declaration of IOC. IOC is declared by site personnel when the system is ready for conditional operational use in the NAS. At the key site, Field Familiarization is followed (or performed in parallel) with IOT&E (for designated programs). The key site should be the only site at which IOC is declared prior to the ISD. (More than one site may be designated a key site.) Field Familiarization culminates with the declaration by site personnel that the system is ready for conditional operational use. SI test activities conclude after successful completion of Field Familiarization, the declaration of IOC, IOT&E, and the ISD.

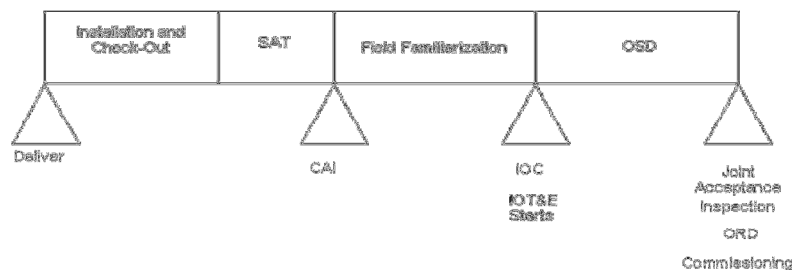


Figure 3.2-10: New System Implementation

New Content: Test and Evaluation Process Guidelines:

Section 3.2.7.1 : SI Field Familiarization Tests

Field familiarization is conducted by Air Traffic and Technical Operations field personnel at each site to which the new product is delivered. New product implementation is depicted in Figure 3.2-10. Field familiarization is performed after OT has been completed. Its primary objective is to verify the site is ready to switch to the new product. This includes ensuring:

The new product has been properly installed

The new product interfaces with the existing NAS

Operational procedures and product documentation are in place

Proper logistics and support are available

Site personnel are trained and ready to use the new product

Prior to conduct, the field familiarization test approach is documented by the key site and subsequent sites to facilitate test conduct. Lessons learned are documented and shared with waterfall sites. As shown in Figure 3.2-10, field familiarization testing is conducted at each site after the product has successfully completed installation, check-out testing, and SAT. Field familiarization follows contract acceptance inspection and leads to the declaration of IOC. IOC is declared by site personnel when the product is ready for conditional operational use in the NAS. At the key site, field familiarization is followed (or performed in parallel) with IOT&E (for designated programs). The key site should be the only site at which IOC is declared prior to the ISD. (More than one site may be designated a key site.) Field familiarization culminates with the declaration by site personnel that the product is ready for conditional operational use. SI test activities conclude after successful completion of field familiarization, the declaration of IOC, IOT&E, and the ISD.

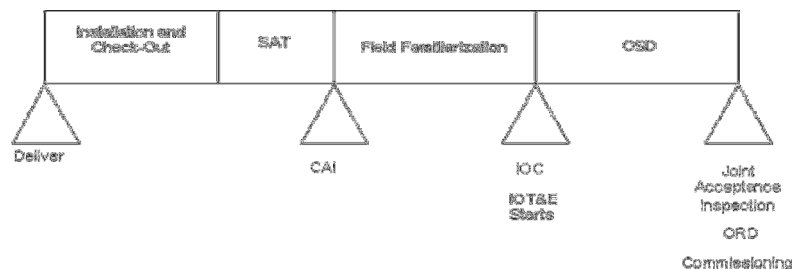


Figure 3.2-10: New Product Implementation

Red Line Content: Test and Evaluation Process Guidelines:

Section 3.2.7.1 : SI Field Familiarization Tests

Field Familiarization familiarization is conducted by Air Traffic and Technical Operations field personnel at each site to which the new system is delivered. -New system implementation is depicted in Figure 3.2-10. -Field Familiarization familiarization is performed after OT has been completed. -Its primary objective is to verify the site is ready to switch to the new system. -This includes ensuring:

- The new system has been properly installed

- The new system interfaces with the existing NAS
- Operational procedures and system documentation are in place
- Proper logistics and support are available
- Site personnel are trained and ready to use the new system

Prior to conduct, the ~~Field Familiarization~~ field familiarization test approach -is be documented by the key site and subsequent sites to facilitate test conduct. -Lessons learned are documented and shared with waterfall sites. -As shown in Figure 3.2-10, ~~Field Familiarization~~ field familiarization testing is conducted at each site after the system has successfully completed installation, check-out testing, and SAT. -Field ~~Familiarization~~ familiarization follows ~~Contract~~ contract ~~Acceptance Inspection~~ acceptance inspection and leads to the declaration of IOC. -IOC is declared by site personnel when the system is ready for conditional operational use in the NAS. -At the key site, ~~Field Familiarization~~ field familiarization is followed (or performed in parallel) with IOT&E (for designated programs). -The key site should be the only site at which IOC is declared prior to the ISD. -(More than one site may be designated a key site.) Field ~~Familiarization~~ familiarization culminates with the declaration by site personnel that the system is ready for conditional operational use. -SI test activities conclude after successful completion of ~~Field Familiarization~~ field familiarization, the declaration of IOC, IOT&E, and the ISD.

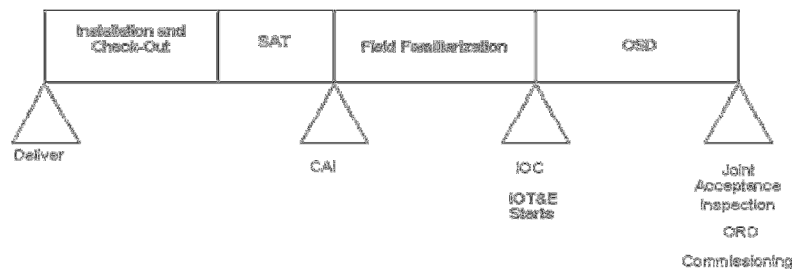


Figure 3.2-10: New System Implementation

Section 3.2.7.2 : ISM Field Acceptance Test and Field Familiarization

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.7.2 : ISM Field Acceptance Test and Field Familiarization

The ISM Field Acceptance Test and Field Familiarization are performed at all downstream sites to validate performance prior to operational use. Field Acceptance Test is conducted by Air Traffic and Technical Operations field personnel at each site to which the system or modification is delivered. The installed system or modification is certified as the first step toward operational integration. If the modified system passes certification, Air Traffic begins operational suitability testing. (The Air Traffic Automation Operational Suitability Requirement Checklist can be found in Figure 3.2-11.) Test activities are performed after

successful Key Site Test has been completed. Its primary objective is to verify the site is ready to integrate the system or modification into the NAS. This ensures the new system is properly installed and interfaces with the existing NAS, system documentation is in place, and proper logistics and support are available. Prior to conduct, the Field Acceptance Test approach should be documented by the key site and subsequent sites. Lessons learned should be documented and shared with subsequent sites.

Field Familiarization follows Field Acceptance Test and leads to a declaration of full operational integration. Field Familiarization ensures operational procedures and system documentation are in place and site personnel are trained and ready to use the upgraded system. After a system achieves the declaration of IOC, site personnel may use the new system operationally, usually in conjunction with the legacy system. During this period of joint use, which is called Operational Suitability Demonstration (OSD), Air Traffic and Technical Operations personnel become familiar with the system, and additional personnel are trained until all personnel who will operate the modified system are qualified to do so. Site personnel declare full operational integration, which signifies the system has been modified and is ready for conditional operational use in the NAS. When modifications are completed at all eligible sites, action will be taken to close out the implementation of the modification via the Maintenance Management System process.

Air Traffic Automation Operational Suitability Requirement Checklist:
1. Review Documentation
2. Review Site Adaptation Changes
3. Review Potential Impacts
4. Develop Test Plan
5. Coordinate with Stakeholders
6. Schedule Implementation
7. Log Entry

Figure 3.2-11: Air Traffic Automation Operational Suitability Requirement Checklist

New Content: Test and Evaluation Process Guidelines:

Section 3.2.7.2 : ISM Field Acceptance Test and Field Familiarization

The ISM field acceptance test and field familiarization are performed at all downstream sites to validate performance prior to operational use. Field acceptance test is conducted by Air

Traffic and Technical Operations field personnel at each site to which the product or modification is delivered. The installed product or modification is certified as the first step toward operational integration. If the modified product passes certification, Air Traffic begins operational suitability testing. (The Air Traffic Automation Operational Suitability Requirement Checklist can be found in Figure 3.2-11.) Test activities are performed after successful key site test has been completed. Its primary objective is to verify the site is ready to integrate the product or modification into the NAS. This ensures the new product is properly installed and interfaces with the existing NAS, product documentation is in place, and proper logistics and support are available. Prior to conduct, the field acceptance test approach should be documented by the key site and subsequent sites. Lessons learned should be documented and shared with subsequent sites.

Field familiarization follows field acceptance test and leads to a declaration of full operational integration. Field familiarization ensures operational procedures and product documentation are in place and site personnel are trained and ready to use the upgraded product. After a product achieves the declaration of IOC, site personnel may use the new product operationally, usually in conjunction with the legacy product. During this period of joint use, which is called operational suitability demonstration (OSD), Air Traffic and Technical Operations personnel become familiar with the product, and additional personnel are trained until all personnel who will operate the modified product are qualified to do so. Site personnel declare full operational integration, which signifies the product has been modified and is ready for conditional operational use in the NAS. When modifications are completed at all eligible sites, action will be taken to close out the implementation of the modification via the maintenance management process.

Air Traffic Automation Operational Suitability Requirement Checklist:
1. Review Documentation
2. Review Site Adaptation Changes
3. Review Potential Impacts
4. Develop Test Plan
5. Coordinate with Stakeholders
6. Schedule Implementation
7. Log Entry

Figure 3.2-11: Air Traffic Automation Operational Suitability Requirement Checklist

*Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.7.2 : ISM Field Acceptance Test and Field Familiarization*

The ISM ~~Field Acceptance Test~~field acceptance test and ~~Field~~field Familiarizationfamiliarization are performed at all downstream sites to validate performance prior to operational use. -Field ~~Acceptance Test~~acceptance test is conducted by Air Traffic and Technical Operations field personnel at each site to which the system or modification is delivered. -The installed system or modification is certified as the first step toward operational integration. -If the modified system passes certification, Air Traffic begins operational suitability testing. (The Air Traffic Automation Operational Suitability Requirement Checklist can be found in Figure 3.2-11.) Test activities are performed after successful ~~Key Site Test~~key site test has been completed. -Its primary objective is to verify the site is ready to integrate the system or modification into the NAS. -This ensures the new system is properly installed and interfaces with the existing NAS, system documentation is in place, and proper logistics and support are available. -Prior to conduct, the ~~Field Acceptance Test~~field acceptance test approach should be documented by the key site and subsequent sites. -Lessons learned should be documented and shared with subsequent sites.

Field ~~Familiarization~~familiarization follows ~~Field~~field ~~Acceptance Test~~acceptance test and leads to a declaration of full operational integration. -Field ~~Familiarization~~familiarization ensures operational procedures and system documentation are in place and site personnel are trained and ready to use the upgraded system. -After a system achieves the declaration of IOC, site personnel may use the new system operationally, usually in conjunction with the legacy system. -During this period of joint use, which is called ~~Operational Suitability Demonstration~~operational suitability demonstration (OSD), Air Traffic and Technical Operations personnel become familiar with the system, and additional personnel are trained until all personnel who will operate the modified system are qualified to do so. -Site personnel declare full operational integration, which signifies the system has been modified and is ready for conditional operational use in the NAS. -When modifications are completed at all eligible sites, action will be taken to close out the implementation of the modification via the ~~Maintenance Management System~~maintenance management system process.

Air Traffic Automation
Operational Suitability
Requirement Checklist:

1. Review Documentation
2. Review Site Adaptation Changes
3. Review Potential Impacts
4. Develop Test Plan
5. Coordinate with Stakeholders

- | |
|---|
| <ol style="list-style-type: none">6. Schedule Implementation7. Log Entry |
|---|

Figure 3.2-11: Air Traffic Automation Operational Suitability Requirement Checklist

Section 3.3 : TEST AND EVALUATION FOR PRE-PLANNED PRODUCT IMPROVEMENTS

Old Content: Test and Evaluation Process Guidelines:

Section 3.3 : TEST AND EVALUATION FOR PRE-PLANNED PRODUCT IMPROVEMENTS

Most NAS systems are modified during their in-service lifetimes. Sometimes, modifications are pre-planned as part of the acquisition strategy and are called Pre-Planned Product Improvements (P³Is). Other modifications are made to correct problems discovered during operational use or to adapt the system to a changing operational environment. Major modifications and P³I projects follow the same System Test, Field Familiarization, and IOT&E test sequence described in sections 3.1 and 3.2, suitably tailored to match the smaller scope typical of these projects.

When an operational system is modified, a generic version of the product is usually tested by the service organization in a series of tests designed to verify requirements compliance and operational readiness. HW/SW unit tests are conducted on individual, modified, or new SW and HW items. The generic system is then tested in a series of system verification tests. These tests validate new functionality and measure system performance and capacity. They also identify any problems with system documentation. Baseline regression tests are also conducted to verify the integrity of existing functionality. The generic system is delivered to the key site via a draft System Support Directive (SSD).

Service organization personnel travel to the key site to help install and test a locally adapted version of the system. Key Site Test ensures the system is installed correctly and interfaces to other systems are operating properly. Key Site Test also tests all modified and new SW items at the unit, module, and system levels. Successful completion of Key Site Test is required before a final SSD is issued to deploy the system nationally. When all operational and support SW has been tested successfully, Field Familiarization begins.

New Content: Test and Evaluation Process Guidelines:

Section 3.3 : TEST AND EVALUATION FOR PRE-PLANNED PRODUCT IMPROVEMENTS

Most NAS products are modified during their in-service lifetimes. Sometimes, modifications are pre-planned as part of the acquisition strategy and are called pre-planned product improvements (P³Is). Other modifications are made to correct problems discovered during

operational use or to adapt the product to a changing operational environment. Major modifications and P3I projects follow the same system test, field familiarization, and IOT&E test sequence described in sections 3.1 and 3.2, suitably tailored to match the smaller scope typical of these projects.

When an operational asset is modified, a generic version of the product is usually tested by the service organization in a series of tests designed to verify requirements compliance and operational readiness. HW/SW unit tests are conducted on individual, modified, or new SW and HW items. The generic product is then tested in a series of verification tests. These tests validate new functionality and measure performance and capacity. They also identify any problems with documentation. Baseline regression tests are also conducted to verify the integrity of existing functionality. The generic product is delivered to the key site via a draft system support directive (SSD).

Service organization personnel travel to the key site to help install and test a locally adapted version of the product. Key site test ensures the product is installed correctly and interfaces to other assets completion of key site test is required before a final SSD is issued to deploy the product nationally. When all operational and support SW has been tested successfully, Field familiarization begins.

Red Line Content: Test and Evaluation Process Guidelines:

Section 3.3 : TEST AND EVALUATION FOR PRE-PLANNED PRODUCT IMPROVEMENTS

Most NAS systems are modified during their in-service lifetimes. ~~Sometimes~~sometimes, modifications are pre-planned as part of the acquisition strategy and are called ~~Prepre-Planned Product Improvements~~planned product improvements (P³Is). -Other modifications are made to correct problems discovered during operational use or to adapt the system to a changing operational environment. -Major modifications and P³I projects follow the same ~~System Test~~system test, ~~Fieldfield Familiarization~~familiarization, and IOT&E test sequence described in sections 3.1 and 3.2, suitably tailored to match the smaller scope typical of these projects.

When an operational system is modified, a generic version of the product is usually tested by the service organization in a series of tests designed to verify requirements compliance and operational readiness. -HW/SW unit tests are conducted on individual, modified, or new SW and HW items. -The generic system is then tested in a series of system verification tests. -These tests validate new functionality and measure system performance and capacity. -They also identify any problems with system documentation. -Baseline regression tests are also conducted to verify the integrity of existing functionality. The generic system is delivered to the key site via a draft ~~System Support Directive~~system support directive (SSD).

Service organization personnel travel to the key site to help install and test a locally adapted version of the system. -Key ~~Site Test~~site test ensures the system is installed correctly and interfaces to other systems are operating properly. -Key ~~Site Test~~site test also tests all modified and new SW items at the unit, module, and system levels. - Successful completion of ~~Key Site~~

~~Test~~key site test is required before a final SSD is issued to deploy the system nationally. -When all operational and support SW has been tested successfully, Field Familiarizationfamiliarization begins.
