

CHANGE REQUEST COVER SHEET

Change Request Number: 11-24

Date Received: 3/28/2011

Title: Update to Independent Operational Assessment T&E Guidance

Name: David Woodson

Phone: 202-267-7601

Policy OR Guidance: Guidance

Section/Text Location Affected: T&E Process Guidelines

Summary of Change: Updates IOT&E to IOA, IOTRD to IOARD, Safety Services to Office of ATO Safety, Safety Assurance to Independent Safety Assessments and revised System Assessment Process

Reason for Change: To be consistent with revised IOA policy change

Development, Review, and/or Concurrence: Reviewed with the ISA Group and ISM Group and ISM Directorate

Target Audience: AJS-23 and service teams with systems designated for IOA

Potential Links within FAST for the Change: None

Briefing Planned: No

ASAG Responsibilities: None

Potential Links within FAST for the Change: None

Links for New/Modified Forms (or) Documents (LINK 1)

Links for New/Modified Forms (or) Documents (LINK 2)

Links for New/Modified Forms (or) Documents (LINK 3)

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Test and Evaluation Process

Guidelines



July 2006

New Content: Test and Evaluation Process Guidelines:
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Test and Evaluation Process

Guidelines



March 2011

Red Line Content: Test and Evaluation Process Guidelines:
COVER PAGE

Test and ~~Evaluation~~ Evaluation Process

Guidelines

~~July 2006~~ March 2011

Section 2 : TEST AND EVALUATION GUIDING PRINCIPLES

Old Content: Test and Evaluation Process Guidelines:

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 - Provide essential information to support decision-making
 - Provide essential information for assessing technical and acquisition risk

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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 assessment (IOA) 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 (*FAA only*)

New Content: Test and Evaluation Process Guidelines:

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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

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.

Acquisition Management

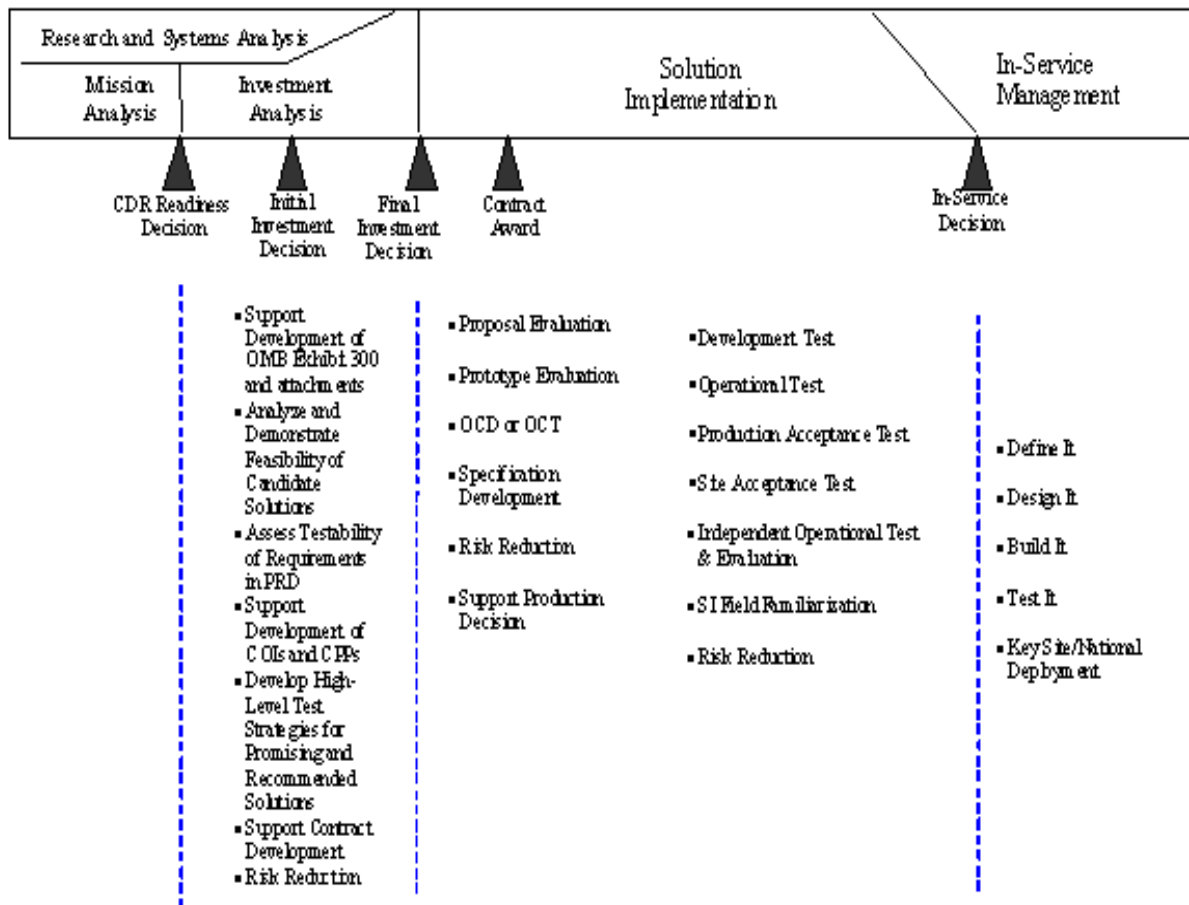


Figure 3.0-1: Tests and Test Activities Associated with NAS Investment Programs

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.

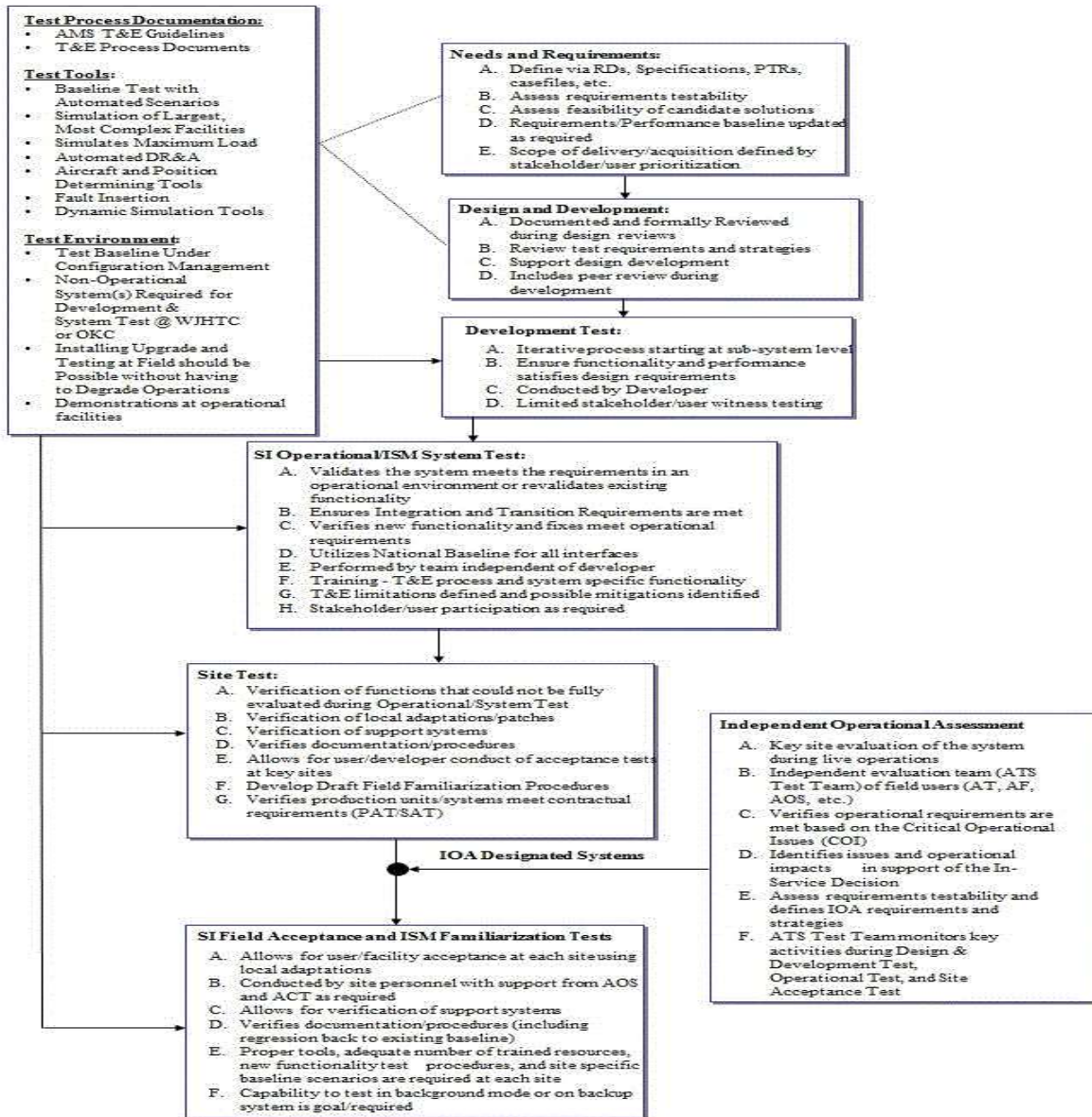


Figure 3.0-2: Test and Evaluation Process

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), IOA, 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 IOA is responsible for performing IOA 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 IOA is not required) or IOA. 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/.

IOA 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 IOA 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”)
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 - Field acceptance and field familiarization test (“Key site/National deployment”)
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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

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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.

?? **New Content:** Test and Evaluation Process Guidelines:

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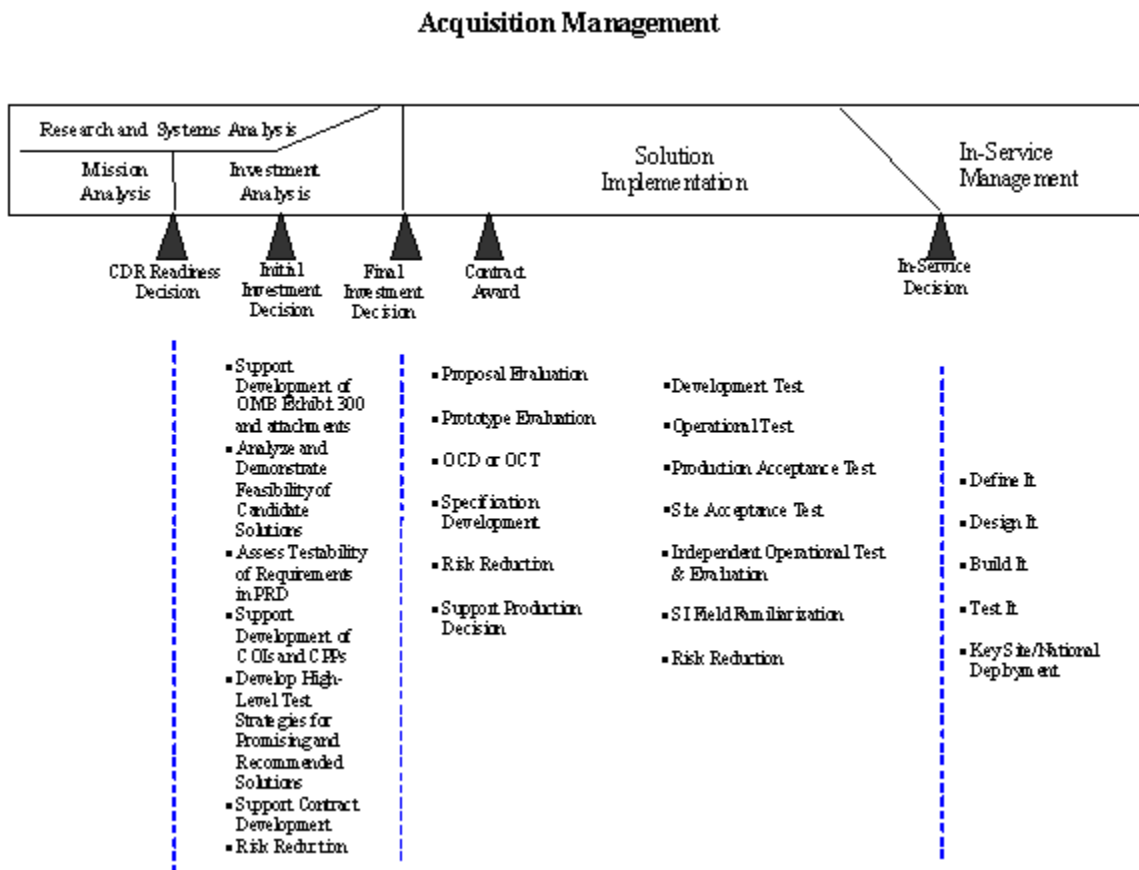


Figure 3.0-1: Tests and Test Activities Associated with NAS Investment Programs

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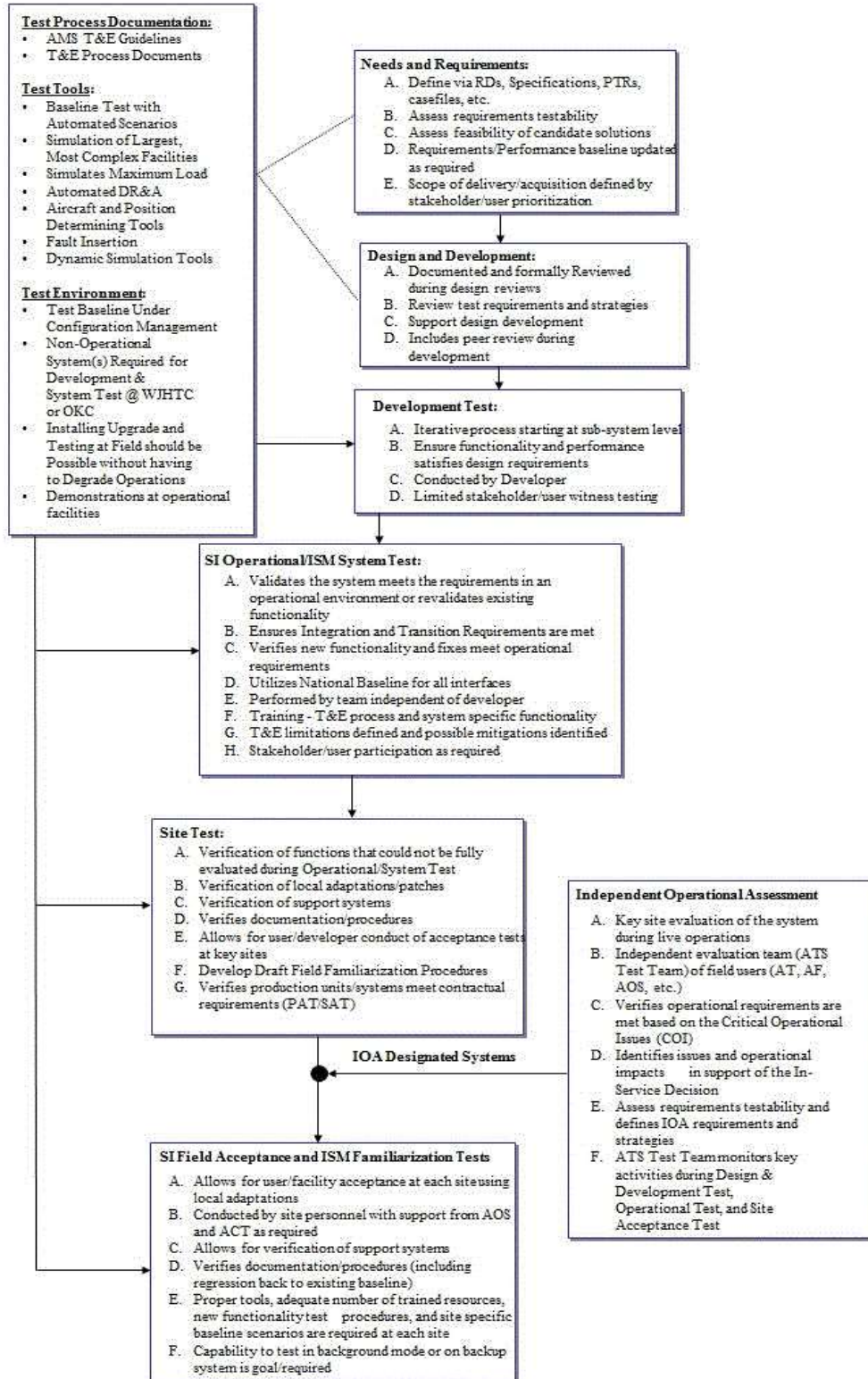


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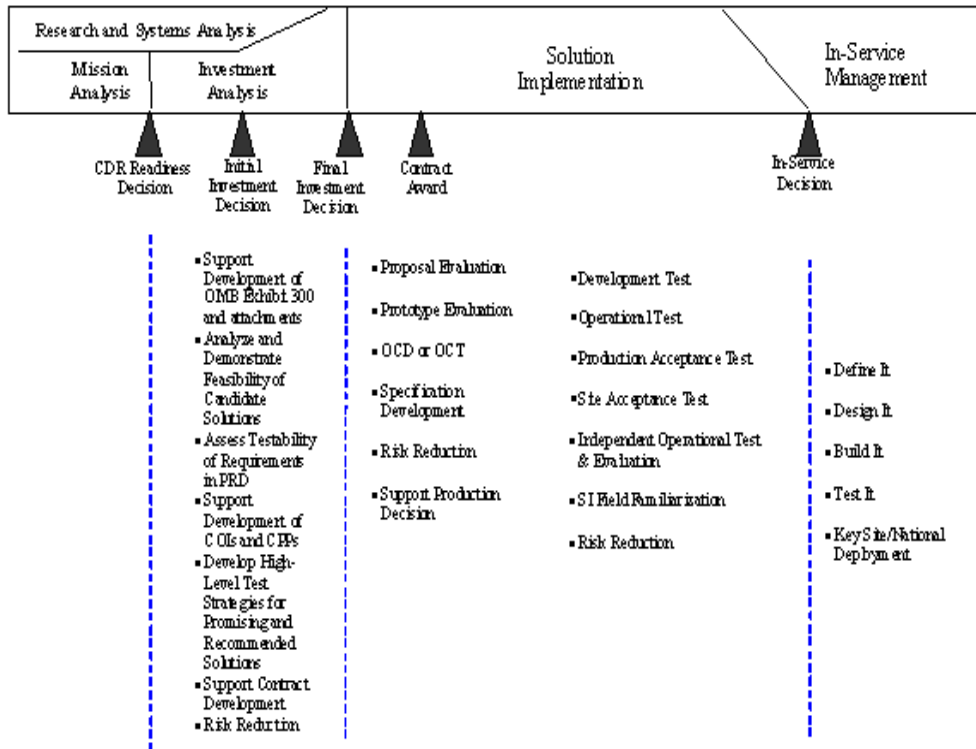


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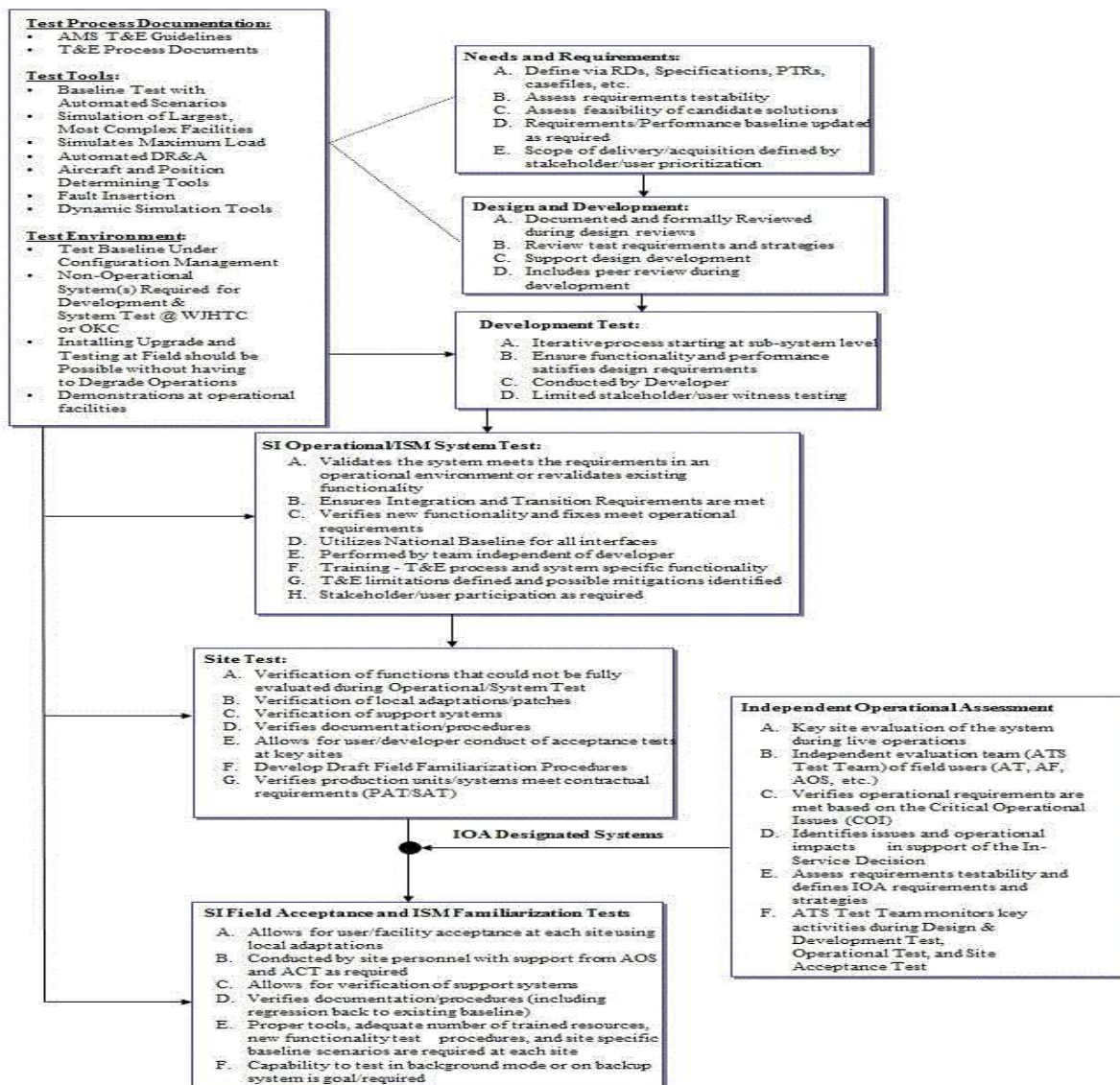


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Section 3.2 : SI AND ISM TEST AND EVALUATION

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 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 IOA are provided in the IOA 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 IOA. These programs must adhere to an IOA process that is equivalent to the process followed for new acquisitions.

SI Test Objectives	DT	OT	SAT	FF	IOA
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 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

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 IOA (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 IOA are provided in the IOA Technical-Level Process. 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 IOA. These programs must adhere to an IOA process that is equivalent to the process followed for new acquisitions.

SI Test Objectives	DT	OT	SAT	FF	IOA
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 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 solution implementation. During this phase, the test strategy is implemented through a series of tests that includes DT, OT, SAT, field familiarization, and [IOT&EIOA](#) (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 IOA are provided in the [IOA Operations](#) [Technical-Level Manual](#) [Process](#). 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 IOA. These programs must adhere to an IOA process that is equivalent to the process followed for new acquisitions.

SI Test Objectives	DT	OT	SAT	FF	IOA
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	x	x	x		x

performance factors, and operational concepts					
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 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

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 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.

The major components of OT are integration tests, performance tests, effectiveness tests, and suitability tests. Integration testing performed during OT verifies product interfaces with existing elements of the NAS and the NAS can operate with the new product 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 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, 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 product ready for IOA via the IOA readiness declaration (IOTRD). The IOTRD addresses the IOA prerequisites/requirements as detailed in the T&E section of the ISPD. (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.

The major components of OT are integration tests, performance tests, effectiveness tests, and suitability tests. Integration testing performed during OT verifies product interfaces with existing elements of the NAS and the NAS can operate with the new product 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 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, 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 product ready for IOA via the IOA readiness declaration (IOARD). The IOARD addresses the IOA prerequisites/requirements as detailed in the T&E section of the ISPD. (See Appendix C-11 for a sample IOARD template.)

Red Line 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.

The major components of OT are integration tests, performance tests, effectiveness tests, and suitability tests. Integration testing performed during OT verifies product interfaces with existing elements of the NAS and the NAS can operate with the new product 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 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, 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 product ready for IOA via the IOA readiness declaration ([IOTRDIOARD](#)). The [IOTRDIOARD](#) addresses the IOA prerequisites/requirements as detailed in the T&E section of the ISPD. (See Appendix C-11 for a sample [IOTRDIOARD](#) template.)

Section 3.2.6 : Independent Operational Assessment

Old Content: Test and Evaluation Process Guidelines:

Section 3.2.6 : Independent Operational Assessment

Figure 3.2-8 identifies associated processes and criteria for IOA 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. IOA is a system-level evaluation conducted in an operational environment to confirm the operational readiness and identify the safety hazards of a product to be part of the NAS. Therefore, IOA is performed on products that have achieved initial operating capability (IOC) at an operational field facility (the key site). Data collection at the key site for IOA may begin prior to IOC if there are concerns about:

- HW/SW installation
- Transition between the product under evaluation and any legacy assets

Data collected from monitoring System Test prior to IOC supplements formal data collection during IOA. After IOC, the product undergoing IOA 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 IOA are used to support the ISD or other decisions regarding the operational use and deployment of products.

The Vice President of Safety Services designates programs for IOA. Factors considered in designating programs include complexity, operational criticality, lifecycle cost, interoperability,

and hazards. An IOA is conducted by an IOA team that includes members from Air Traffic, Technical Operations, and other product users and is led by a program manager from the Office of Safety Assurance. The strategy, resources, and schedule for IOA are documented in the T&E section of the Implementation Strategy and Planning Document (ISPD). The Office of Safety Assurance co-approves the T&E Section of the ISPD for designated programs.

After formation, IOA teams are involved in monitoring key test events conducted earlier in SI or ISM to identify operational hazards. Identified hazards are communicated to the service organization and may affect the scope of IOA. At the conclusion of System Test activities, the Vice President of the Service Unit declares to the Vice President of the Office of Safety via IOTRD the system's readiness for IOA and operational use. Upon receipt of the IOTRD, and at the discretion of the Vice President of Safety Services, the IOA team commences IOA at the key site(s). At the conclusion of the IOA, the IOA team makes a determination of the product's operational readiness based on the safety hazards associated with any identified issues. IOA results are briefed to the key site managers, the service organization, and Air Traffic Organization stakeholders at the Directorate and Vice President levels.

- Independent Operational Test and Evaluation Characteristics:
- Key site evaluation of the system during live operations
- Independent evaluation team (IOA Team) of field users (Air Traffic, Technical Operations, Second-level Support, etc.)
- Verification of the meeting of operational requirements based on the COIs
- Identification of hazards and the operational readiness of the system in support of the ISD
- Definition of IOA requirements and strategies
- Monitoring by the IOA Team of key activities during System Test and Field

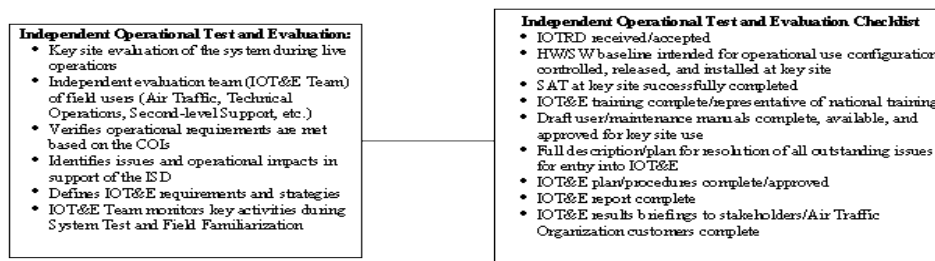


Figure 3.2-8: IOA Checklist

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

Figure 3.2-8 identifies associated processes and criteria for IOA 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. IOA is a system-level evaluation conducted in an operational environment to confirm the operational readiness and identify the safety hazards of a product to be part of the NAS. Therefore, IOA is performed on products that have achieved

initial operating capability (IOC) at an operational field facility (the key site). Data collection at the key site for IOA may begin prior to IOC if there are concerns about:

- HW/SW installation
- Transition between the product under evaluation and any legacy assets

Data collected from monitoring System Test prior to IOC supplements formal data collection during IOA. After IOC, the product undergoing IOA 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 IOA are used to support the ISD or other decisions regarding the operational use and deployment of products.

The Vice President of ATO Safety designates programs for IOA. Factors considered in designating programs include complexity, operational criticality, lifecycle cost, interoperability, and hazards. An IOA is conducted by an IOA team that includes members from Air Traffic, Technical Operations, and other product users and is led by a program manager from the Office of Independent Safety Assessment (ISA). The strategy, resources, and schedule for IOA are documented in the T&E section of the Implementation Strategy and Planning Document (ISPD). The Office of ISA co-approves the T&E Section of the ISPD for designated programs.

After formation, IOA teams are involved in monitoring key test events conducted earlier in SI or ISM to identify operational hazards. Identified hazards are communicated to the service organization and may affect the scope of IOA. At the conclusion of System Test activities, the Vice President of the Service Unit declares to the Vice President of ATO Safety via IOARD the system's readiness for IOA and operational use. Upon receipt of the IOARD, and at the discretion of the Vice President of ATO Safety, the IOA team commences IOA at the key site(s). At the conclusion of the IOA, the IOA team makes a determination of the product's operational readiness based on the safety hazards associated with any identified issues. IOA results are briefed to the key site managers, the service organization, and Air Traffic Organization stakeholders at the Directorate and Vice President levels.

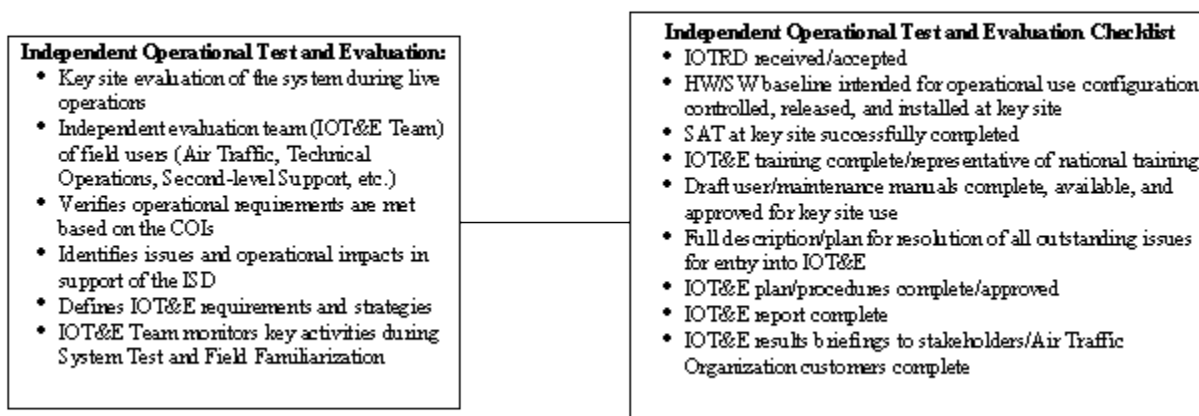


Figure 3.2-8: IOA Checklist

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

Figure 3.2-8 identifies associated processes and criteria for IOA 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. IOA is a system-level evaluation conducted in an operational environment to confirm the operational readiness and identify the safety hazards of a product to be part of the NAS. Therefore, IOA is performed on products that have achieved initial operating capability (IOC) at an operational field facility (the key site). Data collection at the key site for IOA may begin prior to IOC if there are concerns about:

- HW/SW installation
- Transition between the product under evaluation and any legacy assets

Data collected from monitoring System Test prior to IOC supplements formal data collection during IOA. After IOC, the product undergoing IOA 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 IOA are used to support the ISD or other decisions regarding the operational use and deployment of products.

The Vice President of ~~Safety Services~~ATO Safety designates programs for IOA. Factors considered in designating programs include complexity, operational criticality, lifecycle cost, interoperability, and hazards. An IOA is conducted by an IOA team that includes members from Air Traffic, Technical Operations, and other product users and is led by a program manager from the Office of Independent Safety Assurance Assessment (ISA). The strategy, resources, and schedule for IOA are documented in the T&E section of the Implementation Strategy and Planning Document (ISPD). The Office of ~~Safety Assurance~~ISA co-approves the T&E Section of the ISPD for designated programs.

After formation, IOA teams are involved in monitoring key test events conducted earlier in SI or ISM to identify operational hazards. Identified hazards are communicated to the service organization and may affect the scope of IOA. At the conclusion of System Test activities, the Vice President of the Service Unit declares to the Vice President of ~~the Office of~~ATO Safety via ~~IOTRD~~IOARD the system's readiness for IOA and operational use. Upon receipt of the ~~IOTRD~~IOARD, and at the discretion of the Vice President of ~~Safety Services~~ATO Safety, the IOA team commences IOA at the key site(s). At the conclusion of the IOA, the IOA team makes a determination of the product's operational readiness based on the safety hazards associated with any identified issues. IOA results are briefed to the key site managers, the service organization, and Air Traffic Organization stakeholders at the Directorate and Vice President levels.

- ~~Independent Operational Test and Evaluation Characteristics:~~ • ~~Key site evaluation of the system during live operations~~ • ~~Independent evaluation team (IOA Team) of field users (Air Traffic, Technical Operations, Second level Support, etc.)~~ • ~~Verification of the meeting of operational requirements based on the COIs~~ • ~~Identification of hazards and the operational readiness of the system in support of the ISD~~ • ~~Definition of IOA requirements and strategies~~ • ~~Monitoring by the IOA Team of key activities during System Test and Field~~

Figure 3.2-8: IOA 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 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 IOA (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, IOA, and the ISD.

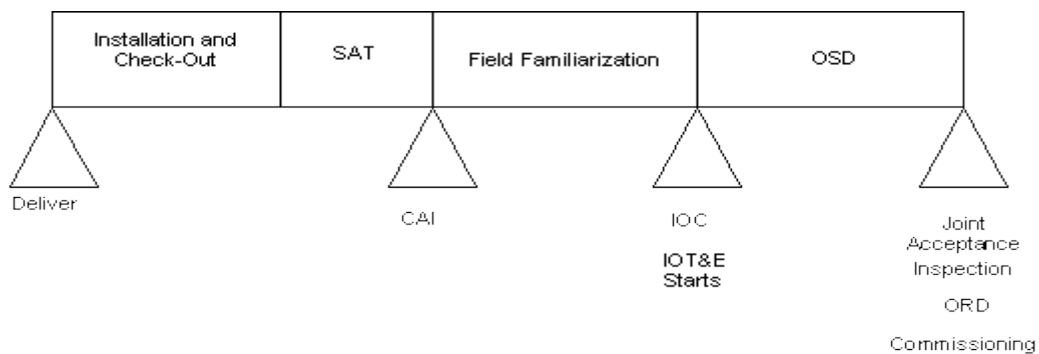


Figure 3.2-10: New Product Implementation

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 to 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 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 IOA (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, IOA, and the ISD.

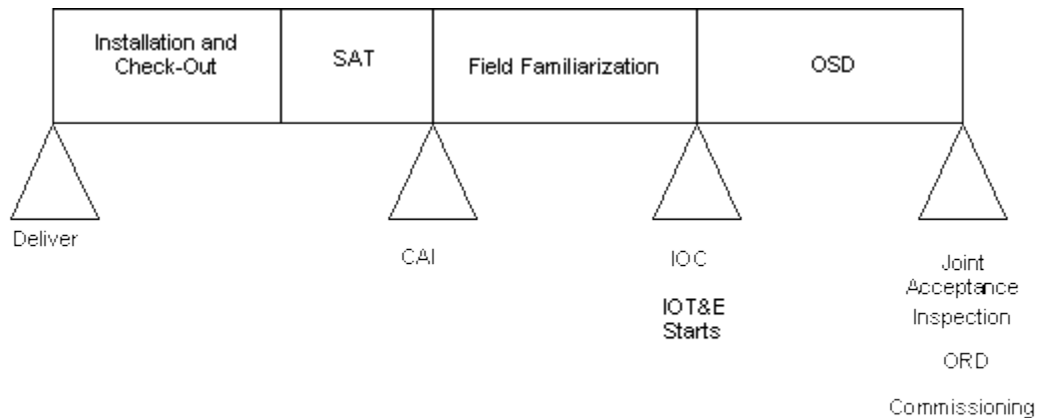


Figure 3.2-10: New Product Implementation

Red Line Content: Test and Evaluation Process Guidelines:
Section 3.2.7.1 : SI Field Familiarization Tests

Field familiarization 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 IOA (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, IOA, and the ISD.

Figure 3.2-10: New Product 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 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.

- | |
|---|
| <p style="text-align: center;">Air Traffic Automation
Operational Suitability
Requirement Checklist:</p> <ol style="list-style-type: none">1. Review
Documentation2. Review Site
Adaptation Changes3. Review Potential
Impacts4. Develop Test
Plan5. Coordinate with
Stakeholders6. Schedule
Implementation7. 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.

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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

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- 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

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 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 IOA 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.

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 IOA test sequence described in sections 3.1 and 3.2, suitably tailored to match the smaller scope typical of these projects.

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Red Line Content: Test and Evaluation Process Guidelines:

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

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Section 5.3 : OFFICE OF SAFETY ASSURANCE

Old Content: Test and Evaluation Process Guidelines:

Section 5.3 : OFFICE OF SAFETY ASSURANCE

The Office of Safety Assurance is responsible for planning and conducting IOA on designated programs. It develops IOA sections for inclusion in the T&E section of the Implementation Strategy and Planning Document (ISPD) and co-approves the ISPD T&E section on programs designated for IOA. The IOA team develops IOA plans and procedures. The Office of Safety

Assurance also provides assistance in the development of COIs for inclusion in the program's Program Requirements Document.

New Content: Test and Evaluation Process Guidelines:
Section 5.3 : OFFICE OF ISA

The Office of ISA is responsible for planning and conducting IOA on designated programs. It develops IOA sections for inclusion in the T&E section of the Implementation Strategy and Planning Document (ISPD) and co-approves the ISPD T&E section on programs designated for IOA. The IOA team develops IOA plans and procedures. The Office of ISA also provides assistance in the development of COIs for inclusion in the program's Program Requirements Document.

Red Line Content: Test and Evaluation Process Guidelines:
Section 5.3 : OFFICE OF ~~SAFETY ASSURANCE~~ISA

The Office of ~~Safety Assurance~~ **ISA** is responsible for planning and conducting IOA on designated programs. It develops IOA sections for inclusion in the T&E section of the Implementation Strategy and Planning Document (ISPD) and co-approves the ISPD T&E section on programs designated for IOA. The IOA team develops IOA plans and procedures. The Office of ~~Safety Assurance~~ **ISA** also provides assistance in the development of COIs for inclusion in the program's Program Requirements Document.

APPENDIX A - BEST PRACTICES

Old Content: Test and Evaluation Process Guidelines:
APPENDIX A - BEST PRACTICES

Best practices are fundamental principles that foster sound T&E programs.

A.1 Early Involvement of the Expanded T&E Team. Involve IOT&E and site personnel when defining the test strategy and increase coordination as development proceeds. IOT&E should be involved in all aspects of test planning and test strategy development that affect IOT&E. Field sector and air traffic managers should concur with the key site selection and with the demands that testing will place on the key site. The expanded test team should be apprised of program and schedule changes that might affect site testing, IOT&E, and Field Familiarization.

A.2 Use the WJHTC for Testing. The WJHTC has superb test and simulation facilities, experienced test personnel, and a corporate memory of FAA testing. Test at WJHTC instead of at the developer's facilities when realistic operational environments are critical to the test. Beginning OT at WJHTC will minimize test disruptions to site operations.

A.3 Early Testing. The earlier in the acquisition management process problems are discovered the easier they are to correct, the lower the cost to correct, and the smaller the schedule impact. Transfer testing forward from the operational site to WJHTC to the developer's facility when

feasible. Increase resources for early testing until the marginal cost of additional testing equals the expected savings associated with finding problems earlier rather than later.

A.4 Coordination. Test programs for major acquisitions are extremely complex. Test program success is dependent on team coordination, even when test documents are perfectly prepared.

A.5 Contractor/FAA Relationships. The relationship between FAA and contractor personnel should be cooperative and goal-oriented rather than adversarial. Testing is adversely affected if FAA goals and contractor goals are significantly different or if organization loyalties are more important than cooperating to get the job done.

A.6 Use Software Inspections and Automated Tools to Reduce Testing Costs. It is reported that 60 to 90 percent of software defects are found through software inspection. In addition to eliminating some repetitive manual tasks, tools can promote effective dynamic analysis by guiding the selection of test data and monitoring test execution.

A.7 Testing COTS/NDI. COTS/NDI systems, like developmental systems, must satisfy NAS operational performance and suitability requirements. The greatest differences between COTS/NDI system testing and developmental system testing occur in lower-level tests where the user does not have access to COTS/NDI code, board designs, etc. Consider conducting OCDs/OCTs to stress COTS/NDI components and to demonstrate that the COTS/NDI equipment will function as expected in the NAS operational environment.

A.8 Joint Test Programs. For joint test programs to be successful, planning must start early in the acquisition management process. Mitigate differences through coordination, define roles and responsibilities, ensure requirements are broad enough to cover all participant needs, and develop and use similar test strategies.

A.9 Dry Runs. All test programs significantly benefit from the performance of “dry runs” of tests/procedures prior to formal conduct.

New Content: Test and Evaluation Process Guidelines:

APPENDIX A - BEST PRACTICES

Best practices are fundamental principles that foster sound T&E programs.

A.1 Early Involvement of the Expanded T&E Team. Involve IOA and site personnel when defining the test strategy and increase coordination as development proceeds. IOA should be involved in all aspects of test planning and test strategy development that affects IOA. Field sector and air traffic managers should concur with the key site selection and with the demands that testing will place on the key site. The expanded test team should be apprised of program and schedule changes that might affect site testing, IOA, and Field Familiarization.

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A.9 Dry Runs. All test programs significantly benefit from the performance of "dry runs" of tests/procedures prior to formal conduct.

Red Line Content: Test and Evaluation Process Guidelines:

APPENDIX A - BEST PRACTICES

Best practices are fundamental principles that foster sound T&E programs.

A.1 Early Involvement of the Expanded T&E Team. Involve IOT&EIOA and site personnel when defining the test strategy and increase coordination as development proceeds. IOT&EIOA should be involved in all aspects of test planning and test strategy development that affectaffects IOT&EIOA. Field sector and air traffic managers should concur with the key site selection and

with the demands that testing will place on the key site. The expanded test team should be apprised of program and schedule changes that might affect site testing, [IOT&EIOA](#), and Field Familiarization.

A.2 Use the WJHTC for Testing. The WJHTC has superb test and simulation facilities, experienced test personnel, and a corporate memory of FAA testing. Test at WJHTC instead of at the developer's facilities when realistic operational environments are critical to the test. Beginning OT at WJHTC will minimize test disruptions to site operations.

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A.9 Dry Runs. All test programs significantly benefit from the performance of "dry runs" of tests/procedures prior to formal conduct.

C-11: SAMPLE IOARD FORMAT

Old Content: Test and Evaluation Process Guidelines:
C-11: SAMPLE IOARD FORMAT

Appendix C-11

[Sample IOARD Format]

[3/22/10]

[Note: The IOARD should provide details about the **current** status of the system. It **does not** describe what will be done to the system **in the future**, but rather what state it is in **at this point**.]

1.0 Test Status

1.1 Status

[Report the status of DT and OT. It is expected that DT and OT have been successfully completed and have met all exit criteria. State whether the AMS T&E Guidance was followed or tailored. If it was tailored, describe what was changed. State whether the T&E Gold Standard was used.]

1.2 Results

[Summarize the **results** of DT and OT. The write-up should detail which tests/requirements, if any, have failed. Typically, the summary states that tests indicate the system will be ready for approval at the In-Service Decision milestone. For open items from OT and DT, the IOARD should contain an appendix that provides the disposition of each (e.g., deferred to next phase, "planned for closure prior to IOT&E," "fix planned for Build XXX").]

1.3 Test Report and Distribution

[Summarize the test report and distribution status. A representative entry might state that DT reports and Quick-Look OT reports have been completed and distributed to the appropriate parties, including the Office of SSIA and all test participants. Include information about any supplemental test reports that provide additional information on DT or OT results.]

2.0 System Status

2.1 Open PTRs

[Summarize the number of open PTRs and their significance (type) and overall impact on system performance, suitability, and effectiveness. Identify any PTRs that will **not** be closed before the start of IOA, along with expected closure date. Identify any limitations to operational use that the open PTRs might pose.]

2.2 System Stability

[Describe the stability of the system in terms of configuration management and baselining. Include a list of all unapproved or pending deviations/waivers. For example, "system hardware, software, and specifications are baselined and under the configuration control of the NAS CCB." The IOARD should address the **national baseline** of the system. Describe the schedule for any planned software or hardware revisions required during IOA and how they will be handled. If the system is not under NAS CCB control, a description of the configuration management process should be included.]

2.3 Status of Issues/Concerns from the Pre-IOA Status Paper

[Provide a table or appendix that contains the current status of the Issues/Concerns documented in the Pre-IOA Status Paper.]

Issues/Concerns	Current Status [(Current Date)]
[Issues/Concerns Statement]	[status]
[Issues/Concerns Statement]	[status]
[Issues/Concerns Statement]	[status]

3.0 IOA Prerequisite Status

[Provide the status of each IOA prerequisite detailed in the T&E section of the program's Implementation Strategy and Planning Document (ISPD) and the proposed workaround if the prerequisite is not ready/available/complete.]

3.1 Status of Site Acceptance

[Provide the status of Site Acceptance by the FAA at the key site.]

3.2 Equipment Support Status

[Describe the support equipment for the system. A typical statement might be: "Spares for all FAA-maintained equipment are on site, and the logistics center will maintain a two year supply of spares for the LRU. Leased equipment will be maintained by the _____ Company."]

3.3 Technical Operations Manuals

[Describe the status of Technical Operations manuals. Are they available, verified, and approved for use at the key site?]

3.4 Training Status

[Describe the training given to operational facility personnel. For example, "Personnel who will operate and maintain the system during IOA have received the approved training, which is representative of the training that will be given to operational personnel at downstream sites."]

3.5 AT Procedures Status

[If changes are/were required to AT procedures, state whether the new procedures have been approved or incorporated into the appropriate documentation (i.e., FAA Order 7110.65).]

3.6 Safety Status

[The current signed SRMD, updated with the results from OT, should be provided. Provide the current status of each hazard, and associated mitigations, identified in the most current SRMD, as reflected in the monitoring plan.]

3.7 Readiness for Operational Use

[Describe any concerns (e.g., training, procedures, system stability) with using the system operationally at the key site.]

3.8 IOC

[Describe the readiness of the site to declare IOC.]

3.9 Additional Sites

[Describe any additional sites that will declare IOC or have already declared IOC prior to the ISD, which is not permitted by the AMS.]

4.0 Exceptions

[Identify and describe any outstanding exceptions to the readiness of the system for operational use at key site (see sections 1.0 through 3.0, above). Describe the **operational impact** of the exception(s) and the **justification** for proceeding with an IOARD despite the exception(s). An exception is considered an open/unresolved item or deficiency that has a **potential significant operational impact**. These problems usually impact system performance or require an operational workaround by the users.]

5.0 Recommendation

[Clearly state the recommendation and any associated conditions. For example, "The system is ready for operational use. [Responsible Service Organization] recommends proceeding before the PTRs identified in section 2.1 are closed.")]

Declaration of Readiness: Signed, [VP of the Responsible Service Organization] [Date}

New Content: Test and Evaluation Process Guidelines:

C-11: SAMPLE IOARD FORMAT

Appendix C-11

[Sample IOA Readiness Declaration (IOARD) Format]

[1/27/11]

[Note: The IOARD should provide details about the current status of the system. It does not describe what will be done to the system in the future, but rather the system state at this point.

The IOARD is considered official correspondence between the responsible service organization and the Office of Safety; as such, a softcopy should also be sent to the Office of Safety Correspondence Mailbox (9-AWA-AJS-COR; see Correspondence Mailbox guidance).]

- Test Status

1.1 Status

[Report the **status** of Development Test (DT) and Operational Test (OT). It is expected that DT and OT have been successfully completed and have met all exit criteria. State whether the Acquisition Management System (AMS) Test and Evaluation (T&E) guidance was followed or tailored. If it was tailored, describe what was changed. State whether the T&E Gold Standard was used.]

1.2 Results

[Summarize the **results** of DT and OT. The write-up should detail which tests/requirements, if any, have failed. Typically, the summary states that tests indicate the system will be ready for approval at the In-Service Decision (ISD) milestone. For open items from OT and DT, the IOARD should contain an appendix that provides the disposition of each (e.g., "deferred to next phase," "planned for closure prior to IOA," "fix planned for Build XXX").]

1.3 Test Report and Distribution

[Summarize the test report and distribution status. A representative entry might state that DT reports and Quick-Look OT reports have been completed and distributed to the appropriate parties, including the Office of ISA and all test participants. Include information about any supplemental test reports that provide additional information on DT or OT results.]

- System Status

2.1 Open Program Trouble Reports (PTRs)

[Summarize the number of open PTRs and their significance (type) and overall impact on system performance, suitability, and effectiveness. Identify any PTRs that will **not** be closed before the start of IOA, along with the expected closure date. Identify any limitations to operational use that the open PTRs might pose.]

2.2 System Stability

[Describe the stability of the system in terms of configuration management and baselining. Include a list of all unapproved or pending deviations/waivers. For example, "system hardware, software, and specifications are baselined and under the configuration control of the National Airspace (NAS) Configuration Control Board (CCB)." The IOARD should address the **national baseline** of the system. Describe the schedule for any planned software or hardware revisions required during IOA and how they will be handled. If the system is not under NAS CCB control, a description of the configuration management process should be included.]

2.3 Status of Issues/Concerns from the Pre-IOA Status Paper

[Provide a table or an appendix that contains the current status of the issues/concerns documented in the Pre-IOA Status Paper.]

Issue/Concern	Current Status [(Current Date)]
[Issue/Concern Statement]	[status]
[Issue/Concern Statement]	[status]
[Issue/Concern Statement]	[status]

- IOA Prerequisite Status

[Provide the status of each IOA prerequisite detailed in the Implementation Strategy and Planning Document (ISPD) and the proposed workaround if the prerequisite is not ready/available/complete.]

3.1 Status of Site Acceptance

[Provide the status of Site Acceptance by the FAA at the key site.]

3.2 Equipment Support Status

[Describe the support equipment for the system. A typical statement might be: "Spares for all FAA-maintained equipment are on site, and the logistics center will maintain a two-year supply of spares for the Line Replaceable Unit (LRU). Leased equipment will be maintained by the _____ Company."]

3.3 Technical Operations Manuals

[Describe the status of Technical Operations manuals. Are they available, verified, and approved for use at the key site?]

3.4 Training Status

[Describe the training given to operational facility personnel. For example, "Personnel who will operate and maintain the system during IOA have received the approved training, which is representative of the training that will be given to operational personnel at downstream sites."]

3.5 AT Procedures Status

[If changes are/were required to Air Traffic (AT) procedures, state whether the new procedures have been approved or incorporated into the appropriate documentation (i.e., FAA Order 7110.65).]

3.6 Safety Status

[The current signed Safety Risk Management Document (SRMD), updated with the results from OT, should be provided. Provide the current status of each hazard as reflected in the monitoring plan that is identified in the most current SRMD.]

3.7 Readiness for Operational Use

[Describe any concerns (e.g., training, procedures, system stability) with operational use of the system at the key site.]

3.8 Initial Operating Capability (IOC)

[Describe the key site's readiness to declare IOC.]

3.9 Additional Sites

[Describe any additional sites that will declare IOC or have already declared IOC prior to the ISD (which is not permitted by the AMS).]

- Exceptions

[Identify and describe any outstanding exceptions to the readiness of the system for operational use at the key site (see Sections 1.0 through 3.0 above). Describe the **operational impact** of the exception(s) and the **justification** for proceeding with an IOARD despite the exception(s). An exception is considered an open/unresolved item or deficiency that has a **potential significant operational impact**. These problems usually impact system performance or require an operational workaround by the users.]

- Recommendation

[Clearly state the recommendation and any associated conditions. For example, "The system is ready for operational use. [Responsible Service Organization] recommends proceeding before the PTRs identified in Section 2.1 are closed."]

Declaration of Readiness: Signed, [VP of the Responsible Service Organization]

[Date]

Red Line Content: Test and Evaluation Process Guidelines:
C-11: SAMPLE IOARD FORMAT

Appendix C-~~11~~11

[Sample *IOA Readiness Declaration* (IOARD) Format]

[~~31/2227/1011~~]

[Note:- The IOARD should provide details about the current status of the system. It does not describe what will be done to the system in the future, but rather ~~what state it~~the is insystem state at this point.]

~~1.0~~

The IOARD is considered official correspondence between the responsible service organization and the Office of Safety; as such, a softcopy should also be sent to the Office of Safety Correspondence Mailbox (9-AWA-AJS-COR; see Correspondence Mailbox guidance).

- Test Status

1.1 Status

[Report the **status** of *Development Test (DT)* and *Operational Test (OT)*. - It is expected that DT and OT have been successfully completed and have met all exit criteria. State whether the *Acquisition Management System (AMS) Test and Evaluation (T&E) Guidance* was followed or tailored. If it was tailored, describe what was changed. State whether the T&E Gold Standard was used.]

1.2 Results-

[Summarize the **results** of DT and OT. The write-up should detail which tests/_requirements, if any, have failed. Typically, the summary states that tests indicate the system-will be-ready for approval at the In-Service Decision (*ISD*) milestone. For open items from OT and DT, the IOARD should contain an appendix that provides the disposition of each (e.g., “deferred to next phase,” “planned for closure prior to ~~IOA~~, &~~#8221~~; “fix planned for Build XXX”].]

1.3 Test Report and Distribution

[Summarize the test report and distribution status. A representative entry might state that DT reports and Quick-Look OT reports have been completed and distributed to the appropriate parties, including the Office of SSA/ISA and all test participants. Include information about any supplemental test reports that provide additional information on DT or OT results.]

2.0

- System Status

2.1 Open Program Trouble Reports (PTRs)

[Summarize the number of open PTRs and their significance (type) and overall impact on system performance, suitability, and effectiveness. Identify any PTRs that will **not** be closed before the start of IOA, along with the expected closure date. Identify any limitations to operational use that the open PTRs might pose.]

2.2 System Stability

[Describe the stability of the system in terms of configuration management and baselining. Include a list of all unapproved or pending deviations/waivers. For example, "system hardware, software, and specifications are baselined and under the configuration control of the National Airspace (NAS) Configuration Control Board (CCB)." The IOARD should address the **national baseline** of the system. Describe the schedule for any planned software or hardware revisions required during IOA and how they will be handled. If the system is not under NAS CCB control, a description of the configuration management process should be included.]

2.3 Status of Issues/Concerns from the Pre-IOA Status Paper

[Provide a table or an appendix that contains the current status of the Issues/Concerns documented in the Pre-IOA Status Paper.]

<u>Issues</u> <u>Issue/Concern</u>	Current Status [(Current Date)]
<u>Issues/Concern</u> Statement]-	[status]
<u>Issues/Concern</u> Statement]-	[status]

[Issues <u>Issue</u> /Concerns <u>Concern</u> Statement]-	[status]
---	----------

3.0

- IOA Prerequisite Status

[Provide the status of each IOA prerequisite detailed in the T&E section of the program's Implementation Strategy and Planning Document (ISPD) and the proposed workaround if the prerequisite is not ready/available/complete.]

3.1 Status of Site Acceptance

[Provide the status of Site Acceptance by the FAA at the key site.]

3.2 Equipment Support Status

[Describe the support equipment for the system. A typical statement might be: "Spares for all FAA-maintained equipment are on site, and the logistics center will maintain a two-year supply of spares for the Line Replaceable Unit (LRU). Leased equipment will be maintained by the _____ Company."]

3.3 Technical Operations Manuals

[Describe the status of Technical Operations manuals. Are they available, verified, and approved for use at the key site?]

3.4 Training Status

[Describe the training given to operational facility personnel. For example, "Personnel who will operate and maintain the system during IOA have received the approved training, which is representative of the training that will be given to operational personnel at downstream sites."]

3.5 AT Procedures Status

[If changes are/were required to Air Traffic (AT) procedures, state whether the new procedures have been approved or incorporated into the appropriate documentation (i.e., FAA Order 7110.65).]

3.6 Safety Status

[The current signed Safety Risk Management Document (SRMD), updated with the results from OT, should be provided. Provide the current status of each hazard, and associated

mitigations, as identified reflected in the most monitoring current plan SRMD, that as reflected is identified in the monitoring most plan current SRMD.]

3.7 Readiness for Operational Use

[Describe any concerns (e.g., training, procedures, system stability-) with using operational use of the system operationally at the key site.]

3.8 Initial Operating Capability (IOC)

[Describe the readiness of the key site's readiness to declare IOC.]

3.9 Additional Sites

[Describe any additional sites that will declare IOC or have already declared IOC prior to the ISD; (which is not permitted by the AMS).]

4.0

- Exceptions

[Identify and describe any outstanding exceptions to the readiness of the system for operational use at the key site (see sections Sections 1.0 through 3.0; above). - Describe the operational impact of the exception(s) and the justification for proceeding with an IOARD despite the exception(s). An exception is considered an open/unresolved item or deficiency that has a potential significant operational impact. These problems usually impact system performance or require an operational workaround by the users.]

5.0

- Recommendation

[Clearly state the recommendation and any associated- conditions. For example, "The system is ready for operational use. [Responsible Service Organization] recommends proceeding before the PTRs identified in section Section 2.1 are closed."]

-

-

Declaration of Readiness:- Signed, [VP of the Responsible Service Organization]

-

[Date]

D.1 IOA Documentation

Old Content: Test and Evaluation Process Guidelines:

D.1 IOA Documentation

During early program monitoring, the Office of Safety Assurance identifies potential hazards and communicates them to the service organization via informal verbal communication and formal written communication. IOA required documentation includes input to the ISPD test and evaluation section, an IOA plan, an IOA procedures document, and an IOA Team assessment report (IOA Report). Figure DI-1 depicts a generic timeline of IOA activities and shows when supporting IOA documents would normally be developed.

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

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

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

Pre-IOA Status Paper. Subsequent to OT completion and prior to the IOARD, the Office of Safety Assurance and the IOA team prepare a status paper for the service organization that provides a summary of the potential risks that are being tracked as IOA approaches.

Intermediate Email. Halfway through IOA (and during Data Reduction and Analysis (DR&A), if new significant concerns are identified), the PM sends an email summarizing, at a high level (i.e., not IIS data), significant concerns to the Service Team Lead (see Intermediate Email template).

Preliminary IOA Report. A Preliminary IOA Report may be developed to allow for the earlier identification and resolution of hazards prior to the ISD (see template). Once the program is designated for IOA, the PM must discuss this option with the Service Team Lead. The PM

should promote the benefits of a Preliminary IOA Report but stress its effect on the program schedule. The Service Team's decision on having a Preliminary IOA Report must be documented in an email from the PM to the Service Team Lead and the SA Manager, with a "cc:" to the Director. The decision can also be recorded in the ISPD if it has not been finalized. The Preliminary IOA Report is prepared during the IOA caucus and includes the identified hazards and ratings, an Executive Summary, and does not include an assessment of Operational Readiness.

The Service Team must respond to the Preliminary IOA Report via memorandum at a minimum of five weeks prior to the ISD, indicating that the system is ready to be assessed for Operational Readiness. The length of time for IOA activities after the Service Team's response may need to be negotiated if major changes are made to the system after the Preliminary IOA Report. Upon receiving the Service Team response, the IOA Team Lead reconvenes the team to re-evaluate the system. At this time, the system is assessed for Operational Readiness.

Report. The IOA report will be distributed to the service organization and all ATO stakeholders at the Directorate and Vice President levels. This report supports the in-service decision. Due to the independent nature of the IOA report, there is no formal comment/review process outside of the IOA team. The IOA report is based on all data available at that time.

Follow-on Assessment and Reporting. The Office of Safety Assurance, along with the IOA team, provides a follow-up assessment on any new hazards/risks identified after the ISD and a status of significant hazards that were identified in the original IOA report. Results of the follow-up assessment are detailed in a follow-up report issued approximately six months following the ISD.

-

New Content: Test and Evaluation Process Guidelines:

D.1 IOA Documentation

During early program monitoring, the Office of ISA identifies potential hazards and communicates them to the service organization via informal verbal communication and formal written communication. IOA required documentation includes input to the ISPD test and evaluation section, an IOA plan, an IOA procedures document, and an IOA Team assessment report (IOA Report). Figure D1-1 depicts a generic timeline of IOA activities and shows when supporting IOA documents would normally be developed.

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

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prepares a signature page for the front of the ISPD T&E section, and, if applicable, a memo to the service team lead detailing any issues or conditions prior to co-approval.

IOA Plan and Procedures. The IOA Plan and Procedures documents should include scheduling, resources, coverage of system test, and data collection and analysis to allow a formal IOA team assessment of the system's operational readiness.

Pre-IOA Status Paper. Subsequent to OT completion and prior to the IOARD, the Office of ISA and the IOA team prepare a status paper for the service organization that provides a summary of the potential risks that are being tracked as IOA approaches.

Intermediate Email. Halfway through IOA (and during Data Reduction and Analysis (DR&A), if new significant concerns are identified), the PM sends an email summarizing, at a high level (i.e., not IIS data), significant concerns to the Service Team Lead (see Intermediate Email template).

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

Figure D.1-1: Generic Timeline of IOA Activities

[Click here to view figure](#)

Red Line Content: Test and Evaluation Process Guidelines:
D.1 IOA Documentation

During early program monitoring, the Office of ~~Safety Assurance~~ ISA identifies potential hazards and communicates them to the service organization via informal verbal communication and formal written communication. IOA required documentation includes input to the ISPD test and evaluation section, an IOA plan, an IOA procedures document, and an IOA Team assessment report (IOA Report). Figure D1-1 depicts a generic timeline of IOA activities and shows when supporting IOA documents would normally be developed.

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Follow-up Assessment and Reporting. The Office of ~~Safety Assurance~~ISA, along with the IOA team, provides a follow-up assessment on any new hazards/risks identified after the ISD and a status of significant hazards that were identified in the original IOA report. Results of the follow-up assessment are detailed in a follow-up report issued approximately six months following the ISD.

Figure D.1-1: Generic Timeline of IOA Activities

[Click here to view figure](#)

D2 IOA Team

Old Content: Test and Evaluation Process Guidelines:
D2 IOA Team

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

The Office of Safety Assurance coordinates with appropriate ATO offices to obtain IOA team members from field facilities. Additional participants may include non-FAA personnel who

are system users such as the National Weather Service, and employees of the Department of Defense.

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

IOA Team Responsibility. The IOA 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, IOA team assessments and/or recommendations will be based solely on the analyses of system performance and capabilities during IOA and of data collected during earlier test phases.

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

Role of Office of Safety Assurance and IOA 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 Safety Assurance 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 IOA program manager should be those defined in the Program Requirements Document.

New Content: Test and Evaluation Process Guidelines:
D2 IOA Team

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Red Line Content: Test and Evaluation Process Guidelines:
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Office of ~~Safety Assurance~~'ISA's Role in IOA. The IOA program manager from the Office of ~~Safety Assurance~~ ISA leads and provides full administrative support to the IOA team during IOA. The Office of ~~Safety Assurance~~ ISA facilitates the final IOA team system assessment by ensuring proper collection, analysis, and reporting of results. The IOA team reports the operational assessment of the evaluated system to the in-service decision authority. The Manager of the Office of ~~Safety Assurance~~ ISA represents independent test and evaluation within the FAA.

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D.3 Relationship with Service Organizations

Old Content: Test and Evaluation Process Guidelines:

D.3 Relationship with Service Organizations

IOA program managers should attend all pertinent service organization activities and work closely with the service organizations regarding IOA and the early identification of hazards/risks during the monitoring process. The IOA team is provided access to SI system test documentation, which it reviews and on which it provides comments. During IOA, the service organization may decide to withdraw the system if further development and/or corrective action is required before IOA proceeds.

Safety Assurance Interaction with Test Work Groups. For programs with an established Test Work Group (TWG), PMs are encouraged to participate. This helps the Office of SA understand the Service Team's test strategy, and it helps the Service Team understand IOA strategy, particularly as it applies to COI assessment and multiple IOA activities. Participation in the TWG allows the PM to share Lessons Learned from previous IOAs and to be involved in reviewing documents produced by the TWG members. Participation also ensures that IOA resource requirements are explained.

SA Involvement with Operational Capability Tests and Operational Capability Demonstrations. The Office of SA may monitor Operational Capability Tests and Operational Capability Demonstrations, system evaluations conducted prior to contract award, and R&D demonstrations of designated programs. To maintain its independence, the Office of SA does not directly participate in these activities, but instead monitors them to identify potential safety hazards and possible areas of improvement in the evaluation process.

New Content: Test and Evaluation Process Guidelines:

D.3 Relationship with Service Organizations

IOA program managers should attend all pertinent service organization activities and work closely with the service organizations regarding IOA and the early identification of hazards/risks during the monitoring process. The IOA team is provided access to SI system test documentation, which it reviews and on which it provides comments. During IOA, the service organization may decide to withdraw the system if further development and/or corrective action is required before IOA proceeds.

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Red Line Content: Test and Evaluation Process Guidelines:
D.3 Relationship with Service Organizations

IOA program managers should attend all pertinent service organization activities and work closely with the service organizations regarding IOA and the early identification of hazards/risks during the monitoring process. The IOA team is provided access to SI system test documentation, which it reviews and on which it provides comments. During IOA, the service organization may decide to withdraw the system if further development and/or corrective action is required before IOA proceeds.

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D.4 IOA Designation Process

Old Content: Test and Evaluation Process Guidelines:

D.4 IOA Designation Process

Prior to convening the IOA designation board, representatives from each organization meet to discuss the programs and recommendations. The IOA designation process is conducted at least once a year and is scheduled to support FAA and Office of Safety Assurance budget development. Figure 1 depicts the IOA designation process.

- The Office of SA's Designation Lead manages the designation process by adhering to the following process:
- The Office of SA conducts a review of new and existing acquisition programs, as well as any additional activities requested by the Vice President of the Office of Safety or Designation Working Group. Acquisition program information is garnered from other sources, such as readiness decisions, Joint Resources Council (JRC) readiness meeting minutes, and Office of Management and Budget Exhibits 300.
- The Office of SA prepares program information sheets (see template) that include designation recommendations based on the program review.
- The Office of SA updates all existing Program Management Plans (PMPs) (at a minimum, the Resources section) (see PMP template). The Designation Lead and an SA budget Point of Contact (POC) analyze the resource estimates in the updated PMPs against the projected activities associated with anticipated program designation and IOA strategies; as necessary, the Office of SA develops resource mitigation strategies.
- Representatives from the IOA Designation Board's member organizations review the information package and develop recommendations for the Designation Board to review.
- If resources are not sufficient, the IOA Designation Board prioritizes recommendations based on potential complexity, criticality, acquisition cost, and hazards, so that the Vice President of the Office of Safety can make decisions on IOA designation relative to Office of SA staffing and funding levels.
- The IOA Designation Board reviews the program information and makes recommendations to the Vice President of the Office of Safety concerning IOA program designation and designated program priorities. The Vice President of the Office of Safety approves or modifies the recommendations.
- The Vice President of the Office of Safety sends a decision memorandum identifying all programs designated for IOA to the Vice Presidents of the operational Service Units and also provides a copy to the Office of Aviation Safety.
- Program designation decisions are reviewed at key program milestones. A decision to increase or decrease the level of IOA activity can be made at these times.
- If the Vice President of the Office of Safety removes a program from IOA designation, the Office of SA prepares a decision memorandum to be signed by the Vice President of the Office of Safety.

Figure D4-1: IOA Designation Process

New Content: Test and Evaluation Process Guidelines:

D.4 IOA Designation Process

Prior to convening the IOA designation board, representatives from each organization meet to discuss the programs and recommendations. The IOA designation process is conducted at least once a year and is scheduled to support FAA and Office of ISA budget development. Figure D.4-1 depicts the IOA designation process.

- The Office of ISA's Designation Lead manages the designation process by adhering to the following process:
- The Office of ISA conducts a review of new and existing acquisition programs, as well as any additional activities requested by the Vice President of ATO Safety or Designation Working Group. Acquisition program information is garnered from other sources, such as readiness decisions, Joint Resources Council (JRC) readiness meeting minutes, and Office of Management and Budget Exhibits 300 (designated programs only).
- The Office of ISA prepares program information sheets (see template) that include designation recommendations based on the program review.
- The Office of ISA updates all existing Program Management Plans (PMPs) (at a minimum, the Resources section) (see PMP template). The Designation Lead and an ISA budget Point of Contact (POC) analyze the resource estimates in the updated PMPs against the projected activities associated with anticipated program designation and IOA strategies; as necessary, the Office of ISA develops resource mitigation strategies.
- Representatives from the IOA Designation Board's member organizations review the information package and develop recommendations for the Designation Board to review.
- If resources are not sufficient, the IOA Designation Board prioritizes recommendations based on potential complexity, criticality, acquisition cost, and hazards, so that the Vice President of ATO Safety can make decisions on IOA designation relative to Office of ISA staffing and funding levels.
- The IOA Designation Board reviews the program information and makes recommendations to the Vice President of ATO Safety concerning IOA program designation and designated program priorities. The Vice President of ATO Safety approves or modifies the recommendations.
- The Vice President of ATO Safety sends a decision memorandum identifying all programs designated for IOA to the Vice Presidents of the operational Service Units and also provides a copy to the Office of Aviation Safety.
- Program designation decisions are reviewed at key program milestones. A decision to increase or decrease the level of IOA activity can be made at these times.

- *If the Vice President of ATO Safety removes a program from IOA designation, the Office of ISA prepares a decision memorandum to be signed by the Vice President of ATO Safety.*

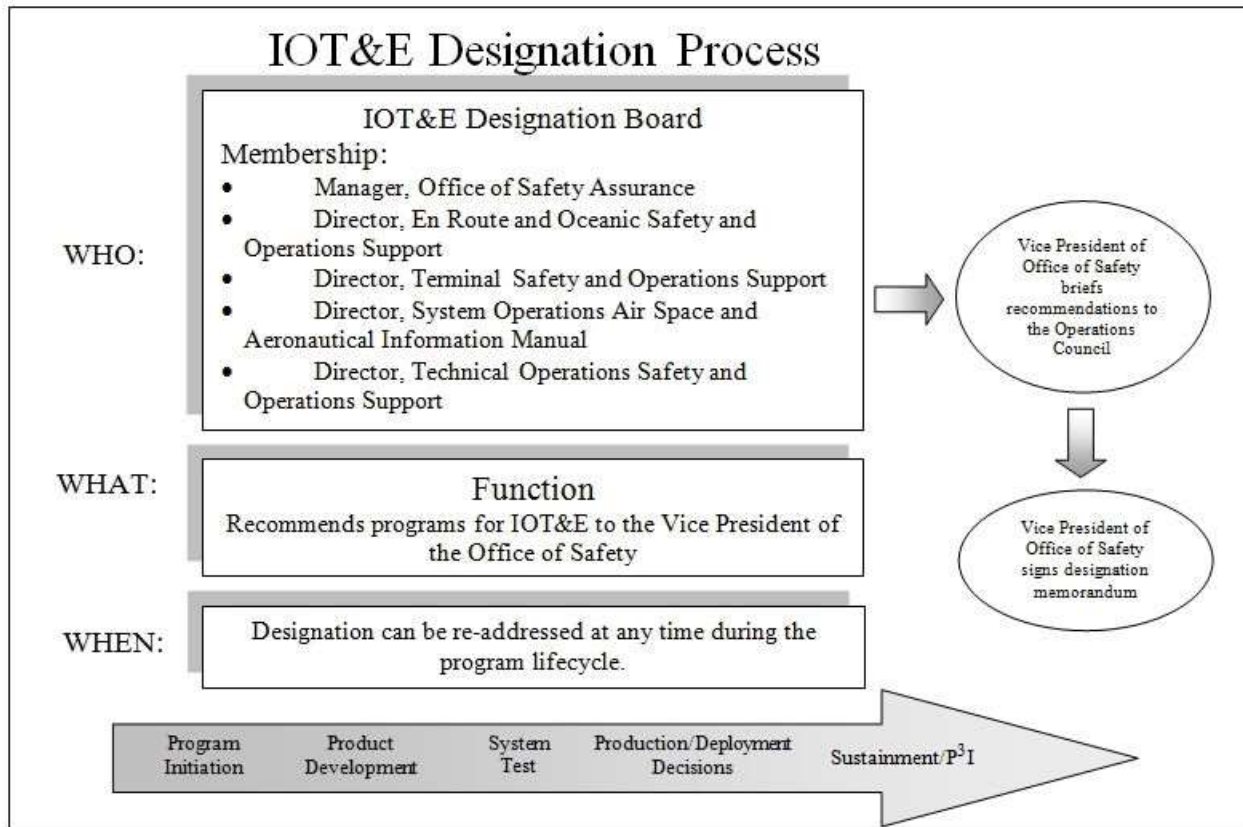


Figure D.4-1: IOA Designation Process

*Red Line Content: Test and Evaluation Process Guidelines:
D.4 IOA Designation Process*

Prior to convening the IOA designation board, representatives from each organization meet to discuss the programs and recommendations. The IOA designation process is conducted at least once a year and is scheduled to support FAA and Office of ~~Safety Assurance~~ ISA budget development. Figure D.4-1 depicts the IOA designation process.

- *The Office of ~~SAISA~~'s Designation Lead manages the designation process by adhering to the following process:*
- *The Office of ~~SAISA~~ conducts a review of new and existing acquisition programs, as well as any additional activities requested by the Vice President of ~~the Office of ATO Safety~~ or Designation Working Group. Acquisition program information is garnered from other sources, such as readiness decisions, Joint Resources Council (JRC) readiness meeting minutes, and Office of Management and Budget Exhibits 300 (designated programs only).*

- The Office of SAISA prepares program information sheets (see template) that include designation recommendations based on the program review.
- The Office of SAISA updates all existing Program Management Plans (PMPs) (at a minimum, the Resources section) (see PMP template). The Designation Lead and an SAISA budget Point of Contact (POC) analyze the resource estimates in the updated PMPs against the projected activities associated with anticipated program designation and IOA strategies; as necessary, the Office of SAISA develops resource mitigation strategies.
- Representatives from the IOA Designation Board’s member organizations review the information package and develop recommendations for the Designation Board to review.
- If resources are not sufficient, the IOA Designation Board prioritizes recommendations based on potential complexity, criticality, acquisition cost, and hazards, so that the Vice President of ~~the Office of~~ ATO Safety can make decisions on IOA designation relative to Office of SAISA staffing and funding levels.
- The IOA Designation Board reviews the program information and makes recommendations to the Vice President of ~~the Office of~~ ATO Safety concerning IOA program designation and designated program priorities. The Vice President of ~~the Office of~~ ATO Safety approves or modifies the recommendations.
- The Vice President of ~~the Office of~~ ATO Safety sends a decision memorandum identifying all programs designated for IOA to the Vice Presidents of the operational Service Units and also provides a copy to the Office of Aviation Safety.
- Program designation decisions are reviewed at key program milestones. A decision to increase or decrease the level of IOA activity can be made at these times.
- If the Vice President of ~~the Office of~~ ATO Safety removes a program from IOA designation, the Office of SAISA prepares a decision memorandum to be signed by the Vice President of ~~the Office of~~ ATO Safety.

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Figure D4D.4-1: IOA Designation Process

D.5 IOA Method of System Assessment

Old Content: Test and Evaluation Process Guidelines:

D.5 IOA Method of System Assessment

The evaluation process will begin by correlating the collected data from DT, OT, Field Familiarization, and IOA with the COIs/MOEs/MOSs to verify that all operational requirements have been assessed (see paragraph 4.3.1 for a description of COI/MOE/MOS decomposition). There is a data trail from the Data Elements/MOPs to the MOEs/MOSs, and in turn, to the corresponding COIs and the hazards identified in the SRMD (if applicable).

The IOA Team will analyze the data to identify problems and categorize them as either operational hazards or comments. Identified operational hazards will then be assessed for operational risk using the process described below.

Operational Hazard Assessment

Documenting an IOA hazard involves the first nine steps of the Preliminary Hazard Analysis, which is depicted in the figure below.

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Figure D.5-1: Preliminary Hazard Analysis

-

Definitions of Severity

The IOA Team will assess the severity of each hazard using the following matrix:

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Figure D.5-2: Definitions of Severity

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.

IOA Results

Results from IOA will be documented in an IOA 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 IOA 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 IOA Method of System Assessment

The evaluation process will begin by correlating the collected data from DT, OT, Field Familiarization, and IOA with the COIs/MOEs/MOSs to verify that all operational requirements have been assessed (see paragraph 4.3.1 for a description of COI/MOE/MOS decomposition). There is a data trail from the Data Elements/MOPs to the MOEs/MOSs, and in turn, to the corresponding COIs and the hazards identified in the SRMD (if applicable).

-

The IOA Team will analyze the data to identify problems and categorize them as either operational hazards or comments. Identified operational hazards will then be assessed for operational risk using the process described below.

Operational Hazard Assessment

Documenting an IOA hazard involves the first nine steps of the Preliminary Hazard Analysis, which is depicted in the figure below.

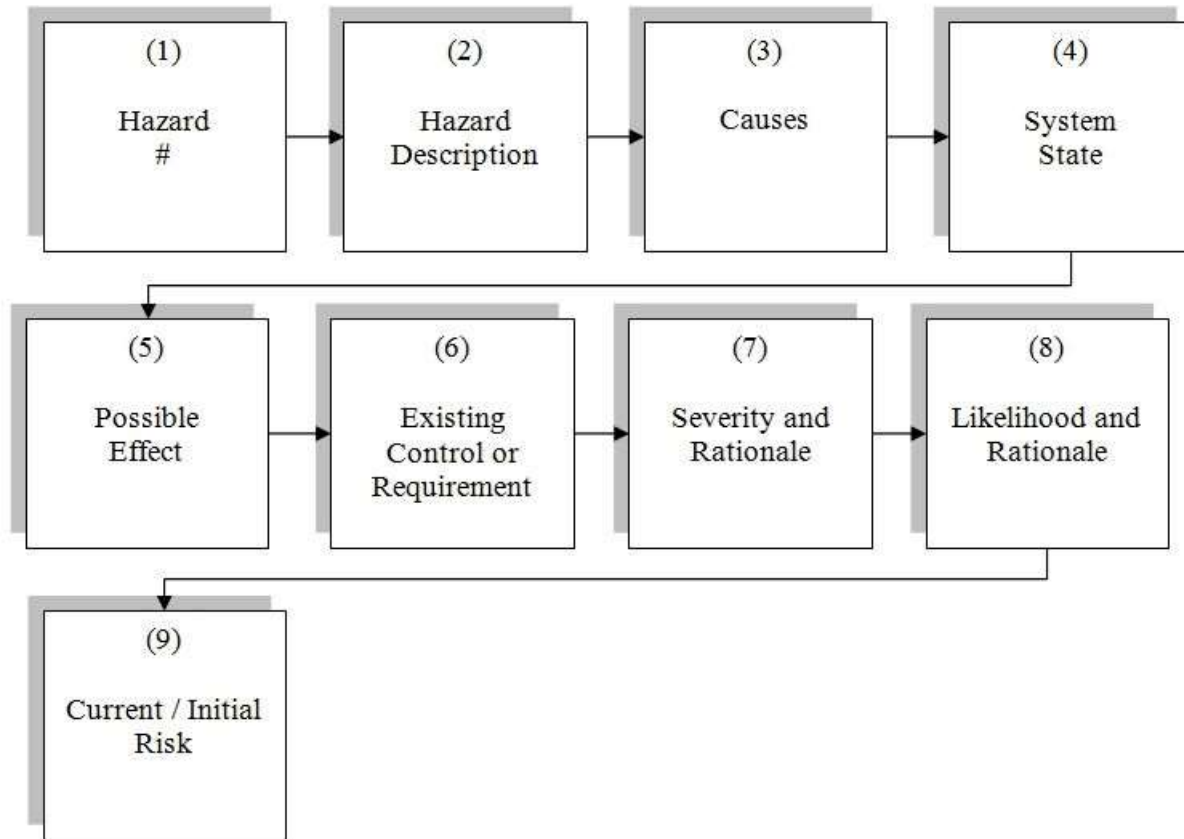


Figure D.5-1: Preliminary Hazard Analysis

Definitions of Severity

The IOA Team will assess the severity of each hazard using the following matrix:

	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Air Traffic Control	Conditions resulting in a minimal reduction in ATC services or a loss of separation resulting in a Category D Runway	Conditions resulting in a slight reduction in ATC services or a loss of separation resulting in a Category C RI or Operational Error (OE)	Conditions resulting in a partial loss of ATC services or a loss of separation resulting in a Category B RI or OE	Conditions resulting in a total loss of ATC services (ATC zero) or a loss of separation resulting in a Category A RI or OE	Conditions resulting in a collision between aircraft, obstacles, or terrain

	Incursion (RI), Operational Deviation, or Proximity Event (PE)				
Flight Crew	<ul style="list-style-type: none"> • Flight crew receives Traffic Collision Avoidance System (TCAS) Traffic Advisory informing of nearby traffic • Pilot Deviation (PD) where loss of airborne separation falls within the same parameters of a Category D OE or PE • Minimal effect on operation of aircraft 	<ul style="list-style-type: none"> • Potential for PD due to TCAS Preventive Resolution Advisory advising crew not to deviate from present vertical profile • PD where loss of airborne separation falls within the same parameters of Category C OE • Reduction of functional capability of aircraft but does not impact overall safety (e.g., normal procedures as per Airplane Flight Manual (AFM)) 	<ul style="list-style-type: none"> • PD due to response to TCAS Corrective Resolution Advisory issued advising crew to take vertical action to avoid developing conflict with traffic • PD where loss of airborne separation falls within the same parameters of a Category B OE • Reduction in safety margin or functional capability of the aircraft, requiring crew to follow abnormal procedures as per AFM 	<ul style="list-style-type: none"> • Near Mid-air Collision results due to proximity of less than 500 feet from another aircraft or a report is filed by pilot or flight crew member that a collision hazard existed between two or more aircraft • Reduction in safety margin and functional capability of the aircraft requiring crew to follow emergency procedures as per AFM 	<ul style="list-style-type: none"> • Conditions resulting in a Mid-air Collision or impact with obstacle or terrain resulting in hull loss, multiple fatalities, or fatal injury
<ul style="list-style-type: none"> • Flying Public 	<ul style="list-style-type: none"> • Minimal injury or discomfort to 	<ul style="list-style-type: none"> • Physical discomfort to passenger(s) 	<ul style="list-style-type: none"> • Physical distress on passengers 	<ul style="list-style-type: none"> • Serious injury to 	<ul style="list-style-type: none"> • Fatalities, or fatal injury to

	passenger(s)	(e.g., extreme braking action; clear air turbulence causing unexpected movement of aircraft causing injuries to one or two passengers out of their seats) <ul style="list-style-type: none"> Minor injury to greater than zero to less or equal to 10% of passengers 	(e.g., abrupt evasive action; severe turbulence causing unexpected aircraft movements) <ul style="list-style-type: none"> Minor injury to greater than 10% of passengers 	passenger(s)	passenger(s)
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Figure D.5-2: Definitions of Severity

Definitions of Likelihood

The IOA Team will assess the likelihood of each hazard using the following matrix:

	NAS Systems		ATC Operational	
	Qualitative		Per Facility	NAS-wide
	Individual Item/ System	ATC Service/ NAS-level System		
Frequent A	Expected to occur about once every three months for an item	Continuously experienced in the system	Expected to occur more than once per week	Expected to occur more than every one to two days
Probable B	Expected to occur about once per year for an item	Expected to occur frequently in the system	Expected to occur about once every month	Expected to occur about several times per month
Remote C	Expected to occur several times in the life cycle of an item	Expected to occur numerous times in the life cycle of a system	Expected to occur about once every year	Expected to occur about once every few months
Extremely Remote D	Unlikely to occur but possible in an item's life cycle	Expected to occur several times in the life cycle of a system	Expected to occur about once every 10 – 100 years	Expected to occur about once every three years

Extremely Improbable E	So unlikely that it can be assumed that it will not occur in an item's life cycle	Unlikely to occur but possible in system life cycle	Expected to occur less than once every 100 years	Expected to occur less than once every 30 years
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Figure D.5-3: Definitions of Likelihood

Risk Assessment Matrix

The IOA Team will use the following matrix to assign a risk rating to each hazard:

		SEVERITY				
		Minimal	Minor	Major	Hazardous	Catastrophic
		5	4	3	2	1
LIKELIHOOD	Frequent A	Low	Medium	High	High	High
	Probable B	Low	Medium	High	High	High
	Remote C	Low	Low	Medium	High	High
	Extremely Remote D	Low	Low	Low	Medium	High
	Extremely Improbable E	Low	Low	Low	Low	Medium / High*

Figure D.5-4: Risk Assessment Matrix

***Even if this risk is rated Medium, it will be considered unacceptable if a single point or common cause failure exists. Only one risk rating will be assigned to a hazard. It will be based on Team consensus.**

Operational Concerns: Issues that are not safety hazards but impact the operational use of the system will be documented as operational concerns. Operational concerns are not rated, but their impact to operations, as determined by the expertise of the IOA Team, will be considered in the system assessment.

Comments: These are used only to provide information to the Service Team on items that do not impact the operational assessment. Comments:

- Are not included in the Executive Summary
- Are not rated for risk
- Do not have to be addressed by the Service Team
- Are not tracked in the ISD Action Plan
- Do not support the assessment of operational readiness
- May provide a positive comment relative to a functionality.

-

System Assessment

In accordance with AMS policy, a system is considered Operationally Ready if it is operationally effective, suitable, and safe prior to deployment.

The system will be assessed for operational readiness based on the following criteria:

- Operationally Ready:
 1. There are no high-risk safety hazards, and the combined level of risk of all hazards does not preclude operational use, and
 2. The system is deemed operationally suitable and effective by the IOA Team based on the assessment of IOA operational concerns.
- Not Operationally Ready:
 1. There is at least one high-risk safety hazard or the combined level of risk of all hazards precludes operational use, and/or
 2. The system is deemed not operationally suitable and/or effective by the IOA Team based on the assessment of IOA operational concerns.

IOA Results

Results from IOA will be documented in an IOA 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 IOA 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:
D.5 IOA Method of System Assessment

The evaluation process will begin by correlating the collected data from DT, OT, Field Familiarization, and IOA with the COIs/MOEs/MOSs to verify that all operational requirements have been assessed (see paragraph 4.3.1 for a description of COI/MOE/MOS decomposition). There is a data trail from the Data Elements/MOPs to the MOEs/MOSs, and in turn, to the corresponding COIs and the hazards identified in the SRMD (if applicable).

-

The IOA Team will analyze the data to identify problems and categorize them as either operational hazards or comments. Identified operational hazards will then be assessed for operational risk using the process described below.

Operational Hazard Assessment

Documenting an IOA hazard involves the first nine steps of the Preliminary Hazard Analysis, which is depicted in the figure below.

-

(1)
Hazard
#

(1)
Hazard
#

(2)
Hazard
Description

(2)
Hazard
Description

(3)
Causes

(3)
Causes

(6)
Control or
Requirement

(4)
System
State

(4)
System
State
(7)
Severity and
Rationale

(7)
Severity and
Rationale
(8)
Likelihood and
Rationale

(8)
Likelihood and
Rationale
(9)
Current Risk

(9)
Current Risk
(5)
Effect

(6)

Possible

Effect
(5)

Existing Control or Requirement

Figure D.5-1: Preliminary Hazard Analysis-

Definitions of Severity

-

The IOA Team will assess the severity of each hazard using the following matrix:

	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Air Traffic Control	Conditions resulting in a minimal reduction in ATC services or a loss of separation resulting in a Category D Runway Incursion (RI), Operational Deviation, or Proximity Event (PE)	Conditions resulting in a slight reduction in ATC services or a loss of separation resulting in a Category C RI or Operational Error (OE)	Conditions resulting in a partial loss of ATC services or a loss of separation resulting in a Category B RI or OE	Conditions resulting in a total loss of ATC services (ATC zero) or a loss of separation resulting in a Category A RI or OE	Conditions resulting in a collision between aircraft, obstacles, or terrain
<u>Flight Crew</u>	<ul style="list-style-type: none"> • Flight crew receives Traffic Collision Avoidance System (TCAS) Traffic Advisory informing of nearby traffic • Pilot Deviation (PD) where loss of airborne separation falls within the same parameters of a Category D OE or PE • Minimal effect on 	<ul style="list-style-type: none"> • Potential for PD due to TCAS Preventive Resolution Advisory advising crew not to deviate from present vertical profile • PD where loss of airborne separation falls within the same parameters of Category C OE • Reduction of functional capability of aircraft but does not impact overall 	<ul style="list-style-type: none"> • PD due to response to TCAS Corrective Resolution Advisory issued advising crew to take vertical action to avoid developing conflict with traffic • PD where loss of airborne separation falls within the same parameters of a Category B 	<ul style="list-style-type: none"> • Near Mid-air Collision results due to proximity of less than 500 feet from another aircraft or a report is filed by pilot or flight crew member that a collision hazard existed between two or more aircraft • Reduction in safety margin and functional capability of the aircraft 	<ul style="list-style-type: none"> • Conditions resulting in a Mid-air Collision or impact with obstacle or terrain resulting in hull loss, multiple fatalities, or fatal injury

	operation of aircraft	safety (e.g., normal procedures as per Airplane Flight Manual (AFM))	OE <ul style="list-style-type: none"> Reduction in safety margin or functional capability of the aircraft, requiring crew to follow abnormal procedures as per AFM 	requiring crew to follow emergency procedures as per AFM	
<ul style="list-style-type: none"> Flying Public 	<ul style="list-style-type: none"> Minimal injury or discomfort to passenger(s) 	<ul style="list-style-type: none"> Physical discomfort to passenger(s) (e.g., extreme braking action; clear air turbulence causing unexpected movement of aircraft causing injuries to one or two passengers out of their seats) Minor injury to greater than zero to less or equal to 10% of passengers 	<ul style="list-style-type: none"> Physical distress on passengers (e.g., abrupt evasive action; severe turbulence causing unexpected aircraft movements) Minor injury to greater than 10% of passengers 	<ul style="list-style-type: none"> Serious injury to passenger(s) 	<ul style="list-style-type: none"> Fatalities, or fatal injury to passenger(s)

Figure D.5-2: Definitions of Severity

Definitions of Likelihood

-

Comments

The IOA Team will assess the likelihood of each hazard using the following matrix:

	NAS Systems		ATC Operational	
	Qualitative		Per Facility	NAS-wide
	Individual Item/ System	ATC Service/ NAS-level System		
Frequent A	Expected to occur about once every three months for an item	Continuously experienced in the system	Expected to occur more than once per week	Expected to occur more than every one to two days
Probable B	Expected to occur about once per year for an item	Expected to occur frequently in the system	Expected to occur about once every month	Expected to occur about several times per month
Remote C	Expected to occur several times in the life cycle of an item	Expected to occur numerous times in the life cycle of a system	Expected to occur about once every year	Expected to occur about once every few months
Extremely Remote D	Unlikely to occur but possible in an item's life cycle	Expected to occur several times in the life cycle of a system	Expected to occur about once every 10 This <u>100 years</u>	Expected to occur about once every category <u>three years</u>
Extremely include <u>Improbable</u> <u>E</u>	So issues <u>unlikely</u> that warrant <u>it</u> consideration <u>and</u> can be <u>assumed that</u> are <u>it will</u> not operational <u>risk</u> occur in <u>an item's</u> issues <u>life cycle</u>	Unlikely to occur but possible in system life cycle	Expected to occur less than once every 100 years	Expected to occur less than once every 30 years

Some

Figure D.5-3: examples Definitions of issues Likelihood

Risk Assessment ~~which~~ Matrix

The ~~may fall into this category~~ IOA Team will use the ~~are~~ following matrix to assign a risk rating to each hazard:

		SEVERITY				
		Minimal	Minor	Major	Hazardous	Catastrophic
		5	4	3	2	1
LIKELIHOOD	Frequent A	Low	Medium	High	High	High
	Probable B	Low	Medium	High	High	High
	Remote C	Low	Low	Medium	High	High
	Extremely Remote D	Low	Low	Low	Medium	High
	Extremely Improbable E	Low	Low	Low	Low	Medium / High*

Figure D.5-4: positive comments Risk Assessment ~~on~~ Matrix

* system Even performance if this risk is rated Medium, concerns it with will be considered be unacceptable if a single point or common cause failure exists. interfacing Only systems one risk rating will be assigned to a hazard. It will be based on Team consensus.

Operational Concerns: Issues that are not currently safety hazards under but assessment, impact the operational use of the required system will be documented as operational capabilities concerns. Operational concerns are not included rated, but their impact to

operations, as determined by the expertise of the IOA Team, will be considered in the system under assessment.

Comments: These are used only to provide information to the Service Team on items that do not impact the operational assessment. (these Comments:

- Are not included in the Executive Summary
- Are not rated for risk
- Do ~~should~~not have ~~been~~to be addressed by the Service Team
- Are not tracked in the IOTRD, ISD and Action Plan
- Do not support the assessment of operational readiness
- May provide a positive comment relative ~~resources~~to a functionality.

System Assessment

~~Once the issues have been identified~~

In and rated for risk accordance with AMS policy, the system will be assessed for operational readiness based on is considered Operationally Ready if it is operationally the effective, assessment suitable, of the individual and safe prior issues to deployment.

The system will be assessed for operational readiness as based on the follows following criteria:

- Operationally Ready:

1. There are no high-risk ~~issues~~safety hazards, and the combined level of risk of all ~~issues~~hazards does not preclude operational use, and
2. The system is deemed operationally suitable and effective by the IOA Team based on the assessment of IOA operational concerns.

- Not Operationally Ready:

1. There is at least one high-risk ~~issue~~safety hazard or the combined level of risk of all ~~issues~~hazards precludes operational use, and/or

2. *The system is deemed not operationally suitable and/or effective by the IOA Team based on the assessment of IOA operational concerns.*

-

IOA Results

-

Results from IOA will be documented in an IOA 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 IOA 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.

E1.1 List of Acronyms

Old 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
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
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
PR	Program Requirements
PTR	Program Trouble Report
R&D	Research and Development
SAT	Site Acceptance Test
SI	Solution Implementation
SOW	Statement of Work
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
V&V	Validation and Verification
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
CMTF	Contractor Master Test Plan
COI	Critical Operational Issue
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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
IOA	Independent Operational Assessment
IOARD	IOA Readiness Declaration
ISD	In-Service Decision
ISM	In-Service Management
ISPD	Implementation Strategy and Planning Document
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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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
PR	Program Requirements
PTR	Program Trouble Report
R&D	Research and Development
SAT	Site Acceptance Test
SI	Solution Implementation
SOW	Statement of Work
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
V&V	Validation and Verification
VRTM	Verification Requirements Traceability Matrix
WJHTC	William J. Hughes Technical Center

Red Line Content: Test and Evaluation Process Guidelines:

E1.1 List of Acronyms

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CCD	Configuration Control Decision
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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 IOA ~~and #160;E~~ Independent Operational ~~Test and Evaluation~~ IOTRD Assessment

IOARD ~~IOT&E~~ IOA Readiness Declaration
 ISD In-Service Decision
 ISM In-Service Management
 ISPD Implementation Strategy and Planning Document
 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
 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
 PR Program Requirements
 PTR Program Trouble Report
 R&D Research and Development
 SAT Site Acceptance Test
 SI Solution Implementation
 SOW Statement of Work
 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
 V&V Validation and Verification
 VRTM Verification Requirements Traceability Matrix
 WJHTC William J. Hughes Technical Center

