

SOFTWARE TEST PLAN
TO 9
for the
Advanced Weather Interactive Processing System
Project

Contract # DG133W-05-CQ-1067

Prepared and Published by:

Raytheon

Intelligence and Information Systems

Omaha, NE

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Date: 14 April 2008

Approval: Omaha AWIPS CCB

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When the revised document is issued, the previous issue is automatically superseded.

Version	Date	Pages Changed	Reason for Change
1.0	14 April 2008	All	Initial Release (Draft)

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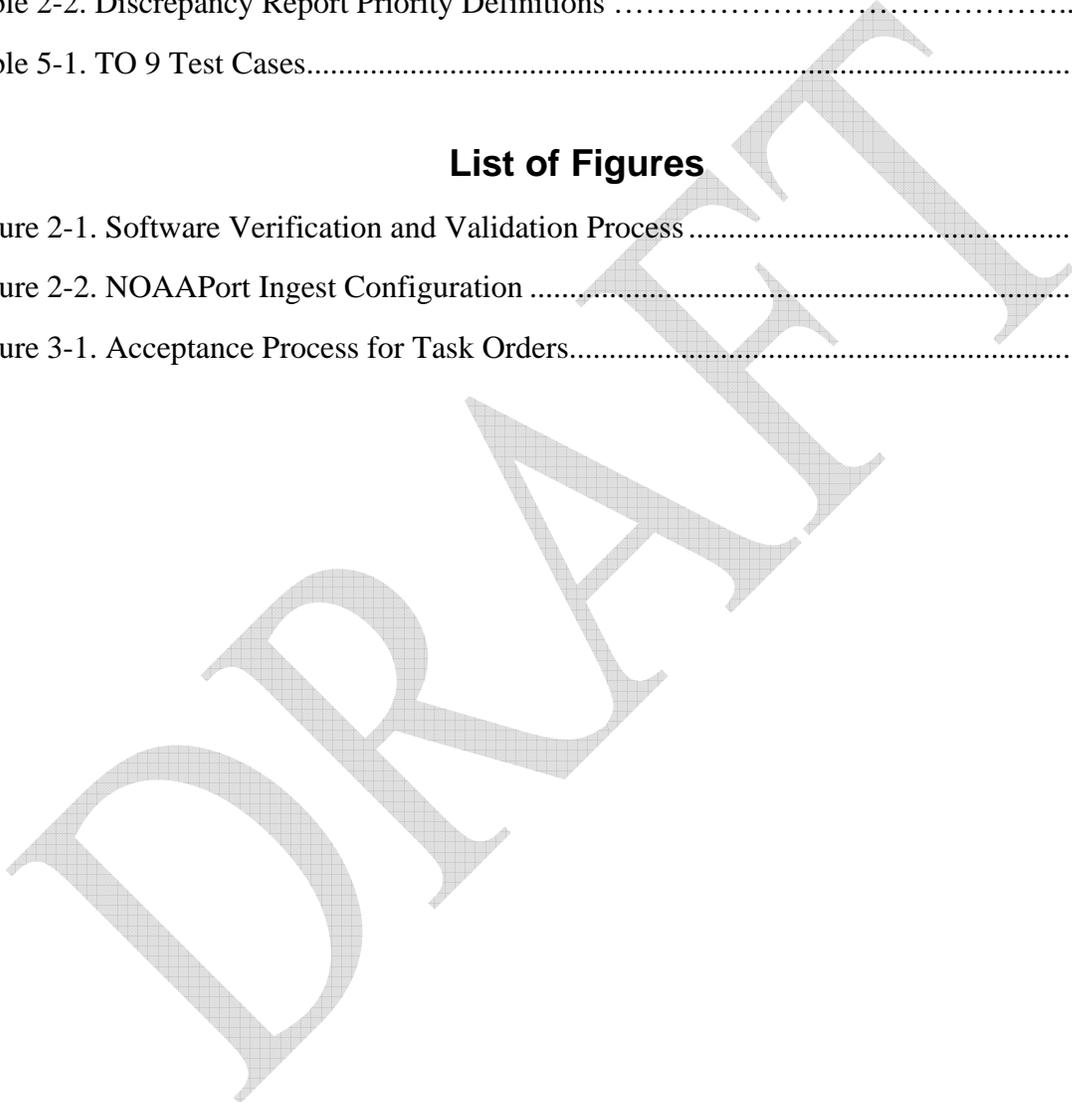
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1 Scope

1.1 Identification

This document establishes the Software Test Plan (STP) for Task Order 9 under the Advanced Weather Interactive Processing System (AWIPS) Software Continuous Technology Refresh (SW CTR). This Task Order (TO) will, when combined with the previously completed TO 8, and future TO10 and TO11, coalesce into AWIPS II Release 1.0. This document, updated for TO 9 is a narrative and tabular description of the overall plan and methodology used to verify requirements for AWIPS II at the Omaha AWIPS Test facility described in section 2.1. The STP includes information on the general test environment, test objectives, test schedule, and the Raytheon test engineering (TE) methodologies that are used to achieve this goal within the limitations of the Omaha AWIPS Test facility. This document will be updated to include test cases for subsequent TOs (TO10, TO11) during the execution of those task orders. The TO 8 STP already delivered to the Government will exist as a stand alone document and will not be included with this document. Test cases and procedures will be delivered to the Raytheon AWIPS Program Management Office (PMO) for coordination with the National Weather Service (NWS) and approval approximately 6 weeks prior to beginning formal testing.

1.2 System Overview

The overall TE and software engineering (SWE) activities deliver on NWS program requirements for CTR throughout the life cycle of the AWIPS II Task Orders. The AWIPS II program migrates the current AWIPS system architecture to the new architecture of AWIPS II, while the functionality of the existing system is maintained.

1.2.1 TO 8

TO 8 delivered the first in a series of migrated end-user functions extending from the software capabilities delivered under the AWIPS CTR Re-Architecture initiative and the AWIPS Development Environment (ADE) Release 1.0. The primary functionality delivered in TO8 was equivalent to functionality found in the legacy D2D. Since not all D2D functionality was developed, however, subsequent TOs will deliver the remaining pieces of D2D functionality.

1.2.2 TO 9

TO 9 is the second in a series of Task Orders delivering migrated end-user functions. Software delivered with this Task Order builds upon the TO 8 delivery, and therefore includes the ADE 1.0, selected end-user functionality, and extensions to the ADE/infrastructure. Primary functionality delivered with this TO includes the Graphical Forecast Editor (GFE) perspective and asso-

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ciated Service Oriented Architecture (SOA) capabilities, Graphical Hazards Generations (GHG) functionality, Aviation Forecast Preparation System (AvnFPS) for Terminal Aerodrome Forecasts (TAFs), additional SOA plug-ins (i.e., Binary Universal Form for data Representation (BUFR) Decoder) and the initial delivery of derived parameters from grid data.

1.2.3 TO 10

This section will be completed with the delivery of the STP updates for TO 10.

1.2.4 TO 11

This section will be completed with the delivery of the STP updates for TO 11.

1.3 Document Overview

This document identifies and describes the organization, resources, activities, methods, and procedures used during Pre-Delivery Test (PDT) and Delivery Test (DT). The sections incorporated in this STP include:

- **Section 1: Scope.** Provides an introduction to this document, its purpose, and identifies the system under test.
- **Section 2: Software Verification and Validation.** Identifies the facility in which the test activities are to take place, the software and hardware items used throughout the test cycle, the personnel involved in the test process, and overall verification and validation approach.
- **Section 3: System Verification and Validation.** Describes the test process.
- **Section 4: Test Identification.** Describes the test cases and the objectives of each test.
- **Section 5: Task Order Test Cases.** Lists the test cases to be executed and a brief description of the capability tested.
- **Section 6: Test Schedule.** Lists the testing activities. The schedule for each activity is in the Integrated Master Schedule (IMS).
- **Section 7: Notes**
- **Appendix A: Acronyms.** Lists the definitions of acronyms used in this document.
- **Appendix B: Regression Test Cases.** Describes the regression test process.
- **Appendix C: NWS Product Worksheet.**

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2 Software Verification and Validation

The Raytheon AWIPS CTR test facility is the AWIPS Test Lab located within the Scott Technology Center (STC), Raytheon Office, Omaha, NE. The AWIPS Test Lab supports the software development, integration, and DR testing for each TO. In addition, the development of test cases and test procedures that satisfy the derived requirements listed in the Requirements Traceability Matrix (RTM) occur using the lab. The lab is the site for formal PDT for each TO. PDT is conducted internally by Raytheon test engineer(s) and witnessed by Omaha Raytheon Mission Assurance. Results are documented internally. DRs are opened as necessary and fixed prior to DT. The goal of PDT is to detect and resolve system deficiencies prior to DT. Section 3 contains a more detailed breakdown of the PDT and DT process. Testing throughout each TO is accomplished primarily using live data ingested through NOAAPort. However, canned-static datasets may be substituted for data types not available over NOAAPort. Figure 2-1 outlines the Raytheon verification and validation process.

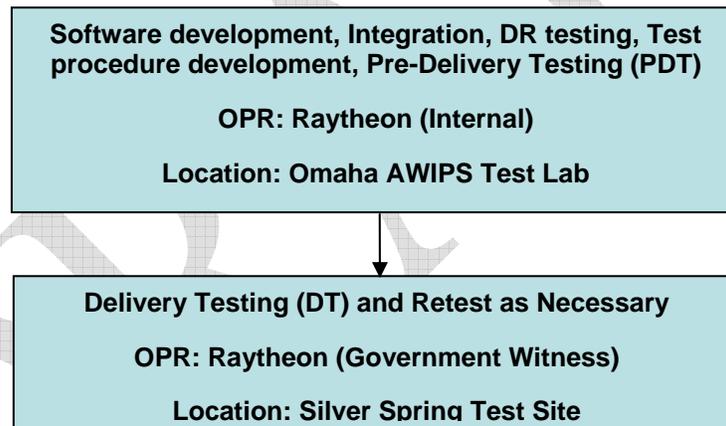


Figure 2-1. Software Verification and Validation Process

2.1 Omaha Test Site

The Omaha test site uses a NOAAPort data feed for live data. The NOAAPort hardware configuration is detailed in figure 2-2. Two workstations running AWIPS II software are configured to access the data base. A third workstation with VPN access to the tbw3 AWIPS I test bed in Silver Spring Maryland is also located in the test lab. The workstation is used for software development and testing as well as operational comparisons between AWIPS II and the legacy system.

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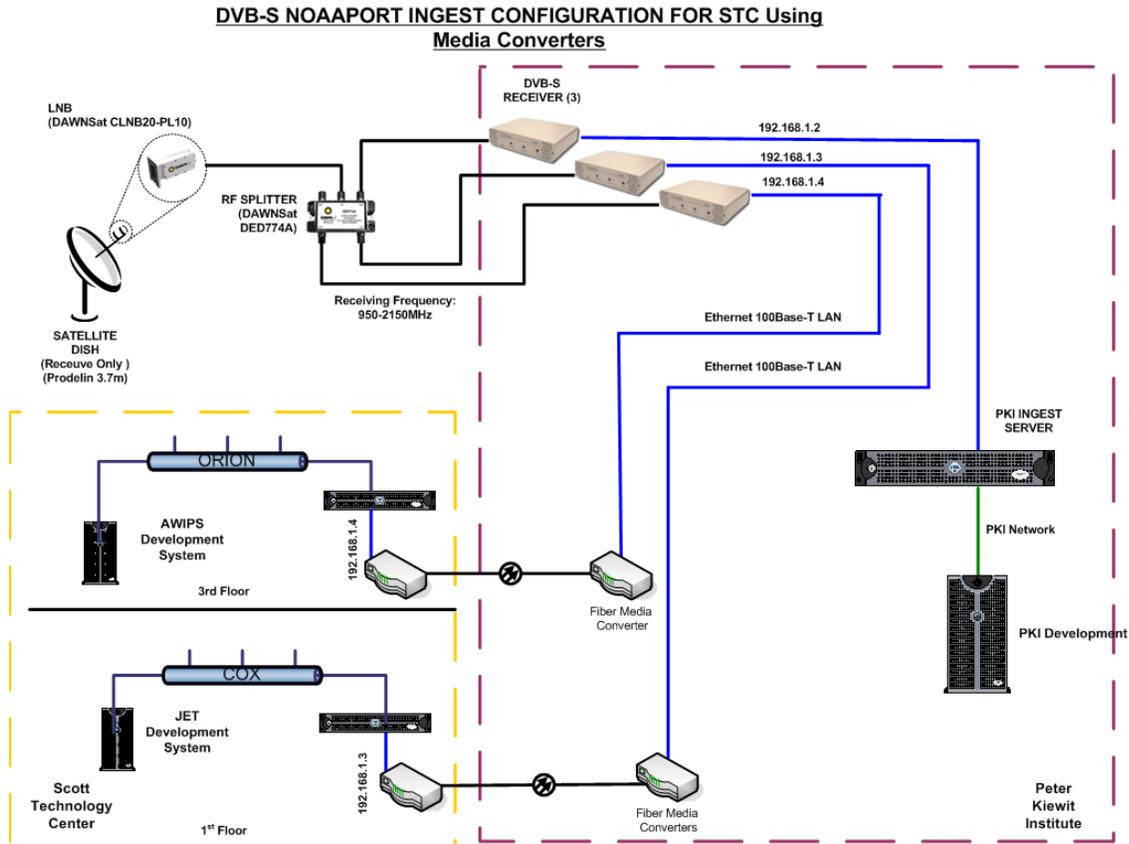


Figure 2-2. NOAAPort Ingest Configuration

2.1.1 Software (SW) Items

The software configuration for the test computer:

- Windows
 - Windows Professional XP Service Pack 2
- Linux
 - Red Hat Enterprise Linux (RHEL) 4.4

The components of the Runtime Environment used for both operating systems are listed in the Software Version Description (SVD) document AWIPS2_TO9_SVD.

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AWIPS STP**Draft: Version 1.0****Owner:** Omaha AWIPS Test Engineering**Date:** 14 April 2008**Approval:** Omaha AWIPS CCB**Page 5 of 27****2.1.2 Hardware (HW) Items**

The following hardware items comprise the Omaha AWIPS test bed configuration.

- AWIPS Integration Server Configuration: Two Dell 2950 Servers, each with:
 - 2 Quad Core Xeon E5320 Processors running at 1.86GHz
 - 4GB RAM
 - 140 GB Hard drive space
 - RedHat Linux 4 Release 4
- AWIPS Database Server Configuration: One Dell 2950 Server with:
 - 2 Quad Core Xeon E5320 Processors running at 1.86 GHz
 - 4GB RAM
 - 140 GB Hard drive space
 - RedHat Linux 4 Release 4
- AWIPS Network Attached Storage Server Configuration: One Dell 2950 Server with:
 - 1 Quad Core Xeon E5320 Processors running at 1.86 GHz
 - 4GB RAM
 - 1.4TB Hard drive space
 - RedHat Linux 4 Release 4
- NOAAPort Hardware: One Dell 2550 Server with:
 - Pentium III 1.1GHz
 - 4GB RAM
 - 60GB Hard drive
 - Fedora Core 6 OS
 - Refer to figure 2-2
- Windows Workstation: Dell Precision 380 with:
 - Processors: Dual Pentium D 3.0GHz

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- Memory: 2 Gigabyte RAM
- Hard Drive: Two 140 Gigabyte Hard Drives in Raid-0 Configuration
- Video Card: NVIDIA Quadro FX with 256 Megabytes RAM
- Monitor: Dual 21" LCD Monitors
- Linux Workstation: HP Workstation XW 6200 with:
 - Processors: Intel Xeon 2.8GHz
 - Memory: 2 Gigabyte RAM
 - Hard Drive: 32 Gigabyte SCSI
 - Video Card: G Force 7600 GT with 256 Megabytes RAM
 - Monitor: Dual 21" LCD Monitors

2.2 Silver Spring Test Site

The Silver Spring Test Site is the location of DT. Configuration management baseline AWIPS II software for the applicable TO being tested will be loaded on test bed hardware. Test procedures will then be dry run prior to commencing DT.

2.2.1 Software Items

The software configuration for the test bed used for DT should match as closely as possible the configuration used in the Omaha Test Lab, and remain consistent (as configured by the Raytheon team) throughout the DT and SW Delivery / Outbrief period.

2.2.2 Hardware Items

The hardware configuration should match as closely as possible the configuration used in the Omaha Test Lab. TO8 DT testing was conducted on the AWIPS 1 National Weather Service (NWS) Headquarters Development Weather Forecast Office (WFO) configuration (NHOW) test bed (DX4) with a live AWIPS 1 data flow configured for KOAX (Omaha) localization. TO 9 – 11 DT testing should use the same or very similar configuration.

2.3 Test Data

Data ingested via a live NOAAPort feed will be the primary source for all testing, including stability and performance. However, if TE determines that a static data set is required for certain test cases, then a canned data set will be developed. The canned-static dataset is defined by TE and controlled by Software Configuration Management (SCM) throughout the test process. Test

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data is defined within the Software Test Description (STD) documents and controlled to ensure the test can be reproduced. The test dataset may be refined through the design and integration phases. A copy of canned data sets used during DT will be provided to the NWS as part of the official TO delivery documentation.

2.4 Other Materials

A copy of the AWIPS program installation instructions, test cases, test procedures, Requirements Traceability Matrix (RTM) and test data files are supplied to SCM for configuration control before the start of PDT. Changes to the test documentation during PDT are supplied to SCM for configuration control and made available to the Government prior to beginning DT.

2.5 Installation, Testing and Control

SCM is responsible for software installation in accordance with the AWIPS program installation instructions. Plans for the control and maintenance of the AWIPS program software are detailed in the AWIPS program Project Management Plan (PMP).

TE is responsible for the initialization of the test data in the AWIPS program test computers.

Mission Assurance (MA) monitors software installations and data initialization.

2.6 Participating Organizations

The following roles are defined for organizations involved in the test activities during PDT and DT.

- Test Engineer
 - Performs integration, regression and DR testing
 - Develops test plans and procedures
 - Executes PDT and DT
 - Responsible for successful, safe and efficient conduct of the test
- Mission Assurance
 - Witnesses PDT
 - Oversees the test process including the quality of documentation.
- Software Configuration Management
 - Responsible for controlling the baseline configuration

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- Raytheon AWIPS PMO
 - Approves Raytheon developed test plans, test cases, verification requirements, and the RTM prior to testing;
 - Coordinates with the NWS to identify and reserve an appropriate test environment (e.g., servers, workstations) and facility to conduct DT;
 - Interfaces/coordinates with NWS on all matters concerning test and integration

2.7 Tests Performed

The software capabilities developed throughout each TO are verified in accordance with the applicable tests listed in section 5.

2.8 Verification Methods

System requirements are tested using the verification methods outlined below. Each requirement is traced to one or more of the verification methods listed below. The verification methods and descriptions include:

- **Demonstration.** The operation of the software product, or a part of the software product, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis.
- **Inspection.** The visual examination of software product code, documentation, etc.
- **Analysis.** The processing of accumulated data obtained from other Verification methods. Examples include the reduction, interpretation, or extrapolation of test results.
- **Test.** The operation of the software product, or a part of the software product, using instrumentation or other special test equipment to collect data for later analysis.
- **Similarity.** Used only if it can be shown that the article under test is similar to another article that has already been verified to equivalent or more stringent requirements.
- **Special Verification methods.** Any special Verification methods for the software product, such as special tools, techniques, procedures, facilities, and acceptance limits.

2.9 Entry and Exit Criteria

To define success during each phase of the test process, specified criteria are set that allows TE to progress to the next test stage. Table 2-1 outlines the various phases that Raytheon follows and defines the entry/exit criteria for each phase.

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Table 2-1. Entry/Exit Criteria

Phase	Entry Criteria	Exit Criteria
Test Planning	Task Order awarded	Completed STP and updated RTM
Software Integration	Completion of each build	Draft Test Procedures (TP). All builds tested.
Pre-Delivery Test Dry Runs	Software Integration completed. Test Plan completed. Draft test procedures completed.	Final Draft TP. No locally derived priority 1 or 2 DRs without an acceptable risk/closure plan.
Pre-Delivery Test	Dry Runs completed. All priority 1 DRs closed. Open priority 2 and 3 DRs have acceptable work around approved by Raytheon AWIPS PMO	All formal testing conducted locally (Omaha, NE Test Lab). All SRS and System level requirements verified. Final TP. No locally derived priority 1 DRs. Locally derived priority 2 and 3 DRs have a workaround or an acceptable closure plan.
Delivery Test	Pre-Delivery tests completed.	All formal testing conducted in Silver Spring. All System level requirements and SRS-level requirements specified in the Government approved test cases verified. No locally derived priority 1 DRs. Locally derived priority 2 and 3 DRs have a workaround or an acceptable closure plan.

Discrepancy Reports (DRs) uncovered during the integration phase, Dry Runs, and PDT, are documented in the AWIPS Problem Tracking Database. DRs are assigned a priority number (1 through 5) and assigned to the appropriate personnel to be resolved. Table 2-2 provides a definition for each priority. Prioritizing DRs helps the Omaha development team assess the significance and the ranking of discrepancies that need to be worked.

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Table 2-2 Discrepancy Report Priority Definitions

DR Priority	Definition
1	<ul style="list-style-type: none">Prevents the accomplishment of an operational or mission essential capabilityJeopardizes safety, security, or other requirements designated "critical"
2	<ul style="list-style-type: none">Adversely affects the accomplishment of an operational or mission essential capability; no work around solutionAdversely affects technical, cost or schedule risks to the project or to life cycle support of the system; no work around solution
3	<ul style="list-style-type: none">Adversely affects the accomplishment of an operational or mission essential capability; work around solution existsAdversely affects technical, cost or schedule risks to the project or to life cycle support of the system; work around solution exists
4	<ul style="list-style-type: none">Results in user/operator inconvenience or annoyance; does not affect an operational or mission essential capabilityResults in inconvenience or annoyance for development or support personnel; does not prevent the accomplishment of those responsibilities
5	<ul style="list-style-type: none">No operational or safety impacts; an enhancement

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3 System Verification and Validation

3.1 System Validation Strategy

Not applicable.

3.2 System Documentation Validation

Not applicable.

3.3 System Validation Planning

Not applicable.

3.4 Conduct Preliminary Delivery Test and Engineering Dry Runs

The purpose of formal dry runs is to create and solidify a verification approach for formal PDT and DT.

3.5 Readiness Review

After the formal dry runs are complete (immediately prior to commencing PDT), TE holds a Test Readiness Review (TRR). The TRR establishes the readiness of the software and test documentation, ensuring all components are in place to begin PDT. The following groups are required to be represented at this meeting: Program Manager (PM), Lead Engineer (LE), test engineers, SCM, and MA. This review includes risk assessment for PDT and concludes with a go/no-go decision by the required participants of the review. The TRR includes:

- Completion of test procedures and verification against requirements
- Verification that dry runs are complete
- Verification of the quality of the software
- Readiness/status of the Omaha AWIPS II test bed for PDT
- Availability of the AWIPS II test support team for PDT

3.6 Conduct Incremental Software Integration Testing

The components of the system are integrated into a product based on the TO's build plan. Following each scheduled TO build and installation, the product is tested via test procedures to ensure successful DR and software integration and to verify requirements from the RTM delivered with the build.

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3.7 PDT

Following integration and regression testing of the final TO build, the PDT dry run phase begins. The applicable TO test procedures developed for DT are executed. Redlines may be made to the test procedures. Significant redlines impacting the testing of requirements will be reviewed by the software and engineering leads to ensure the integrity of requirements testing. Defects identified locally during the dry run phase are recorded in the AWIPS Problem Tracking Database as a DR. DRs include a description of the problem, the test case that failed, the test steps executed, the failed result, and the name of the used data file. This information may be necessary when the SW developer and test engineer repeat the test after the defect has been resolved.

Table 2-1, Section 2.9 lists the entry criteria for PDT dry runs. In addition, MA verifies the installation of the latest baseline software. Any canned data required for testing will be under CM control.

The PL, LE, and test engineer determine whether to proceed with formal dry runs or postpone the onset of this activity until the above criteria are achieved. The AWIPS TEs execute dry runs in Omaha using the AWIPS II test bed.

Once dry runs are complete and the TRR conducted, testing is phased into PDT. During PDT the AWIPS program software is tested with documentation, software, and test environment under SCM control. The test procedures are tested and the results recorded with comments on the hard copy of each STD. Upon completion of a test, results are recorded in a Test Report. The PDT test report is delivered with the final TO delivery. During PDT, test procedures (TP)s are again red lined appropriately for additional corrections or adjustments. The red lines are recorded on a Flag Form. Defects discovered during PDT are also flagged and then recorded in the AWIPS Problem Tracking Database. The repaired test procedures and significant defects impacting completion of the upcoming DT are retested and validated per MA, and the Flag Forms closed. PDT is conducted by AWIPS TE and MA in Omaha prior to DT using the AWIPS II test bed.

3.8 DT

Delivery testing is conducted by Raytheon personnel on AWIPS baseline hardware at the Silver Spring test bed running the applicable TO baselined software with the purpose to determine delivery readiness. DT dry runs begin the formal DT phase. The purpose of the dry runs is to check out data flows, software installation, hardware configuration and test procedures to ensure the software and hardware suite is ready for DT. Upon completion of system and TP checkout, DT begins. Government personnel participate in all aspects of this test. Problems encountered will be captured for future resolution. Critical DRs must be corrected prior to accepting the software. If delivery testing fails, another test is conducted at the time of delivery of the applicable TO deliverables and consists of a demonstration of those test procedures necessary to confirm the correc-

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tion of critical DRs. This demonstration occurs on AWIPS baseline hardware and includes necessary regression tests to demonstrate that corrected DRs have not negatively impacted other parts of the software deliverable. This test is to be repeated until all critical DRs are corrected. Successful completion of the test procedures constitutes acceptance of the software. However, if any critical DRs are found during the Delivery Test, Raytheon must demonstrate, using agreed upon procedures, that the problem has been corrected prior to the acceptance of the delivery by the Government.

The official acceptance approach is illustrated in Figure 3-1. If Pass equals “Y” (yes), the software is accepted. If Pass equals “N” (No), Raytheon fixes the software and demonstrates the fix. If it doesn’t pass again (N), the software is fixed and demonstrated until it passes.

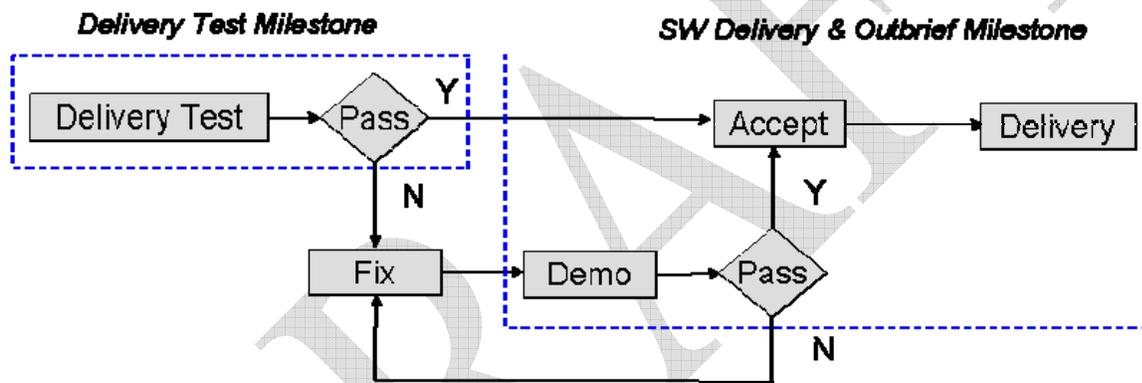


Figure 3-1. Acceptance Process for Task Orders

Following successful completion of DT, the TO software and required deliverables are turned over to the NWS for Independent Validation and Verification and User Evaluation.

3.9 Evaluate Validation Results

Raytheon engineers will assist the Government in validating test results.

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4 Test Identification

4.1 General Information

This section describes the test process in general. The subject matter addressed may be applicable across all levels of testing to include build testing, regression testing, PDT and DT.

4.1.1 Test Classes

One or more types of tests or test classes are implemented during test. The test type or test class is assigned to each tested requirement listed in the RTM. The test types or test classes include:

- Regression Testing: Exercises and checks the functionality of the upgraded software or system against a baseline software or system functionality to ensure that any existing system or software capabilities have not been adversely impacted.
- Load/Stress Testing: Validates the limits of the system.
- Stability Testing: Ensures the system remains operational for an extended period of time.
- Performance Testing: Ensures the system can meet response time, throughput, and physical data transfer requirements.
- Human Factors Testing: Ensures the system is easy to use, manipulate, and understand by the users. The areas tested include the user interface, help facilities, ad-hoc commands, error handling, security, documentation, and ergonomics. For AWIPS II, this will entail testing to verify that the system replicates, as closely as feasible, the features incorporated into the existing AWIPS.
- Data Acquisition Testing: Validates the system's data acquisition and control capability by acquiring, processing, and manipulating data.
- Output Generation Testing: Ensures all required outputs of the system are produced properly.
- Functional Testing: Ensures the system meets the functional requirements of the RTM.

4.1.2 Test Conditions

Tests for the AWIPS program meet the following general test conditions:

- Regression testing is based on software or test changes generated throughout the TO and during PDT.
- Some test cases may include valid and invalid data as appropriate; those test cases will so state.

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- Each ingest test uses a subset of static/canned data as ingested via NOAAPort or a live NOAAPort feed.

4.1.3 Data Recording, Reduction, and Analysis

The following guidelines are used during testing:

- If a test case is discovered to be in error during PDT, the error is marked in red and documented on a Flag Form. The error is corrected in preparation for the next software release and the Flag Form signed to indicate the correction has been made. Additionally, prior to DT the test case will be updated.
- If the software fails when tested in accordance with a test case, the failure is documented on a Flag Form. The test step will be recorded as failed and a DR opened. The information entered contains the name of the failed test case, a complete description of the problem, the failed result, the test steps taken, and the name of the data file used with that test case. After the error is corrected, the DR is tested, the step(s) or test case retested, and the Flag Form signed to indicate the correction has been implemented.
- New DRs are documented in the AWIPS problem tracking system.
- DRs recorded in previous versions and fixed for this version are tested and their status in the AWIPS problem tracking system updated as needed. DR fixes are incorporated into the baseline.
- Test cases are written to verify all software requirements being tested.

4.2 Planned Tests

A regression test is executed when there has been an update to one or more software components in the run time environment as listed in the SVD, and/or coding has been re-factored. The regression tests are composed of test cases from previous task orders as well as current TO procedures.

Where ever possible, existing AWIPS test procedures will be used for DT. However, for those requirements not covered, the test cases will be derived from the applicable Task Order Work Items/Activities Table found in the Task Order Proposal, or from the collection of the TO's requirements listed in the RTM. The RTM maps the Task Order Proposal requirements to test cases.

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5 Task Order Test Cases

This section contains a listing and a summary of TO 9 – 11 test cases. TO 10 and 11 test cases will be added with the delivery of the STP for the particular TO. Draft test procedures are delivered approximately 6-8 weeks prior to scheduled software delivery. Delivery dates are included in the Integrated Master Schedule (IMS). Pertinent government feedback is rolled into the procedures prior to beginning DT.

5.1 TO 9

5.1.1 Table of Test Cases

Table 5-1. TO 9 Test Cases

STP Paragraph Number	Test
5.1.2.1.1	AvnFPS_Initial_Configuration
5.1.2.1.2	AvnFPS_TAF
5.1.2.1.3	AvnFPS_View_Current_TAF
5.1.2.1.4	AvnFPS_MOS_Decoders
5.1.2.1.5	AvnFPS_Weather_Plot
5.1.2.1.6	AvnFPS_Wind_Rose (GUI demonstration)
5.1.2.1.7	AvnFPS_Cig/Vis_Distribution (GUI demonstration)
5.1.2.1.8	AvnFPS_Cig/Vis_Trend (GUI demonstration)
5.1.2.1.9	AvnFPS_METARS
5.1.2.2.1	Basic GFE Menus (ac001)
5.1.2.2.2	Basic GFE Toolbar (ac002)
5.1.2.2.3	Grid Manager (ac003)
5.1.2.2.4	Spatial Editor Legends (ac004)
5.1.2.2.5	Spatial Editor_Color Bar Popups_Status Bar (ac005)
5.1.2.2.6	Intersite Coordination (ac007) (GUI demonstration)
5.1.2.2.7	Other Programs (ac008) (Applicable sections)
5.1.2.2.8	Text Products (ac0010)
5.1.2.3.1	Derived Parameters-Gridded
5.1.2.4.1	Plug-Ins

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STP Paragraph Number	Test
5.1.2.5.1	Text Editor
5.1.2.6.1	WarnGen
5.1.2.7.1	Prepare the Hazards Data for the GHG Monitor Tests (gh001)
5.1.2.7.2	Saving and Loading Configurations of the GHG Monitor (gh002)
5.1.2.7.3	Using the Display Sector to view both the Map and Text Display Areas (gh003)
5.1.2.7.4	Using the Pane Resizer and Scroll Bars to adjust and resize the Map/Text Display and the Spreadsheet Display Areas (gh004)
5.1.2.7.5	Using the Zoom Features from the Map Pull-Down Menu on the Map and Text Display Area (gh005)
5.1.2.7.6	To Display the Different Types of Maps from the Map Pull-Down Menu and Using the Show Label Feature on the Map and Text Display Area (gh006)
5.1.2.7.7	Using the Map Display Area of the GHG Monitor to Query Hazards based on a Zone (gh007)
5.1.2.7.8	Using the Text Display Area of the GHG Monitor (gh008)
5.1.2.7.9	Using the Spreadsheet Display Area of the GHG Monitor (gh009)
5.1.2.8.1	WFO Generated Products. See Appendix C for a listing of the products.
5.1.2.9.1	Smart Tools

5.1.2 System Level Test Cases

System Level Test Cases will be executed during DT. Government provided test procedures will be used to the fullest extent possible in testing the AvnFPS, GFE, and GHG capabilities. Changes made to the Government provided test procedures will be annotated in the test case. Additional applicable Government provided subsystem level test cases not tested during DT will be executed during unit testing and PDT. Each test case will contain a requirements traceability matrix.

5.1.2.1 AvnFPS

The following test cases for AvnFPS are Government provided and maintain the same name. Test procedures not executed in the test cases because either they don't apply or not all the functionality is available will be so marked.

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5.1.2.1.1 AvnFPS_Initial_Configuration

- Test objective: Test case verifies the capability of adding new TAF(s), new forecaster and other configurations to AvnFPS without any errors.
- Related Test Cases:
 - None.

5.1.2.1.2 AvnFPS_TAF

- Test objective: Test case verifies that the TAF functionality is working properly with or without the transmit privilege.
- Related Test Cases:
 - None.

5.1.2.1.3 AvnFPS_View_Current_TAF

- Test Objective: Test case verifies that the user is able to view current Terminal Aerodrome Forecasts (TAF) and Meteorological Aviation Report (METAR) in the viewer mode for a particular site. The test case also verifies that when viewing All Metars the order of observations is grouped by site, then issuance time.
- Related Test Cases:
 - None.

5.1.2.1.4 AvnFPS_MOS_Decoders

- Test objective: This test case verifies that the data source of Metar and MOS decoders are displayed and functions correctly. It also verifies that the MOS/LAMP categories balloon message shows the 'actual' values of visibility, when mouse over to one of the VIS values.
- Related Test Cases:
 - None.

5.1.2.1.5 AvnFPS_Weather_Plot

- Test objective: This test case verifies that the Weather Plot function displays METARS, current guidance, and past forecasts in form of a time series. This test case verifies the weather plot for a particular Site ID (TAF id).

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- Related Test Cases:
 - None.

5.1.2.1.6 AvnFPS_Wind_Rose

- Test objective: This test case verifies that the climatology tool (Wind Rose), launched through the AvnFPS function, will produce a wind rose for a given month and hour (or a range of hours) and capability to specify flight category to further refine the results. Climatology data dependent functionality will mainly consist of GUI testing.
- Related Test Cases:
 - None.

5.1.2.1.7 AvnFPS_Cig/Vis_Distribution

- Test objective: This test case verifies that the climatology tool (Ceiling and Visibility Distribution – CigVis Dist), launched through the AvnFPS function, will display distributions of visibility and ceiling by month and hour in a form of histogram. Climatology data dependent functionality will mainly consist of GUI testing.
- Related Test Cases:
 - None.

5.1.2.1.8 AvnFPS_Cig/Vis_Trend

- Test objective: This test case verifies that the climatology tool (Ceiling and Visibility Trend – CigVis Trend), launched through the AvnFPS function, will display forecasts of visibility and ceiling given initial conditions in a form of histogram. Climatology data dependent functionality will mainly consist of GUI testing.
- Related Test Cases:
 - None.

5.1.2.1.9 AvnFPS_Cig/Vis_METARS

- Test objective: This test case verifies that the climatology tool (METARs) launched through the AvnFPS function performs the associated functions for Historical METARs successfully. Climatology data dependent functionality will mainly consist of GUI testing.
- Related Test Cases:
 - None.

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5.1.2.2 Graphical Forecast Editor (GFE)

The following test cases for the GFE acceptance testing (GFESuite-Acceptance) are Government provided and maintain the same name and number (acxxx). These test cases were used for conducting acceptance testing for the OB8.1 GFE software (hence the “ac” prefix). Test procedures not executed in the test cases will be so marked when either they don’t apply or not all the functionality is available. Test cases ac006, Temporal Editor, and ac009, Smart Tools, will not be executed. Software development for the Temporal Editor occurs in a later task order. A separate test case developed by the AWIPS II test team will be used to test Smart Tools.

5.1.2.2.1 Basic GFE Menus (ac001)

- Test objective: This test case exercises and demonstrates the capabilities of the GFE menus.
- Related Test Cases:
 - Various Government-derived manual test cases from Edit Areas (EA), Grid Manager (GM), Populate (PO), Spatial Editor (SE), and Miscellaneous User Interface (UI).

5.1.2.2.2 Basic GFE Toolbar (ac002)

- Test objective: This test case exercises and demonstrates the capabilities of the GFE toolbar.
- Related Test Cases:
 - Various Government-derived manual test cases from Edit Areas (EA), Grid Manager (GM), Populate (PO), Spatial Editor (SE), and Miscellaneous User Interface (UI).

5.1.2.2.3 Grid Manager (ac003)

- Test Objective: This test case exercises and demonstrates the capabilities of the Grid Manager using the GFE application.
- Related Test Cases:
 - Government created Grid Manager test cases gm001-gm024.

5.1.2.2.4 Spatial Editor Legends (ac004)

- Test objective: This test case exercises and demonstrates the capabilities of the Spatial Editor Legends.

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- Related Test Cases:
 - Government created Spatial Editor test cases se001-se031 (Legends/Popups), sc001-sc011 (Contour/Pencil Tools), and st001-sc006 (Edit Area Based Tools).

5.1.2.2.5 Spatial Editor_Color Bar Popups_Status Bar (ac005)

- Test Objective: This test case exercises and demonstrates the interactivity of the Spatial Editor, Color Bar Popups, and the Status Bar.
- Related Test Cases:
 - Government created Spatial Editor test cases se001-se031 (Legends/Popups), sc001-sc011 (Contour/Pencil Tools), and st001-sc006 (Edit Area Based Tools).

5.1.2.2.6 Intersite Coordination (ac007)

- Test Objective: This test case exercises and demonstrates the capabilities of the Intersite Coordination functionality GUIs. Actual testing with another WFO will be conducted in a later Task Order.
- Related Test Cases:
 - Government created Intersite/Intrasite Coordination
 - site Coordination test cases ic001-ic018.

5.1.2.2.7 Other Programs (ac008)

- Test objective: This test case contains test procedures for numerous small programs (e.g., coordConversion, getNotify, ifpAG, etc) included in the GFE function that are too small to test in an individual test case. Therefore, they have been included in one test case. Only the procedures covering applicable programs integrated in TO9 will be executed.
- Related Test Cases:
 - Government created test cases Product Generation ifpAG pa001-pa006, Product Generation ifpIMAGE pg001-pg027, Product Generation iscMosaic pm001-pm006, and ifpServer Configuration cs001-cs025.

5.1.2.2.8 Text Products (ac010)

- Test objective: This test case demonstrates the capability of the Text Products functionality contained in GFE.

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- Related Test Cases:
 - Government created Product Generation test cases tp001-tp031 (text products) and User Interface ui029-ui031, ui045 (Formatter Launcher).

5.1.2.3 Derived Parameters

5.1.2.3.1 Derived Parameters-Gridded

- Test objective: This test case demonstrates the display of derived parameters from gridded data developed as part of the TO9 takings. Display of the parameters infers data base storage completed.
- Related Test Cases:
 - None

5.1.2.4 Plug-Ins

5.1.2.4.1 Plug-Ins

- Test Objective: This test case demonstrates the plug-ins developed during TO9. Testing of the plug-ins includes examining the database and/or displaying stored data from the applicable plug-in.
- Related Test Cases:
 - TO 8 test case SOA_PlugIns_1.0_Final.

5.1.2.5 Text Editor

5.1.2.5.1 Text Editor

- Test Objective: This test case demonstrates the text database accessibility added during TO9. Displays of TAFS, METARs, and text bulletins from the live NOAAPort data flow are demonstrated.
- Related Test Cases:
 - TO 8 test case Text_Display_Edit_1.0_Final.

5.1.2.6 WarnGen

5.1.2.6.1 WarnGen

- Test Objective: This test case demonstrates the extension of the tornado and severe thunderstorm WarnGen templates to include life cycle controls. Templates for Cancel,

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Expiration, and Correct statements were added in TO9.

- Related Test Cases:
 - TO 8 test case WarnGen_1.0_Final.

5.1.2.7 Graphical Hazards Generator (GHG)

The following test cases for the GHG are government provided and maintain the same name and number (e.g., gh001). These test cases were developed for testing OB8.1 GHG. Test procedures not executed in the test cases because either they don't apply or not all the functionality is available will be so marked.

5.1.2.7.1 Prepare the Hazards Data for the GHG Monitor Tests (gh001)

- Test Objective: This test case demonstrates preparing the hazards data for the GHG monitor test.
- Related Test Cases:
 - None.

5.1.2.7.2 Saving and Loading Configurations of the GHG Monitor (gh002)

- Test objective: This test case demonstrates saving and loading configurations of the GHG monitor.
- Related Test Cases:
 - None.

5.1.2.7.3 Using the Display Sector to view both the Map and Text Display Areas (gh003)

- Test objective: This test case demonstrates using the display sector to view both the map and test display areas.
- Related Test Cases:
 - None

5.1.2.7.4 Using the Pane Resizer and Scroll Bars to adjust and resize the Map/Text Display and the Spreadsheet Display Areas (gh004)

- Test Objective: This test case demonstrates using the pane resizer and scroll bars to ad-

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just and resize the map/text display and the Spreadsheet Display areas.

- Related Test Cases:
 - None

5.1.2.7.5 Using the Zoom Features from the Map Pull-Down Menu on the Map and Text Display Area (gh005)

- Test Objective: This test case demonstrates using the zoom features from the map pull-down menu on the Map and Text Display Area.
- Related Test Cases:
 - None

5.1.2.7.6 To Display the Different Types of Maps from the Map Pull-Down Menu and Using the Show Label Feature on the Map and Text Display Area (gh006)

- Test Objective: This test case demonstrates the display of different types of maps from the Map Pull-Down Menu and using the Show Label Feature on the Map and Text Display Area.
- Related Test Cases:
 - None

5.1.2.7.7 Using the Map Display Area of the GHG Monitor to Query Hazards based on a Zone (gh007)

- Test Objective: This test case demonstrates using the Map Display Area of the GHG monitor to query hazards based on a zone.
- Related Test Cases:
 - None

5.1.2.7.8 Using the Text Display Area of the GHG Monitor (gh008)

- Test Objective: This test case demonstrates using the Text Display Area of the GHG monitor.
- Related Test Cases:
 - None

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5.1.2.7.9 Using the Spreadsheet Display Area of the GHG Monitor (gh009)

- Test Objective: This test case demonstrates using the Spreadsheet Display Area of the GHG monitor.
- Related Test Cases:
 - None

5.1.2.8 Weather Forecast Office (WFO) Generated Products

5.1.2.8.1 WFO Generated Products

- Test Objective: This test case lists WFO products that are ready to be demonstrated during TO9. Appendix C contains the spreadsheet listing the NWS products that will be demonstrated during TO9 testing. The remainder of the NWS products not tested during TO9 will be tested in future Task Orders.
- Related Test Cases:
 - None.

5.1.2.9 Smart Tools

5.1.2.9.1 Smart Tools

- Test Objective: This test case exercises and demonstrates the Smart Tools functionality developed during TO9.
- Related Test Cases:
 - Government created Smart Tools test cases sm001-sm023.
 - Smart Tools, ac009.

5.1.2.10 Stability and Performance

5.1.2.10.1 Stability_1.0

- Test Objective: This test case demonstrates the stability of the software by running continuously with a KOAX filtered SBN live data flow while monitoring system resources for usage and log files for critical errors. This test case also involves running CAVE periodically checking for retrieval of current data. This test case is verified at the local Omaha test site on the test hardware prior to or during PDT. The test results are recorded in the PDT Test Report. Stability issues exposed during the test, if any, are analyzed and

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required corrections determined. Corrections that cannot be applied prior to Delivery Testing are reported. As is the case of other tests, critical defects that prevent testing and evaluation of TO9 delivery functionality will be corrected prior to acceptance of the delivery. DT stability testing will be accomplished on the Silver Spring DT test bed following the same process used during PDT. Analysis of the results will be included in the DT test report provided the results have been determined.

- Related Test Cases
 - This test case is the same one executed during TO8.

5.2 TO 10

This section will be completed with the delivery of the STP updates for TO 10.

5.3 TO 11

This section will be completed with the delivery of the STP updates for TO 11.

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6 Test Schedule

The schedule for AWIPS program tests and reviews are listed in the IMS. The test and reviews include:

- Dry Runs
- Test Readiness Review
- Pre-Delivery Testing
- Shipment Readiness Review (SRR)
- Delivery Testing

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Appendix A Acronyms

Acronym	Definition
ADE	AWIPS Development Environment
AWIPS	Advanced Weather Interactive Processing System
CAVE	Common AWIPS Visualization Environment
CCB	Configuration Control Board
CTR	Continuous Technology Refresh
DR	Discrepancy Reports
DT	Delivery Test
GFE	Graphical Forecast Editor
IMS	Integrated Master Schedule
LE	Lead Engineer
NWS	National Weather Service
PL	Program Lead
MA	Mission Assurance
PDT	Pre-Delivery Test
PMP	Project Management Plan
RIS	Raytheon Information Systems
RRD	Risk Reduction Demo
RTM	Requirements Traceability Matrix
SAT	System Acceptance Testing
SCM	Software Configuration Manager
SRR	Shipment Readiness Review
STC	Scott Technology Center
STD	Software Test Description

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AWIPS STP**Draft: Version 1.0****Owner:** Omaha AWIPS Test Engineering**Date:** 14 April 2008**Approval:** Omaha AWIPS CCB**Page A-2**

Acronym	Definition
STP	Software Test Plan
SWE	Software Engineering
TBD	To Be Determined
TE	Test Engineering
TO	Task Order
TP	Test Procedure
TRR	Test Readiness Review
VPN	Virtual Private Network

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AWIPS STP

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Owner: Omaha AWIPS Test Engineering

Date: 14 April 2008

Approval: Omaha AWIPS CCB

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Appendix B Regression Test Cases

B.1 TO Build Testing

Because AWIPS II has entered into the migration phase with additional new requirements, test cases and procedures developed prior to each new task order may not be applicable without significant modifications. As a result, the functionality developed prior to each new task order will be incorporated into the applicable TO's test cases and procedures, as applicable. Therefore, regression test cases used to test builds during past task orders will consist of applicable prior test cases as well as currently being developed test cases. Build testing will be conducted at the Omaha test facility.

B.2 DT Regression Testing

Significant DRs opened during a particular task order DT may require regression testing. DT regression testing will consist of re-running the DT test procedures of the task order being tested as mutually determined between Raytheon and the Government.

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Draft: Version 1.0

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Date: 14 April 2008

Approval: Omaha AWIPS CCB

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Appendix C NWS Product Worksheet

This spreadsheet contains the listing of NWS products that will be demonstrated during TO9 testing.

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NWS Product Worksheet

SYSR Tag	Requirement text (from test case title)	TO Assignment	Comment	NWS Instructions	TO9 Test Case
SYSR2936	The AWIPS System shall create the AWW product as produced by the Aviation Services AVNFPS Application.	TO-9	AvnFPS produces, text editor	10-801	WFO Generated Products
SYSR2937	The AWIPS System shall create the TAF product as produced by the Aviation Services AVNFPS Application.	TO-9	AvnFPS produces	10-813	WFO Generated Products
SYSR2938	The AWIPS System shall create the CWA (@CWSU's) product as produced by the Aviation Services AVNFPS Application.	TO-9	AvnFPS produces		WFO Generated Products
SYSR2939	The AWIPS System shall create the MIS (@CWSU's) product as produced by the Aviation Services AVNFPS Application.	TO-9	AvnFPS produces		WFO Generated Products
SYSR2940	The AWIPS System shall create the VFT product as produced by the Aviation Services AVNFPS Application.	TO-9	AvnFPS produces		WFO Generated Products
SYSR2984	The AWIPS System shall create the ICE - St. Lawrence Freeze Up Outlook. Buffalo Only	TO-9	Text Editor	10-331	WFO Generated Products
SYSR2997	The AWIPS System shall create the FWS - Site Specific Forecasts (SPOT) product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR2998	The AWIPS System shall create the NOW - Short Term Forecast product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE	10-517	WFO Generated Products
SYSR3001	The AWIPS System shall create the Gridded Dew Point Temperature product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3002	The AWIPS System shall create the Gridded Wind Gust product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3003	The AWIPS System shall create the Gridded Apparent Temperature product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3004	The AWIPS System shall create the AFM - Area Forecast Matrices product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE	10-503	WFO Generated Products
SYSR3005	The AWIPS System shall create the SFP - State Forecast Product product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE	10-503	WFO Generated Products
SYSR3006	The AWIPS System shall create the ZFP - Zone Forecast Product product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE	10-503	WFO Generated Products

NWS Product Worksheet

SYSR Tag	Requirement text (from test case title)	TO Assignment	Comment	NWS Instructions	TO9 Test Case
SYSR3007	The AWIPS System shall create the Gridded 12-hour Probability of Precipitation product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3008	The AWIPS System shall create the Gridded Maximum Temperature product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3009	The AWIPS System shall create the Gridded Minimum Temperature product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3010	The AWIPS System shall create the Gridded Relative Humidity product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3011	The AWIPS System shall create the Gridded Sky Cover product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3012	The AWIPS System shall create the Gridded Temperature product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3013	The AWIPS System shall create the Gridded Wind Speed and Direction product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3014	The AWIPS System shall create the Gridded Weather product as produced by the Public and Fire Weather Services GFE Application.	TO-9	GFE		WFO Generated Products
SYSR3015	The AWIPS System shall create the AQI - Air Quality Statement product as produced by the Public and Fire Weather Services GFE; Application.	TO-9	GFE		WFO Generated Products
SYSR3042	The AWIPS System shall create the FWA - Incident Meteorologist Status Report product as produced by the Public and Fire Weather Services Text Editor Application.	TO-9	Text Editor		WFO Generated Products
SYSR3043	The AWIPS System shall create the EQR - Earthquake Reports product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor	10-518	WFO Generated Products
SYSR3045	The AWIPS System shall create the FWN - National Fire Danger Rating System Forecast Receipt Verification product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor		WFO Generated Products

NWS Product Worksheet

SYSR Tag	Requirement text (from test case title)	TO Assignment	Comment	NWS Instructions	TO9 Test Case
SYSR3046	The AWIPS System shall create the FWO - National Fire Danger Rating System Fire Weather Observations product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor		WFO Generated Products
SYSR3047	The AWIPS System shall create the HWO - Hazardous Weather Outlook product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor	10-513, 10-515, 10-517	WFO Generated Products
SYSR3048	The AWIPS System shall create the REC - Recreation Report product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor	10-503	WFO Generated Products
SYSR3049	The AWIPS System shall create the RFD - Rangeland Fire Danger product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor		WFO Generated Products
SYSR3050	The AWIPS System shall create the RWS - Weather Summary product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor		WFO Generated Products
SYSR3051	The AWIPS System shall create the SMF - Smoke Management Forecast product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor		WFO Generated Products
SYSR3052	The AWIPS System shall create the ADR,ADM,and ADA Administrative Message product as produced by the Public and Fire Weather Services Text Workstation Editor Application.	TO-9	Text Editor		WFO Generated Products
SYSR3053	The AWIPS System shall create the AFD - Area Forecast Discussion product as produced by the Public and Fire Weather Services Text Workstation Editor, Application.	TO-9	Text Editor	10-503	WFO Generated Products
SYSR3054	The AWIPS System shall create the SVR - Severe Thunderstorm Warning product as produced by the Public and Fire Weather Services WarnGen Application.	TO-9	WarnGen	10-511	WFO Generated Products
SYSR3055	The AWIPS System shall create the SVS - Severe Weather Statement product as produced by the Public and Fire Weather Services WarnGen Application.	TO-9	WarnGen	10-511	WFO Generated Products
SYSR3056	The AWIPS System shall create the TOR - Tornado Warning product as produced by the Public and Fire Weather Services WarnGen Application.	TO-9	WarnGen	10-511	WFO Generated Products