



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric
Administration
NATIONAL WEATHER SERVICE
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Silver Spring, Maryland 20910-3283

MEMORANDUM FOR: Distribution

FROM: W/OPS2 – John Van Kuren

SUBJECT: Operational Test and Evaluation (OT&E) for
Automated Surface Observing System (ASOS) Thin Client OID/VDU
Replacement

The System Test (ST) ASOS OID/VDU Replacement Using the Thin Client was successfully completed using test ASOS systems located at the Sterling Field Support Center, Sterling, VA., the U.S. Navy SPAWARSYSCEN, Charleston, SC, the National Weather Service (NWS) Training Center and National Reconditioning Center, Kansas City, MO, and the Federal Aviation Administration (FAA) AOS Engineering Logistics Support Center, Oklahoma, OK. During the ST, the installations of the replacement thin clients, monitors and keyboards were performed using draft NWS Engineering Modification Notes (Mod Notes). Keyboard functionality tests and regression tests confirmed ASOS functionality and proper interfacing with both NWS and FAA communication/display systems. The ASOS Test Review Board (ATRB) formally approved the results of the ST and recommended proceeding with the OT&E based on the strategy presented at the OT&E Readiness Review meeting held on Thursday, August 7.

The Thin Client OID/VDU Replacement OT&E plan was coordinated through the ATRB including the NWS Regional Headquarters focal points. The official plan is posted at:

http://www.nws.noaa.gov/ops2/ops24/documents/asos_oid_vdu.htm

When all prerequisite NWS logistics are in place and the FAA has notified their Union of this change in operations and provided the users participating in the OT&E with the appropriate training material, the Test Director will commence the OT&E by notifying the appropriate NWS electronics technician (ET's) assigned to each OT&E site to order the replacement ASOS OID/VDUs from the National Logistics Support Center, Kansas City, MO. The Office of Operational Systems Operations Division Maintenance Branch will provide draft NWS Mod Notes as installation instructions to the ETs by e-mail along with a "Spares Kit." Once the hardware kits are received from NLSC, the ETs may perform the required installation(s) at the following sites:

Eastern Region

Southern Region



KACY Atlantic City, NJ
KIAD Washington Dulles, VA
KFAY Fayetteville, NC
KABE Allentown, PA

KHSV Huntsville, AL

Central Region

KORD Chicago O'Hare, IL
KIND Indianapolis, IN
KRAP Rapid City, SD

Western Region

KMSO Missoula, MT
KBOI Boise, ID

Evaluation of ASOS performance at the OT&E sites will be performed in accordance with the methodology presented in the OT&E plan and will continue for approximately two weeks after a site's installation is complete.

A Test Review Group (TRG), as constituted in the OT&E plan and chaired by the Test Director, will oversee the conduct of the OT&E, adjudicate and prioritize for fixing any reported problems, as well as judge the overall performance of the system under test. Prior to the official start of OT&E, an OT&E "kick off" meeting will be conducted with the TRG.

At the end of the OT&E, the Test Director will present to the ATRB the test results along with the TRG's OT&E recommendation for review and approval. The ATRB will vote on whether OT&E was successful. The Chair, ATRB will inform the Chair, ASOS Configuration Control Board (ACCB) of the ATRB's decision.

If you have any questions or comments, please contact the Test Director:

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OPERATIONAL TEST AND EVALUATION (OT&E) PLAN

For the
**Automated Surface Observing System
(ASOS) Thin Client OID/VDU Replacement**

September 2008

**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service/Office of Operational Systems
Field Systems Operations Center/Test and Evaluation Branch**

Executive Summary

This document describes the Operational Test & Evaluation (OT&E) for the replacement of the Automated Surface Observing System (ASOS) Operator Interface Device (OID)/ Visual Display Unit (VDU) using the Thin Client system. The purpose of the OT&E is to confirm the suitability of the thin client in both the OID and VDU applications at operational ASOS locations under the auspices of the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS), the Federal Aviation Administration (FAA), U.S. Air Force (USAF), and U.S. Navy. If the OT&E is successful, the thin clients and associated cabling interfaces, monitors, and keyboards will be stocked at the National Logistics and Support Center (NLSC), Kansas City, MO on an “as needed” basis to replace failed OID/VDUs.

The NOAA NWS Office of Operational Systems (OOS), Field Systems Operations Center (FSOC), Test & Evaluation Branch (OPS24) will plan, conduct, and report on the OT&E. An OT&E Test Readiness Review (TRR) meeting was conducted by OPS24 with the ASOS Test Review Board (ATRB) on August 7, 2008, on the results of the System Test, the OT&E strategy, test objectives, and evaluation criteria. The ATRB reviewed this OT&E plan and approved commencement of an OT&E once all prerequisites are met. The OT&E is scheduled to last approximately two weeks at 10 operational ASOS sites selected to validate the thin client operations with a wide variety of ASOS communication, hardware, and OID/VDU configurations.

During OT&E, the thin client(s) will be requisitioned from NLSC, inventoried, and installed by the local NWS ASOS Electronics Technician (ET) using a draft NWS Engineering Modification Note (Mod Note), and then evaluated by local users during operations for approximately two weeks. The ETs will evaluate both the delivery of the test units from NLSC and the draft installation instructions. Since all OT&E sites are operational, testing will be limited to use of the test equipment and monitoring its performance during service operations as well as reporting and documenting problems found. The ET's and users will be asked to complete a questionnaire about the ease of installation of the thin clients, their assessment of the new OID thin client and displays and keyboard, as well as the VDU thin client and display. For sites with NWS staff, problems found will be identified, documented, and reported on Test Trouble Report (TTR) forms. For sites with FAA or FAA contract staff, all reported problems will be coordinated by the FAA Focal Point at FAA National Headquarters. The USAF Focal Point will coordinate all reported problems for the USAF site. The reported problems from the NWS, FAA, and USAF focal points will be forwarded to the OT&E test director who will enter them into the Test Track Pro database. All reported problems will be discussed during the weekly Test Review Group (TRG) meetings and adjudicated accordingly.

The TRG will manage the OT&E. This oversight group will consist of a representative from each of the four Government agencies, NWS regional headquarters, an NWS Employees Organization representative, and OT&E site focal points. The TRG will meet weekly during the duration of the OT&E to review the status of the test and to review, adjudicate, and prioritize fixing of reported problems found during the OT&E (i.e., TTRs). TTRs created during the OT&E will be tracked and archived using the TestTrack Pro database. Each TTR will be classified with a specific priority for fixing and impact to service operations. If no critical problems are found or left unresolved, the OT&E results and TRG's recommendation will be presented by the Test Director to the ATRB for a

decision whether the OT&E can be declared successful. The ATRB will notify the ASOS Configuration Control Board (ACCB) of its decision. The ACCB will use the ATRB's decision as input into whether to implement the Request for Change on the ASOS OID/VDU Replacement Using Thin Client.

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Acronyms

ACU	Acquisition Control Unit
ACCB	ASOS Configuration Control Board
AFB	Air Force Base
ASOS	Automated Surface Observing System
ATRB	ASOS Test Review Board
DOC	Department of Commerce
DoD	Department of Defense
DOT	Department of Transportation
EMRS	Engineering Management Reporting System
ET	Electronics Technician
FAA	Federal Aviation Administration
Mod Note	NWS Engineering Modification Note
NCAR	National Center for Atmospheric Research
NLSC	National Logistics Support Center
NOAA	National Oceanic and Atmospheric Administration
NRC	National Reconditioning Center
NWS	National Weather Service
NWSEO	National Weather Service Employee Organization
NWSTC	National Weather Service Training Center
OID	Operator Interface Device
OT&E	Operational Test and Evaluation
OOS	Office of Operational Systems
OPS24	Office of Operational Systems, Test & Evaluation Branch
RC	Request for Change
SIO	Serial Input Output
SFSC	Sterling Field Support Center
SPAWARSYSCEN	U.S. Navy Space and Naval Warfare Systems Center (Charleston, SC)
TRG	Test Review Group
TRR	Test Readiness Review
TTR	Test Trouble Report
USAF	United States Air Force
VDU	Video Display Unit
WFO	Weather Forecast Office
WSH	National Weather Service Headquarters

1. Introduction

The principal operator/user displays for the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) Automated Surface Observing System (ASOS) are the Operational Interface Device (OID) and the Video Display Unit (VDU).

The OIDs/VDUs currently in use are cathode ray tube displays originally manufactured by Wyse Technology and are now typically at least 10 years old. Readability is often poor and failures are becoming more frequent. New units are no longer available and both the cost and quality of refurbished units has become unacceptable.

Thin client technology is typically used in a client-server environment where the client terminal depends on the central server for processing activities. By definition, a thin client is a low-cost, centrally-managed computer devoid of CD-ROM players, diskette drives, and expansion slots. Although suitable for more complicated tasks, the thin client is well-suited to the terminal emulation application.

The NWS Office of Operational Systems Maintenance Branch (OPS12) at National Weather Service Headquarters (WSH) has identified and performed a preliminary evaluation of two thin client devices (LINUX-based client-servers). The thin client devices, used in conjunction with a flat-panel liquid crystal display, are cost-effective replacements for Wyse OIDs and VDUs.

During the Operational Test and Evaluation (OT&E), thin clients will replace OIDs/VDUs at selected field sites and will be evaluated by users. A Test Request for Change (RC) titled "ASOS RC 11063 (NWS712) OID/VDU Logistic Replacement" was approved by the ASOS Configuration Control Board (ACCB) on February 28, 2008. A final RC to implement the thin client OID/VDU replacements will be submitted and approved upon successful completion of the OT&E.

1.1 Test Plan Organization

This OT&E Plan is comprised of four sections:

- Section 1 provides an overview of the OT&E. It includes the purpose, test objectives and evaluation criteria, test strategy, prerequisites, assumptions, and risks for the OT&E.
- Section 2 describes the thin client and previous testing.
- Section 3 discusses the management of the OT&E including the roles and responsibilities of the personnel participating in the OT&E.
- Section 4 provides details on the conduct of the OT&E including test sites, pre-OT&E activities, Test Readiness Review (TRR), test schedule, and post OT&E activities.

Included in the OT&E test plan are five Appendices:

- Appendix A - OT&E Site Characteristics.
- Appendix B - Test Trouble Report (TTR) Form.
- Appendix C – Test Review Group (TRG) and ASOS Test Review Board (ATRB) Members.
- Appendix D – Test Personnel
- Appendix E – OT&E Questionnaire

1.2 Purpose

The purpose of the OT&E is to validate the thin client units proposed for replacing the existing ASOS OID/VDUs are properly integrated into the NWS logistics and repair system, are easily installed, and are suitable for operational use.

1.3 Test Objectives and Evaluation Criteria

The OT&E test objectives are to validate the:

- A. Logistics mechanism used to “routine” order the thin client hardware from the National Logistics Support Center (NLSC), Kansas City, MO.

Evaluation Criterion: The equipment received is complete and in working condition.

- B. NWS Engineering Modification Notes (Mod Note) during installation

Evaluation Criterion: The Mod Notes 90 (OID) and 91 (VDU) must be complete and accurate, providing all information required for the installation.

- C. Communication interfaces between the ASOS Acquisition Control Unit (ACU) and the OID/VDU

Evaluation Criterion: VDUs/OIDs must interface properly with all communication configurations included in the OT&E.

- D. Display functions for the OID/VDU

Evaluation Criterion: All required screens must be available and all information must be displayed correctly. Displays must update in a timely manner. Screens are readable in all environments.

- E. Audio alarms

Evaluation Criterion: Audio alarms must be generated when required and the volume level must be acceptable.

- F: Keyboard functionality for the OID

Evaluation Criterion: The OID keyboard must allow users to perform all required functions. The ASOS Ready Reference Guide provides a summary of ASOS OID keyboard functions.

- G. Power loss recovery (Power loss and recovery will only be evaluated if it occurs naturally)

Evaluation Criterion: The VDU must recover from power interruptions without operator intervention. The OID, with operator input, must recover from power interruption. Power loss will not be manually induced at any OT&E site.

1.4 Test Strategy

The OT&E will be conducted at 10 sites selected to include a variety of OID/VDU hardware and communication interfaces, ASOS configurations, OID/VDU user functions, and the participation of the Department of Commerce (DOC) NOAA/NWS, Department of Transportation (DOT) Federal Aviation Administration (FAA), and the Department of Defense (DoD) United States Air Force (USAF) organizations. Tables 1 and 2 in Appendix A provide details on operational requirements, communication interfaces, users, etc. for the participating sites.

The OT&E phase was approved by the ATRB (See Section 3 Test Management) on August 7, 2008, as part of an OT&E Readiness Review which included a briefing on the System Test (ST) results. An OT&E “kick off” meeting will be convened by the Test Director with the TRG (See Section 3, Test Management) to determine if all prerequisites have been met to commence the OT&E. Upon direction of the OT&E Test Director (See Section 3.2, Test Personnel and Responsibilities), the ASOS Electronic Technician (ET) will “routine” order from the National Logistics Support Center (NLSC) the components required to replace the existing OID/VDU for OT&E sites. The thin clients will be installed by the local NWS ASOS ET using draft NWS Mod Note, and then evaluated by local users during operations for approximately two weeks. Since all OT&E sites are operational, testing will be limited to use and performance monitoring of the thin clients OID/VDUs during service operations as well as reporting and documenting of any problems for the duration of the OT&E.

Spare thin clients (one each for an OID and a VDU), one keyboard, and one monitor will be sent to the Weather Forecast Office (WFO) governing the particular OT&E sites participating in the test. These spares will be used to replace any thin client hardware component if it fails. The existing ASOS OID/VDU Wyse terminals will be retained on-site to allow replacement of the thin client test systems if performance is unacceptable, or if the NWS ET cannot get the spare thin clients on site fast enough to make the swap. For sites with NWS staff, problems found will be identified, documented, and reported on TTR forms (See Appendix B). For sites with FAA or FAA contract staff, the FAA Focal Point at FAA Headquarters will coordinate reporting of problems. The USAF Focal Point will coordinate reporting of problems for the USAF site. All reported problems will be passed to the OT&E Test Director by the NWS, FAA, and USAF focal points.

A TRG will be established for the duration of the OT&E to oversee the OT&E. All reported problems will be discussed during the weekly TRG meetings and adjudicated. The OT&E test results and recommendation from the TRG will be presented by OT&E Test Director to the ATRB for a decision whether the OT&E was successful. (See Section 3, Test Management).

1.5 Prerequisites, Assumptions, and Risks

This section describes the actions required before the OT&E, the assumptions and limitations, and a description of the risks associated with performing the OT&E.

1.5.1 Prerequisites

Before proceeding with the thin client OT&E, the following prerequisites include:

- a. The thin client ST has been successfully completed (e.g., no critical problems).

- b. The thin client Mod Note (e-mailed to the OT&E sites by OPS12) is available to the NWS ET at each OT&E site.
- c. Training documentation/procedures are available and FAA training personnel are identified.
- d. The FAA union must provide notification (to the FAA) that the FAA training guide is acceptable, and that it is okay to begin the OT&E.
- e. Thin client hardware (thin clients, monitors, keyboards, etc.) is in stock at the NLSC and spare thin client hardware is in place at the WFO locations associated with the OT&E sites.
- f. NRC procedure written to change the configuration setup files in the thin clients in the event the original setup configuration provided by the thin client vendor doesn't work at a particular site.
- g. The OT&E plan is approved for signature by the ATRB.
- h. A successful ST at SFSC on the Vision Technologies 5700 Advanced VDU which replaced the Boundless ADDS 5700 thin client.
- i. An OT&E Readiness Review is conducted with the ATRB and an OT&E "Kick off" meeting is conducted with the TRG to confirm the thin clients are ready to begin the OT&E.

1.5.2 Assumptions and Limitations

It is assumed that the prerequisites in Section 1.5.1 are met prior to initiation of the OT&E. A limitation of the OT&E is the sites are operational and, since user input is dependent on weather, some user functions might not be exercised during the evaluation period. All screens and user functions, however, were validated during the ST.

1.5.3 Operational Risk

There is some risk that the thin clients might prove to have performance shortcomings or unforeseen problems that were undetected in previous tests. Therefore, thin client hardware spares (2 thin clients, a keyboard, and one monitor) will be sent to the WFO governing the particular OT&E sites participating in the test for use by the NWS ET if any one of the components fails during OT&E. In addition, the old Wyse terminals will be retained on-site to allow replacement of the thin clients if performance is unacceptable, or if the NWS ET cannot get the spare thin clients on site fast enough to make the swap. This process will reduce risk at OT&E sites.

2. Thin Client OID/VDU Description and Previous Testing

The OID function requires keyboard input and the AXEL M75 thin client with a Chicony KB-2961 keyboard has been selected for this application. The VDU function is display only and the Vision Technologies 5700 Advanced thin client has been selected for this application. Both units will use a 19-inch Samsung flat panel monitor (either the 940BX or the 943BXTAA), which meets FAA requirements. The manufacturer will provide the configuration setup for the OID and VDU thin

clients. The manufacturer will deliver a “first article” of each thin client configuration to NWS OPS12 to confirm the setup configuration changes prior to the full shipment of deliverables to NLSC. Programming will be confirmed for the rest of the thin clients at the NLSC prior to being placed in stock. The thin client will be supplied with appropriate connectors to allow “plug-and-play” installation when replacing an existing Wyse OID or VDU.

The thin client OIDs/VDUs underwent extensive testing during an ST in a simulated operational environment at Sterling Field Support Center (SFSC) at Sterling, Virginia, the NWS Training Center (NWSTC) and the National Reconditioning Center (NRC), Kansas City, MO, the U.S. Navy Space and Naval Warfare Systems Center (SPAWARSYSCEN), Charleston, SC, and the FAA’s AOS Engineering Logistics Support Center, Oklahoma, OK.

The ST included evaluation of draft NWS Mod Notes, regression tests to verify the functionality of the thin clients, as well as communications/power failure and recovery tests. Testing was performed using several different ASOS ACU software versions and a variety of ACU-OID/VDU hardware and communication configurations. Test procedures evaluated all keystrokes/commands and display formats. During the ST, all display/keystroke variations from the WYSE terminals were documented. At the conclusion of the ST, thin clients were judged satisfactory by the TRG with a recommendation to proceed to OT&E. The ST plan and report are available at:

http://www.nws.noaa.gov/ops2/ops24/documents/asos_oid_vdu .htm

One caveat was stipulated by the TRG. A problem (documented in three TTR’s) was noted during the ST where the primary OID monitor or keyboard “froze” in a dual OID configuration on the SFSC ASOS test system (ST0), and on the WSH ASOS test system (SP1) A. This problem will be closely monitored during OT&E.

NOTE: After the completion of the ST, the vendor for the VDU thin client (Boundless Technologies) provided a newer version of the thin client hardware (Vision Technologies). This new version will need to be tested with a short System Test (ST) at SFSC, Sterling, VA to verify thin client configuration setup and color and display on the VDU monitor before the start of OT&E.

3. Test Management

Overall management of the OT&E is the responsibility of the Test Director:

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3.1 TRG and ATRB

The TRG will decide when to start the OT&E and oversee the conduct of OT&E. The TRG is comprised of subject-matter experts (see Appendix C) selected from WSH, NWS Regional Headquarters, and the FAA and USAF, and the NWS Employee Organization (NWSEO). The TRG will authorize installation/testing of the thin client OIDs/VDUs at the OT&E sites and may suspend testing at any time, should the performance of the thin clients be found unacceptable. If OT&E testing is suspended, the TRG (with concurrence from the ATRB) will authorize the resumption of

testing when the appropriate corrective actions have been taken. The TRG may recommend additional regression tests prior to the resumption of the OT&E.

The TRG will meet weekly during the conduct of the OT&E. The TRG may also meet irregularly or on an emergency basis. The TRG meetings will be conducted by teleconference calls and will be coordinated by the Test Director.

TRG meetings are conducted to review, clarify, and validate problems documented by the TTRs. Each problem will be evaluated to determine the priority for fixing and its operational impact. The TRG will work to resolve deficiencies and other test-related issues, and will recommend corrective actions to the ATRB. TTRs created during the OT&E will be tracked and archived using the TestTrack Pro database. Each TTR will be classified with a specific priority for fixing and impact to service operations. TTRs may be assigned numerical scores to indicate the severity of the defect (i.e., Impact to operations) and the Priority for fixing the problem. A typical assignment scheme for Impact (Severity) follows:

Impact 1 – System Shutdown Without Workaround: A repeatable problem that prevents or compromises the full delivery of products or services. No workaround exists for the problem.

Action: The TRG recommends the immediate suspension of OT&E and the System-Under-Test is turned over to the system developers to resolve the problem. The OT&E may be resumed at the recommendation of the TRG after an appropriate fix or workaround has been developed. The TRG may recommend tests be resumed under the existing OT&E Plan; or, if significant re-coordination and re-planning are required, the TRG may recommend the OT&E Plan be amended or a separate Follow-On OT&E plan be prepared and tests continue under the new plan. The Test Team may repeat selected Test Case Procedures or develop new Test Case Procedures to fully evaluate the proposed solution.

Impact 2 – System Shutdown With Workaround: A repeatable problem that prevents or compromises the full delivery of products or services. A temporary workaround may be implemented to allow continuation of field tests; however the workaround is not acceptable for national deployment. The System-Under-Test may not be implemented without development of a fix or acceptable workaround.

Action: The TRG may recommend that the OT&E continue with the temporary workaround in place. The TRG recommends that an acceptable workaround or fix be developed prior to national deployment of the System-Under-Test. If a fix becomes available during the OT&E, the TRG may recommend immediate implementation of the fix. The Test Team may develop new Test Case Procedures and/or repeat selected Test Case Procedures to fully evaluate the proposed fix. A Follow-On OT&E may be required to verify the proposed fix.

Impact 3 – System Up With Workaround: A repeatable problem that prevents or compromises the full delivery of products or services. An acceptable workaround has been developed that allows national deployment to proceed.

Action: The TRG may recommend that the OT&E continue with an approved workaround in place until an appropriate fix is developed. If a fix becomes available during the OT&E, the TRG may recommend immediate implementation of the fix. The Test Team may develop new Test Case

Procedures and/or repeat selected Test Case Procedures to fully evaluate the proposed fix. A Follow-On OT&E may be required to verify the proposed fix.

Impact 4 – No Impact: A repeatable problem that does not prevent or compromise the full delivery of products and services.

Action: The OT&E may continue at the discretion of the TRG. An approved workaround may be authorized until the problem is fixed, but this is not mandatory. Routine deficiencies are documented and prioritized by the proper authority for future fixes.

Impact 5 -Watch Item: Infrequent or poorly documented behavior of the System-Under-Test that might prevent or compromise the delivery of products or services.

Action: The TRG may recommend that the OT&E continue. The Test Team may develop new Test Case Procedures and/or repeat selected Test Case Procedures in an attempt to reproduce the problem. Any further observations are documented and submitted to the TRG for review.

Impact 6 - Potential Enhancement: An item identified by the TRG for consideration as a new system requirement.

Action: The TRG forwards the recommended change to the Program Manager for consideration under the Configuration Management process.

The priority assignment addresses how the problem is to be resolved based upon the above Impact assignment. The assignment scheme for the priority follows:

Emergency: Immediate fix is required.

Action: All appropriate resources are directed to resolve the problem.

Urgent: Include before national implementation.

Action: The available resources are directed to promptly resolve the problem.

Routine: Acceptable for national implementation.

Action: Resources are directed to resolve the problem as allowed.

If no critical problems are found or left unresolved, the OT&E results and TRG's recommendation will be presented by the Test Director to the ATRB for a decision whether the OT&E can be declared successful. The ATRB will notify the ACCB of its decision.

3.2 Test Personnel and Responsibilities

Test personnel are identified in Appendix D. The following are descriptions of each test personnel role and responsibilities:

Test Review Group Chair (OPS24) - The Test Director (OPS24) will chair the TRG. The Chair convenes the meetings of the TRG. The Chair works with the TRG to ensure that tests are conducted efficiently and works to resolve any issues that may arise during the conduct of the OT&E.

The Test Review Group Chair is a voting member of the TRG.

Test Director (OPS24) - The Test Director will ensure that tests are performed as described in this OT&E Plan. During the OT&E, in addition, the Test Director will:

- Collect and present TTRs to the TRG for classification, and ensure that all TTRs documented and classified during the OT&E are forwarded to the ATRB for resolution.
- Enter all TTRs into the TestTrack Pro database.
- Prepare status reports summarizing TTRs, operational issues, and test completions. Status reports will be distributed to the members of the TRG prior to the weekly meetings.

Following the completion of the OT&E, the Test Director will coordinate a “wrap-up” meeting to brief the TRG on the status of the tests conducted, summarize the TTRs submitted, and report any other test related issues. The Test Director will submit the TRG recommendation to the ATRB and ensure that the results of the OT&E are properly documented in an OT&E Report.

The Test Director is not a voting member of the TRG

NWS Project Manager (OPS12) –The NWS Maintenance Branch (OPS12) is the project manager for the OID/VDU replacement effort. The NWS project manager is responsible for generating and distributing the Mod Notes required for thin client OID/VDU installation, assuring that thin client hardware is available for the OT&E, issuing the hardware to the ETs responsible for each OT&E site, and providing any support required if problems are encountered during installation of the thin clients at the OT&E sites.

The NWS Project Manager is a voting member of the TRG.

NWS Regional Headquarters ASOS Focal Points – The NWS Regional Headquarters ASOS Focal Points provide liaison between WFOs and WSH. NWS Regional Headquarters Focal Points will participate in meetings of the TRG, coordinate issues, forward TTRs generated at the OT&E sites to the Test Director and work to resolve any problems discovered during tests.

The Regional Focal Points are voting members of the TRG.

FAA Focal Point - The FAA Focal Point serves as a single point of contact for notification of OT&E site staff, training of FAA and FAA contract staff users, collection of trouble reports from FAA-staffed test sites, and forwarding of trouble reports to the Test Director.

The FAA Focal Point is a voting member of the TRG.

USAF Focal Point - The USAF Focal Point serves as a single point of contact for notification of OT&E site staff, training of Air Force users, collection of trouble reports from Ellsworth Air Force Base (AFB), SD and forwarding of trouble reports to the Test Director.

The USAF Focal Point is a voting member of the TRG.

NWS Test Site Focal Points – For sites with NWS staff, the NWS Test Site Focal Points are responsible for coordinating site performance monitoring, for collecting annotated Mod Notes from the ET’s, for collecting questionnaires from the ET’s and contract observers (Appendix E), for documenting problems on TTR forms (Appendix B), and for forwarding the annotated Mod Notes, questionnaires, and TTRs to the NWS Regional Headquarters ASOS Focal Point who will

forward the TTRs to the Test Director.

The OT&E Site Focal Points are not members of the TRG.

NWSEO Representative - The NWSEO focal point represents the NWS employees in matters related to work environment.

The NWSEO Representative is a voting member of the TRG.

ATRB – The ATRB is a board of subject matter experts from each of the participating agencies: DOC NOAA/NWS, DOT FAA, DoD USAF and U.S. Navy, and an independent consultant from the National Center for Atmospheric Research (NCAR). The ATRB will review and may approve or reject the test results and the TRG recommendation as presented in an OT&E test report. The ATRB serves as “gatekeepers” for commencement of any test phases leading to operational, national deployment of ASOS RCs as authorized by the ACCB. The ATRB presides over the TRG, and has the authority to recommend or reject (by vote) moving from one phase of testing to another.

There are five voting members of the ATRB: NWS, FAA, DoD (Air Force), DoD (Navy), and NCAR.

4. Test Conduct

This section describes the:

- Pre-installation activities
- Resource requirements
- Test Readiness Review,
- Installation, evaluation/problem reporting
- OT&E schedule
- Help resources
- Post-OT&E activities.

4.1 Pre-Installation Activities

For sites with FAA or FAA contract staff, the FAA will:

- Notify union representatives of the OT&E and brief them on the plan
- Provide documentation on any changes to displays or keyboard commands
- Brief and train users as required
- Get notification from the FAA union that the FAA training guide is acceptable, and that it is okay to begin OT&E

For sites with NWS staff, the NWS Site Focal Point will:

- Brief users on the plan
- Provide documentation on any changes to displays or keyboard commands.

4.2 Resource Requirements

Before OT&E activities can begin at a given site, the following resources must be in place:

Resource Requirements

Resource	Description
Hardware	For OID sites: AXEL M75 thin client Chicony KB-2961 keyboard For VDU sites: Vision Technologies 5700 Advanced thin client For all sites: Samsung 940BX or 943BXTAA monitor Communications adapters as required
Documentation	a. OT&E Plan b. Draft Mod Note c. TTR forms – Appendix B d. Training Guide e. OT&E Questionnaires

4.3 Test Readiness Review

The TRG will decide when to commence the OT&E. The Test Director will conduct an OT&E “kick-off” meeting with the TRG. The TRG “kick off” meeting is held to determine if all prerequisites (Section 1.5.1) for the thin client OT&E have been met and all OT&E resources are in place. .

4.4 Installation

For all sites, the NWS ET will “routine” order all thin client hardware from NLSC. The Mod Notes #90 (OID) and #91 (VDU) will be provided to the ET’s at each OT&E site by e-mail from OPS12. **NOTE: Installation will be authorized by the Test Director only after all briefing and training is complete.** The ET’s will install the thin clients using the existing cabling that was used for the old Wyse OID’s and VDU’s at the OT&E sites. If the existing cabling from the Wyse OID’s and VDU’s doesn’t work, the ET will use the cabling provided in the thin client hardware kit to install the thin clients. The ET will annotate any changes required to the Mod Notes during the installation, which will improve the accuracy or completeness of instructions. After installation of the thin clients is complete, the ET will record the installation in Engineering Management Reporting System (EMRS). The NWS ASOS ET will complete the OT&E questionnaire (See Appendix E) at the end of the installation and, along with the annotated Mod Notes, provide both documents to the NWS Test Site Focal Point. The NWS Test Site Focal Point will forward these materials to the appropriate NWS Regional Focal Point for forwarding to the Test Director. The Test Director will provide the annotated Mod Notes to NWS OPS12 for incorporation into the final revision. The Test Director will collate all completed questionnaires for use in the test report.

Thin client hardware spares (2 thin clients, a keyboard, and one monitor) will be sent to the WFO governing the particular OT&E sites participating in the test. If any component of the thin client hardware fails during OT&E, the ST will swap out the failed component with the spare component

from the WFO governing the OT&E site. In addition, the Wyse terminals are to be retained on-site to expedite their re-installation if the thin clients are judged unacceptable, or if the ET cannot get the spare to the OT&E site fast enough to make the swap.

4.5 Evaluation and Problem Reporting

To assess whether the thin clients operate correctly and confirm no negative impact on operations, local users will evaluate thin client performance for a period of approximately two weeks during regular service operations. During the evaluation period, users will document and report any problems noted. **NOTE: A problem (documented in three TTR's) was noted during the ST where the primary OID monitor or keyboard "froze" in a dual OID configuration on the SR&DC ST0 ASOS, and on the WSH SP1 ASOS. This problem will be closely monitored during OT&E. If an OID site experiences a lock up of the OID keyboard, the ET will be instructed to replace the locked keyboard with the spare keyboard stored at the WFO governing the OT&E.**

4.5.1 Evaluation

Since all OT&E sites are operational, the evaluation will consist of use of the OID/VDU replacements and performance monitoring during service operations. No on-site test activities other than the routine monitoring of thin client performance and reporting/documenting of any problems are required. "Free play" review of displays and keyboard commands is acceptable – provided that there is no impact on operations.

4.5.2 Problem Reporting and OT&E Questionnaire

For sites with FAA or FAA contract staff, users will report problems to the FAA Focal Point. Also, for the USAF staff, the users will report problems to the USAF Focal point. The focal points will submit the problems on TTR Forms (Appendix B) to the Test Director.

For sites with NWS staff, users will report problems to the Site Focal Point on TTR forms (Appendix B) who will then forward the completed forms to the Test Director.

The Test Director will enter all received TTRs into the Test Track Pro database for retention. The Test Director will present all received TTRs to the TRG at its weekly meetings for review and adjudication.

At the conclusion of the evaluation period, both the NWS ETs, who performed the installations, and the users will complete the OT&E Questionnaire (Appendix E) and submit it to their appropriate OT&E focal point. The OT&E site focal points will pass them onto the Test Director.

4.6 OT&E Schedule

The OT&E will be conducted for approximately two weeks after the installation of the Thin Clients by the ET's are complete. This schedule is contingent the availability of the NLSC stocked thin

client hardware to support the OT&E as well as FAA Union notification/coordination and distribution of training material. As a caveat, any problems that are found during the OT&E will require a fix. A follow-on OT&E will be required to validate critical fixes.

4.7 Help during the OT&E

Questions regarding the OT&E should be directed to the Test Director:

Joseph Fiore
Phone: (301) 713-0326 x119
Fax: (301) 713-0912
Email: joseph.fiore@noaa.gov

The WSH support staff is generally available on weekdays from 0800 to 1700 EDT.

4.8 Post-OT&E Activities

Unless a decision to the contrary is made by the TRG and ATRB, the thin clients will remain in place following the successful conclusion of the OT&E. In addition, if OT&E is successful, the NWS ET's will be instructed to dispose of the existing Wyse OID and VDU hardware locally.

The Test Director will collate all received questionnaires; ensures NWS OPS12 receives all annotated draft NWS Mod Notes, and prepares the final list of TTRs documented during the OT&E with the TRG assigned priority and impact values.

5. Final Recommendation

The TRG Chair will convene a “wrap-up” meeting at the end of the evaluation period. The Test Director will review and present to the TRG the activities conducted to date, including a summary of TTRs documented and prioritized, and any other test findings. The TRG will review the information presented and recommend whether the OT&E is successful. The OT&E Test Director will report the conclusions and recommendation of the TRG to the ATRB. The ATRB will make the final decision on the OT&E. The ATRB Chair will report the ATRB decision to the ACCB as input into the ACCB's decision whether to implement the associated Request for Change for the ASOS OID/VDU Replacement Using the Thin Client.

6. OT&E Report

An OT&E Report will be prepared, by NWS OPS24, upon completion of the OT&E, and will be presented for acceptance by the ATRB. The OT&E Report provides a complete record of the OT&E including details and status of all OT&E TTRs, findings, and recommendations. The OT&E Report will be made available on the OPS24 website.

Appendix A - OT&E Site Characteristics

Site	Comms Port Useage (OID or VDU Identifier)	SIO Board#-Port#	Modem/Hardwire	Connection	User/Location
Allentown (KABE), PA	OID-1	3-4	Hardwire	Hardwire	Tower
Atlantic City (KACY), NJ	OID-1	6-2	Modem 3	Leased line	FAA Contract Observer
Washington Dulles (KIAD), VA	OID-1	3-4	Hardwire	Hardwire	FAA Contract Observer
Indianapolis (KIND), IN	OID-1	3-4	Hardwire	Hardwire 200 ft CAT5	Tower
Indianapolis (KIND), IN	OID-6	5-4	Hardwire	FTI	WFO
Huntsville (KHSV), AL	OID-2	5-4	Hardwire	Fiber optic network	Tower
Missoula (KMSO), MT	OID-7	6-1	Hardwire	FTI	Tower
Chicago (KORD), IL	VDU-1	4-1	Modem 1	Leased line	WFO
Chicago (KORD), IL	VDU-3	6-2	Hardwire	FTI	Tower
Allentown (KABE), PA	VDU-1	6-2	Hardwire	Hardwire	TRACON
Indianapolis (KIND), IN	VDU-1	5-3	Hardwire	Hardwire 200 ft CAT5	FAA Contract Observer
Rapid City (KRAP), SD	VDU-2	4-3	Modem 7	Leased line	Ellsworth AFB Radar Approach Control
Fayetteville (KFAY), NC	VDU-1	5-3	Hardwire	Hardwire	TRACON
Boise (KBOI), ID	VDU-1	4-3	Hardwire	FTI	WFO
Boise (KBOI), ID	VDU-3	5-1	Hardwire	FTI	TRACON

Table 1 - OT&E Sites and OID/VDU Interfaces

NWS Eastern Region

SID	Name	FAA Service Level	Observing Staff	DCPs	Multiple Sensors	ZR	Wind	Precip	Comms	GTA/ ATIS	ACE	RVR	WSP	Current S/W Version
KABE	Allentown, PA	C	FT	1	B	ZR	Belfort	AWPAG	DIAL	ATIS	ACE	---	---	2.79D
KACY	Atlantic City, NJ	C	PT	1	---	ZR	IFW	AWPAG	DIAL	ATIS	ACE	---	WSP	2.79D
KFAY	Fayetteville, NC	C	PT	1	---	---	Belfort	HTB	ADAS	ATIS	---	---	---	2.79D
KIAD	Washington-Dulles, VA	A	FT	3	M/B	ZR	IFW	AWPAG	ADAS	ATIS	ACE	RVR	---	2.79D

NWS Central Region

KIND	Indianapolis, IN	A	FT	2	B	---	IFW	AWPAG	ADAS	ATIS	ACE	RVR	---	2.79E
KORD	Chicago - O'Hare, IL	A	FT	2	B	ZR	IFW	AWPAG	ADAS	ATIS	---	RVR	---	2.79D
KRAP	Rapid City, SD	C	PT	1	---	ZR	IFW	AWPAG	ADAS	GTA	---	---	---	2.79D

NWS Southern Region

KHSV	Huntsville, AL	B	FT	1	---	ZR	IFW	AWPAG	Dial	ATIS	---	RVR	WSP	2.79C
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NWS Western Region

KBOI	Boise, ID	C	FT	1	---	ZR	IFW	AWPAG	ADAS	ATIS	---	---	---	2.79D
KMSO	Missoula, MT	C	PT	1	---	ZR	IFW	AWPAG	ADAS	ATIS	ACE	---	---	2.79D

Table 2 - OT&E Site Operational Characteristics and Interfaces by NWS Region

Appendix B - Test Trouble Report (TTR) form

ASOS TROUBLE REPORT

TYPE/NO _____ LOCATION (SID)

TROUBLE REPORT TITLE

DATE/TIME DISCOVERED _____ ORIGINATOR

AFFECTED SUBSYSTEM _____ S/W VER _____

A. DESCRIPTION AND CAUSE OF PROBLEM:

B. MAINTENANCE CONSULTED?

___ YES ___ NO (WHY?)

C. PROBLEM NOTED ELSEWHERE?

___ YES (WHERE?) ___ NO

D. TECHNICAL DATA ATTACHED?

___ YES ___ PAGES

___ NO

APPROVED _____ DATE

Appendix C - TRG and ATRB members

TRG Members

Name/Organization	Function	Vote
Joseph Fiore (W/OPS24)	Test Review Group Chair	√
Joseph Fiore (W/OPS24)	Test Director	-
Greg Dalyai (W/OPS12)	Maintenance Branch	√
Bing Huang (ATO-T)	FAA Focal Point	√
Brian Lavoie (CMSgt)	USAF Focal Point	√
Tim Rutkoswki (W/ER41)	Eastern Region ASOS Focal Point	√
Lewis Harrington (W/SR41)	Southern Region ASOS Focal Point	√
Bob Brashears (W/CR43)	Central Region ASOS Focal Point	√
Rex Bernhart (W/WR4)	Western Region ASOS Focal Point	√
Jimmy Jones (W/AR42)	Alaska Region ASOS Focal Point	√
John Bush (W/PR1)	Pacific Region ASOS Focal Point	√
Christopher Kornkven (WFO MKE)	NWS Employee Organization Focal Point	√

ATRB Members

Name/Organization	Function	Vote
Jerald Dinges (W/OPS24)	ATR Chair/Primary	-
Joseph Fiore (W/OPS24)	DOC/NWS Secretariat/Alternate Chair/Primary	-
Khien Nguyen (W/OPS24)	DOC/NWS Secretariat Alternate	-
Dave Mannarano (W/OPS22)	DOC Primary	√
Tom Townsend (W/CR1)	DOC Alternate	(√)
Bing Huang (FAA- ATO-T)	FAA Primary	√
Tuyen Kieu (FAA--ATO-W)	FAA Alternate	(√)
Robert Born (USAF YE-2)	USAF Primary	√
Todd Allen (USAF YE-3)	USAF Alternate	(√)
Gerald "Wayne" Knight (SPAWARSYSCEN)	US Navy Primary	√

Ronald Heatherdale (SPAWARSYSCEN)	US Navy Alternate	(√)
Roy Rasmussen (NCAR)	NCAR Primary	√
Scott Landolt (NCAR)	NCAR Alternate	(√)

Appendix D - Test personnel

Test Review Group Chair (OPS24):

Joseph Fiore
Test and Evaluation Branch (OPS24)
301-713-0326 x119
joseph.fiore@noaa.gov

ASOS Test Review Board (ATRB) Chair (OPS24):

Jerald Dinges
Chief, Test and Evaluation Branch (OPS24)
301-713-0326 x160
gerald.dinges@noaa.gov

OT&E Test Director (OPS24):

Joseph Fiore
Test and Evaluation Branch (OPS24)
301-713-0326 x119
joseph.fiore@noaa.gov

Maintenance Branch (OPS12):

Gregory Dalyai
Maintenance Branch (OPS12)
301-713-1835 x147
gregory.dalyai@noaa.gov

NWS Regional Headquarters ASOS Focal Points:

Eastern Region	Tim Rutkowski (W/ER41) timothy.rutkowski@noaa.gov	631-244-0139
Central Region	Bob Brashears (W/CR43) bob.brashears@noaa.gov	816-268-3161
Southern Region	Lewis Harrington (W/SR41) lewis.harrington@noaa.gov	817-978-7777 x 143
Western Region	Rex Bernhart (W/WR4) rex.bernhart@noaa.gov	801-524-5120 x 244
NWS Alaska Region	Jimmy Jones (W/AR42) jimmy.jones@noaa.gov	907-271-5124
NWS Pacific Region	John Bush (W/PR1)	808-532-6435

john.bush@noaa.gov

NWSEO Focal Point

NWS Central Region Christopher Kornkven 262-965-5061 x 381
Chris.Kornkven@noaa.gov

FAA Focal Point (FAA Headquarters)

Bing Huang (ATO-T) bing.huang@faa.gov (208) 386-8579
Tuyen Kieu (ATO-W) tuyen.kieu@faa.gov (202)-267-9435

USAF Focal Point (Ellsworth AFB)

Brian Lavoie(CMSgt) Brian.Lavoie@ellsworth.af.mil (605) 385-2404

NWS Test Site Focal Points:

<u>SITE</u>	<u>Focal Point</u>	<u>Telephone</u>
Allentown (KABE), PA	Chrystal Burden (@ ABE)	(610)-264-4530
Atlantic City (KACY), NJ	Keith Pugh (@ PHI)	(609)-261-6602
Fayetteville (KFAY), NC	Ron Simpson (@ RAH)	(919)-515-8210
Washington Dulles (KIAD), VA	Art Patrick (@ LWX)	(703)-260-0107
Indianapolis (KIND), IN	Curt Tweed (@ IWX)	(317) 856-0360 x 372
Rapid City (KRAP), SD	Bob Baye (at UNR)	(605) 341-9271 x 382
Chicago (KORD), IL	Walter Cowan (@ LOT)	(815) 834-0673 x 372
Huntsville (KHSV), AL	Brian Burgess (@ HUN)	(256) 890-8503 x 260
Boise (KBOI), ID	George Buckwold (@ BOI)	(208) 334-9847
Missoula (KMSO), MT	Jim Hall (@ MSO)	(406) 543-0922 x 260

Appendix E - OT&E Questionnaire

Thin Client OID/VDU Electronic Technician Questionnaire

(This survey is to be completed by the OT&E site during the OT&E, coordinating responses with the test site management and staff).

Test Site:	Date:
Name:	Title:
Test Start Date:	Test End Date:
ASOS firmware version :	

Respond to the statements below by checking the rating box that best describes your opinion according to the following code:

1 <u>Excellent</u> Performed in a manner that could not be improved	2 <u>Good</u> Performed well, met field needs and offered some improvements	3 <u>Satisfactory</u> Performed in a manner that meets basic field needs	4 <u>Deficient</u> Performed in unsatisfactory manner, does not fully meet field needs, may be workarounds	5 <u>Unsatisfactory</u> Performed in a wholly unsatisfactory manner, does not meet field needs and negatively impacts field operations	<u>N/A</u> Does Not Apply
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Statement/Question	1	2	3	4	5	N/A
Installation of thin client OID from Modification Note 90.						
Installation of thin client VDU from Modification Note 91.						
Installation of OID monitor and keyboard from Mode Note 90.						
Installation of VDU monitor from Mode Note 91.						
Did you find that the OID Mode Note 90 was easy to follow?						
Did you find that the VDU Mode Note 91 was easy to follow?						
Was the training guide/errata sheet helpful?						
Was the training guide/errata sheet easy to follow?						
Is the new OID monitor better than the old OID monitor?						
Do you like the colors on the new OID monitor?						
Do you like the new OID keyboard?						
Is the new VDU monitor better than the old VDU monitor?						
Do you like the colors on the new VDU monitor?						
How well were you able to integrate the thin client OID or VDU in place of the legacy OID or VDU?						
Were the mounting options that were offered sufficient to accommodate the specific needs within the present location identified for the OID or VDU?						

Statement/Question	1	2	3	4	5	N/A
<p>Did you find it inconvenient to locate a second AC outlet to accommodate the extra AC plug associated with the thin client replacement?</p> <p>Overall, please rate the performance of the new OID thin client (reliability).</p> <p>Overall, please rate the performance of the new VDU thin client (reliability)</p>						

Please provide a brief paragraph summary for each of the following questions:

1. During Systems Test (ST), three Test Trouble Reports (TTRs) were written about thin OID client monitor and/or keyboard lock up. Did the OID keyboard lock up at any time during OT&E? Please explain what you were doing when the monitor froze or the keyboard locked up.

2. Were you able to use the existing cables from the Wyse OID's and VDU's? If not, how long did it take to reinstall the thin clients using the cables provided with the thin client hardware?

3. If the OID monitor or keyboard locked up, how long did it take to resolve the issue?

4. If the OID monitor or keyboard locked up, how critical do you feel this issue is to operations?

5. Would you suggest any improvements for the OID or VDU mod Notes?

Thin Client OID/VDU Air Traffic Controller/Observer Questionnaire

(This survey is to be completed by the OT&E site during the OT&E, coordinating responses with the test site management and staff).

Test Site:	Date:
Name:	Title:
Test Start Date:	Test End Date:
ASOS Firmware version:	

Respond to the statements below by checking the rating box that best describes your opinion according to the following code:

1 <u>Excellent</u> Performed in a manner that could not be improved	2 <u>Good</u> Performed well, met field needs and offered some improvements	3 <u>Satisfactory</u> Performed in a manner that meets basic field needs	4 <u>Deficient</u> Performed in unsatisfactory manner, does not fully meet field needs, may be workarounds	5 <u>Unsatisfactory</u> Performed in a wholly unsatisfactory manner, does not meet field needs and negatively impacts field operations	N/A Does Not Apply
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Statement	1	2	3	4	5	N/A
Was the training guide/errata sheet helpful?						
Was the training guide/errata sheet easy to follow?						
Is the new OID monitor better than the old OID monitor?						
Do you like the colors on the new OID monitor?						
Do you like the new OID keyboard?						
Is the new VDU monitor better than the old OID monitor?						
Do you like the colors on the new VDU monitor?						
Do you like the way the thin clients are mounted and do you like the placement of the VDU and OID monitors?						
Overall, please rate the appearance of the new OID monitor						
Overall, please rate the appearance of the new VDU monitor						
Overall, please rate the performance of the new OID thin client (reliability).						
Overall, please rate the performance of the new VDU thin client (reliability).						

