SYSTEM TEST PLAN

for the
Automated Surface Observing System
(ASOS)
OID/VDU Replacement Using Thin Client

July 2008

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

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Table of Contents

Page

Tables

Page

Figures

Page

Attachments

Page

Acronyms

ACCB	ASOS Configuration Control Board
ACE	ASOS Controller Equipment
ACU	Acquisition Control Unit
ADAS	AWOS Data Acquisition System
ALDARS	Automated Lightning Detection and Reporting System
AMR	ASOS Meteorological Report
AOMC	ASOS Operations and Monitoring Center
APMC	ASOS Program Management Committee
ASENSE	ASOS Sensor Emulation Software
ASOS	Automated Surface Observing System
ATC	Air Traffic Controller
ATIS	Automatic Terminal Information Service
AWIPS	Advanced Weather Interactive Processing System
AWOS	Automated Weather Observing System
BKN	Broken
CLI	Climate Report
CLR	Clear
COR	Corrected
CRH	Central Region Headquarters
DCA	Washington National Airport, ASOS Site
DCP	Data Collection Platform
DCM	Direct Command Mode
DOD	Department of Defense
DS	Daily Summary
DSM	Daily Summary Message
ECP	Engineering Change Proposal
El Tech	Electronics Technician
EPROM	Erasable Programmable Read-Only Memory
FAA	Federal Aviation Administration
FAATC	FAA Technical Center
FAT	Factory Acceptance Test
FMH-1	Federal Meteorological Handbook # 1
FSOC	Field Systems Operations Center
FZRANO	Freezing Rain Not Available
GENOB	Generate Observation
ICD	Interface Control Document
LDAD	Local Data Acquisition and Dissemination
LEDWI	Light Emitting Diode Weather Identifier
LST	Local Standard Time
METAR	Meteorological Aviation Routine Weather Report
MS	Monthly Summary
MSM	Monthly Summary Message
NCDC	National Climatic Data Center
NGRVR	Next Generation Runway Visual Range
NLSC	NOAA Logistics Support Center
NMTW	National Meteorological Test Weather
NP	No Precipitation

NRC	National Reconditioning Center
NWS	National Weather Service
NWSTC	National Weather Service Training Center
OBS	Observer
OCCW	Office of Climate, Water, and Weather Services
OH	Office of Hydrology
OID	Operator Interface Device
OOS	Office of Operational Systems
OT&E	Operational Test and Evaluation
OTR	Operations Trouble Report
OVC	Overcast
PHYS	Physical
PNO	Precipitation Not Available
PWINO	Precipitation Identifier Information Not Available
PWX	Present Weather
RC	Request for Change
RVR	Runway Visual Range
RVRNO	Runway Visual Range Not Available
SAT	System Acceptance Test
SCA	Single-Cabinet ASOS
SCD	Supplemental Climatological Data
SCT	Scattered
SFSC	Sterling Field Support Center
SHEF	Standard Hydrometeorological Exchange Format
SP1	Silver Spring, MD, ASOS system
SPECI	Aviation Selected Special Weather Reports
SR&DC	Sterling Research and Development Center
SSMC2	Silver Spring Metro Center Bldg. 2
ST	System Test
ST0	Sterling, VA ASOS System 2
ST1	Sterling, VA ASOS System 3
TRG	Test Review Group
TSNO	Thunderstorm Not Available
TTR	Test Trouble Report
USP	Urgent Special Observation
UTC	Universal Time Coordinated
V	version
VDU	Video Display Unit
WSH	National Weather Service Headquarters
WSP	Weather Systems Processor

1.0 Introduction

The National Weather Headquarters (WHS) Office of Operational Systems (OOS), Field Systems Operations Center (FSOC), Test and Evaluation Branch (OPS24) will conduct a System Test (ST) of the Thin Client server which is planned to replace the out-of-production and obsolete Operator Interface Device (OID) and Video Display Unit (VDU) in the field. It is currently envisioned that the Thin Client OID/VDU replacement will be a "drop-in" replacement (one for one exchange).

The OID replacement system consists of an AXEL M75C (ASN#) thin client which is a Linux-based server, a keyboard, and a Samsung LCD monitor (See Attachment A for more details).

The VDU replacement system consists of an ADDS 5700 (ASN#) thin client which is also a Linux-based server, and a Samsung LCD monitor (See Attachment B for more details).

The test methodology as well as personnel and system resources needed to conduct the tests are identified in this plan. Schedules for the tests to be completed are also included.

1.1 Test Plan Organization

This ST plan is composed of three sections and five attachments.

Section 1.0 contains introductory material on test strategy, objectives, result analysis, and prerequisites.

Section 2.0 describes the schedule and methodology for conducting the ST, test facilities, pre- and post-test activities, and supporting documentations. This section also contains information on personnel and their responsibilities.

Section 3.0 discusses how a recommendation for Operational Test and Evaluation (OT&E) will be made and how the ST report will be written.

Attachment 1 lists the regression test procedures to be performed.

Attachment 2 lists the operational keys on the existing OID keyboard.

Attachment 3 is the Test Trouble Report (TTR) form.

Attachment 4 is the Test logs form.

Attachment 5 is the Mod notes for the Thin Client Installations.

1.2 Test Assumption and Limitations

The Thin Client is envisioned to be a simple replacement for the OID/ VDU to perform the display functions of the ASOS and should not affect the ACU internal algorithms. Therefore, the ST is limited to verification of the stability of the Thin Client and the user interface and display functions. No interface tests with the FAA (WSP, ADAS/ALDARS) will be conducted.

1.3 Test Objectives and Evaluation Criteria

The specific test objectives and criteria are:

A. Verify the Engineering Modification Notes for installing the Thin Clients.

Evaluation Criterion: The Engineering Mod Notes for the Thin Client are complete and accurate.

B. Verify the ACU interface requirements for OID and VDU.

Evaluation Criterion: The ACU can successfully interface to the OID/VDU.

C. Verify all existing ASOS display functions of the OID and VDU.

Evaluation Criterion: All existing OID and VDU display functionalities are still available and operational on the OID/VDU replacement systems.

1.4 Test Review Group (TRG) Responsibilities

The TRG will comprise technical experts assigned from each agency. The role of the TRG is to evaluate each observed deficiency as documented by a TTR during the ST.

During the ST, the TRG Chair will convene the TRG weekly to:

a) Review, clarify, and evaluate deficiencies documented in the TTRs;

b) Prioritize, validate deficiencies, and recommend corrective actions to the ASOS Software manager; and

c) Coordinate the resolution of other test-related issues.

If a critical problem occurs between weekly meetings and requires a vote of the members whether to suspend the ST, the ST Director shall convene an emergency TRG meeting.

The TRG will be composed of the personnel identified in Table 1. The "voting" members will forward a recommendation to the Chair, ASOS Configuration Control Board (ACCB) whether the Thin Client is ready for OT&E.

Table 1 – ASOS Test Review Group

Name	Function	Voting Member	Phone
Jerald Dinges (OPS24)	Test Review Group Chair		301-713-0326 x160
Khien Nguyen (OPS24)	System Test Director	Y	301-713-0326 x177
Bryan Moore (PCI)	Test Team Member		301-713-0326 x176
Joseph Fiore (OPS24)	Test Team Member		301-713-0326 x119
Jennifer Dover (SAIC)	Test Team Member		703-661-1259
Brian Rice (SAIC)	Test Team Member		703-661-1259
Dave Eckberg (SAIC)	Electronics technician		703-661-1288
Peggy Hoch (OPS23)	ASOS Software Manager		301-713-0985 x 167
Hak Kim (OPS23)	Test Team Member		301-713-0985 x 169
Richard Parry (OPS22)	Observing Systems		301-713-2093 x 109
Dave Mannarano(OPS22)	Observing Systems	Y	301-713-2093 x 103
Greg Dalyai(OPS12)	Maintenance	Y	301-713-1833 x 147
Kevin Conaty	AOMC	Y	301-713-0864 x 170
Don Rinker	Configuration management		301-713-1892 x 201
Jerry Kranz (FAA Contractor)			
Paul Armbruster (FAA ATO-T)			202-385-8933
Tuyen Kieu (FAA/ATO-W)	Test Team Member	Y	202-267-9435
Bob Born (USAF)	Test Team Member	Y	402-294-0866
R. Retzlaff (NWSTC)	Test Team Member	Y	816-880-9368
Wayne Knight (U.S. Navy)	Test Team Member	Y	843-218-4818
Mark Russo (NRC)	Test Team Member	Y	816-823-1057 x 252
Tom Towsend (NWS CRH)	Test Team Member	Y	816-268-3149

The following describes the major roles and responsibilities of the TRG personnel:

TRG Chair – The TRG Chair convenes the meetings of the TRG and works with the ST Director and the members of the TRG to ensure that tests are conducted efficiently. The Chair works to resolve any issues that may arise during the conduct of the ST.

System Test Director – The Test Director is the primary point of contact for the ST. the test Director manages the development and coordination of the ST Plan, oversees the conduct of the tests, and manages the development and coordination of the ST Report to document the test results and recommendations. As a voting member, the ST Director solicits inputs from the ASOS test team for any issues which require a decision

among the voting members.

ASOS Software Manager – The ASOS Software manager is responsible for providing technical support and information as required when ASOS questions arise, and schedules investigation and solution of ASOS discrepancies.

ASOS Test Team – The ASOS test Team is comprised of subject experts from WSH, NWSTC, and designated DOD personnel representing test sites. The ASOS test Team installs the V2.79D software and conducts the ST.

1.5 Test Result Analysis

On Thursday of each test week, all Test Trouble Reports (TTR) will be collected and the Test Review Group (TRG) will meet to classify the problems. The TRG is a group of subject-matter experts and is chaired by the Chief, Test and Evaluation Branch (OPS24) or his designee. The TTRs may be assigned numerical scores to indicate the severity of the defect, (i.e. the Impact, and the Priority). A 5-point grading system is typically used with 1 being the most severe and 5 being the least severe.

A typical assignment scheme for Impact follows:

1. Critical Deficiency – A repeatable problem, with no workaround, that prevents or may compromise the full delivery of products or services.

   ACTION: The TRG will recommend the immediate suspension of ST, and the software will be turned over to the developer to resolve the problem. The ST may be resumed at the recommendation of the TRG after an appropriate fix or workaround has been developed. The Test Team may develop new Test Case Procedures and/or repeat selected Test Case Procedures to fully evaluate the proposed solutions.

2. Urgent Deficiency - A repeatable problem, with an acceptable workaround, that prevents or may compromise the full delivery of products or services.

   ACTION: The TRG may recommend the ST continue with an approved workaround in place until an appropriate fix is developed. If a fix becomes available during the ST, the TRG may recommend the immediate implementation of the fix. The test Team may develop new Test case Procedures and/or repeat selected Test Case procedures to full y evaluate the fix.

3. Routine – A repeatable problem that does not prevent or compromise the full delivery of products and services.

   ACTION: The ST 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.

4. Watch Item – Infrequent or poorly documented behavior of the System-Under-Test that may prevent or compromise the delivery of products or services.

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

5. Potential Enhancement – An item identified by the TRG for consideration as a new system requirement.

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

The Priority addresses how the problem is to be solved. A typical assignment scheme for the Priority follows:

$ Priority 1 – Urgent: Immediate emergency action is required.

  ACTION: All appropriate resources are directed to resolve the problem as soon as possible.

$ Priority 2 – High: Include in the next interim release.

  ACTION: The available resources are directed to resolve the problem.

$ Priority 3 – Routine: Include in a future interim release.

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

$ Priority 4 – Low: Consider for the next major release.

  ACTION: The item is deferred to future system improvements.

$ Priority 5 – Undetermined: The Priority has not yet been assigned.

  ACTION: None.

No recommendation will be made to proceed to the OT&E if any critical Impact 1 and urgent Priority 1 deficiency remains open.

1. 6 Prerequisites and Assumptions

The following are specific items required to commence the ST and assumptions made going into the ST:

a) Thin Client units and a draft version of Engineering Modification Notes are available for each test location.

b) An ST Test Readiness Review is conducted and the TRG determines the system is ready to begin the ST (See Section 2.3.1 Pre-ST Activities).

2.0 Method of Accomplishment

The following sections provide the test schedule, descriptions of the test facilities, the test system configurations, the required test resources, and the methodology for how the ST will be conducted.

2.1 Schedule

The ST will start with a “kick-off” TRG meeting to discuss test strategies and schedules. The ST will be performed as specified in the following Table 2. The ST will conclude with a “wrap-up” meeting to finalize recommendations to the ACCB Chair.

Test team members will use all test systems as required. On Thursdays during the ST, a meeting will be convened by the Test Director to review the problems documented on Test Trouble Report forms during the week and to assess the status of the ST. If the TRG deems deficiencies to be critical Impact 1/urgent Priority 1, these test trouble reports will be forwarded to the ACCB Chair for review and approval. If the ACCB Chair agrees the deficiencies are “urgent”, the Chair will task the Maintenance Branch (OPS12) to correct them. The revised Thin Client will be subject to a limited ST retest. Depending on the time required for deficiency correction, revisions to the test schedule will be required. At the end of the ST, the TRG will recommend to the ACCB Chair whether to proceed to the OT&E.

Table 2 - Test Schedule

Dates	Duration	Action
Delivery of Thin Client units for ST		Thin Client units and Mod Notes ready
Day 1	1 day	ST kick-off meeting
Day 2	1 day	Install Thin Clients (per mod notes) At NWSH, NWSTC, SR&DC, and Charleston Naval Shipyard, NC
Day 3 - Day 16	14 days	ST at WSH and SR&DC
Day 17 - Day 18	2 days	Fix ST problems (if necessary)
Day 19 - Day 21	3 days	Retest (if necessary)
Day 22	1 day	Wrap-up meeting
Day 23 - Day 36	14 days	Prepare ST test report

2.2 Test Facilities

The SR&DC, WSH, NWSTC, and U.S. Navy will participate in the ST. The primary test systems include WSH SCA, SR&DC ST0 and ST1. The ASOS Sensor Emulation Software (ASENSE V1.81 or latter versions) program will be used to emulate specified ASOS sensors when needed. Additional ASOS systems will be used to validate the Mod Notes and to supports “baseline”, “free-play”, and stability tests. These will be selected from the ASOSs at NWSTC, NRC, and Charleston Naval Shipyard, SC.

2.2.1 SR&DC

The Sterling Research and Development Center (SR&DC), an NWS facility for testing surface and upper air observation systems, is located in Sterling, Virginia. The SR&DC has two ASOSs that will be used for testing – 1) ST0 and 2) ST1. ST0 (see Figure 1) will be used to validate specific software fixes and enhancements; it is configured as an operational system.

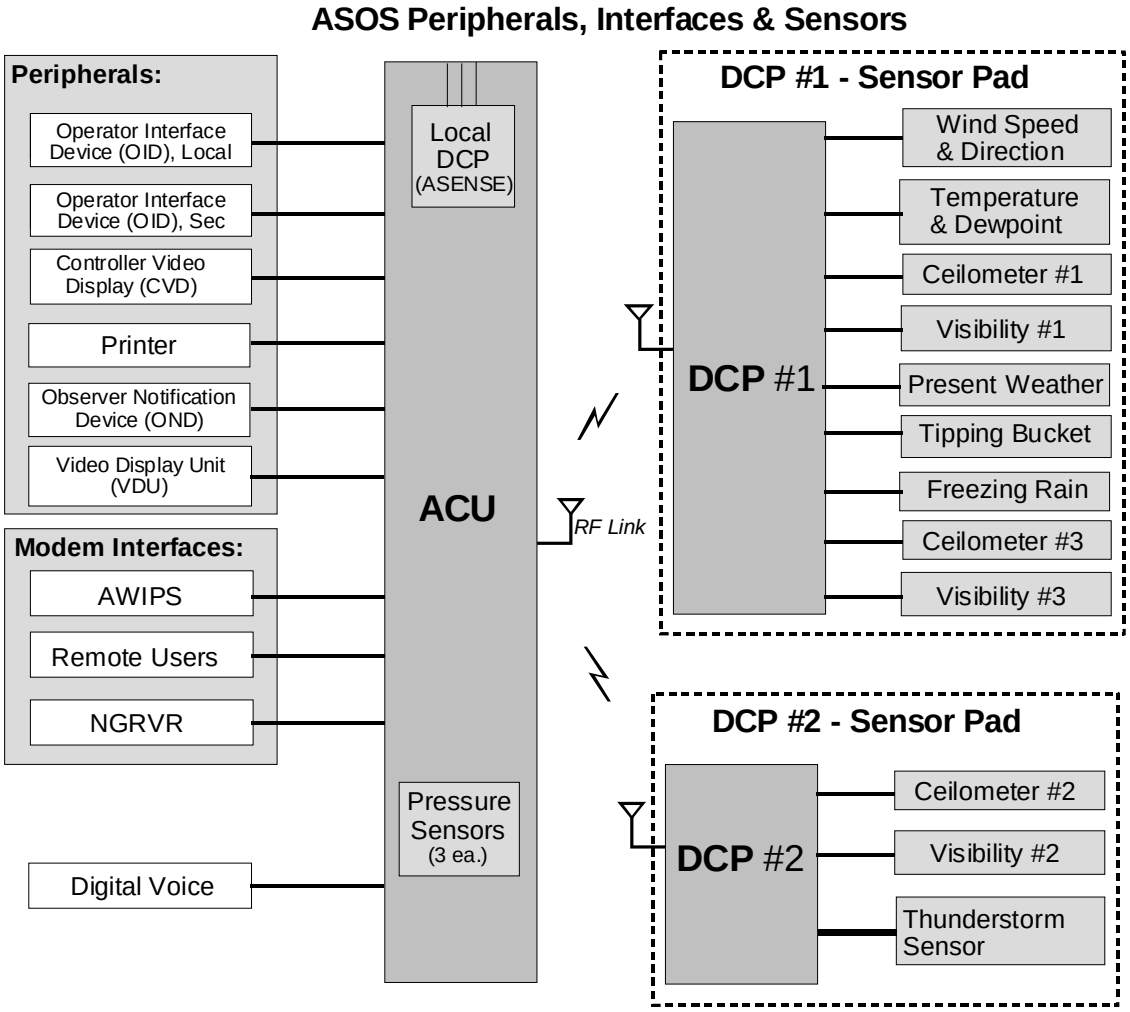


Figure 1. ST0 ASOS Configuration

During the ST for the ST0 ASOS, the primary OID replacement system (Thin Client + monitor + keyboard) will take place of the current primary OID, the secondary OID replacement system (Thin Client + monitor + keyboard) will take place of the current secondary OID, and the VDU replacement system (Thin Client + monitor) will take place of the current VDU.

ST1 (see Figure 2) will be used as a control system to provide side-by-side performance comparison of the existing OID/VDU and the OID/VDU replacement systems.

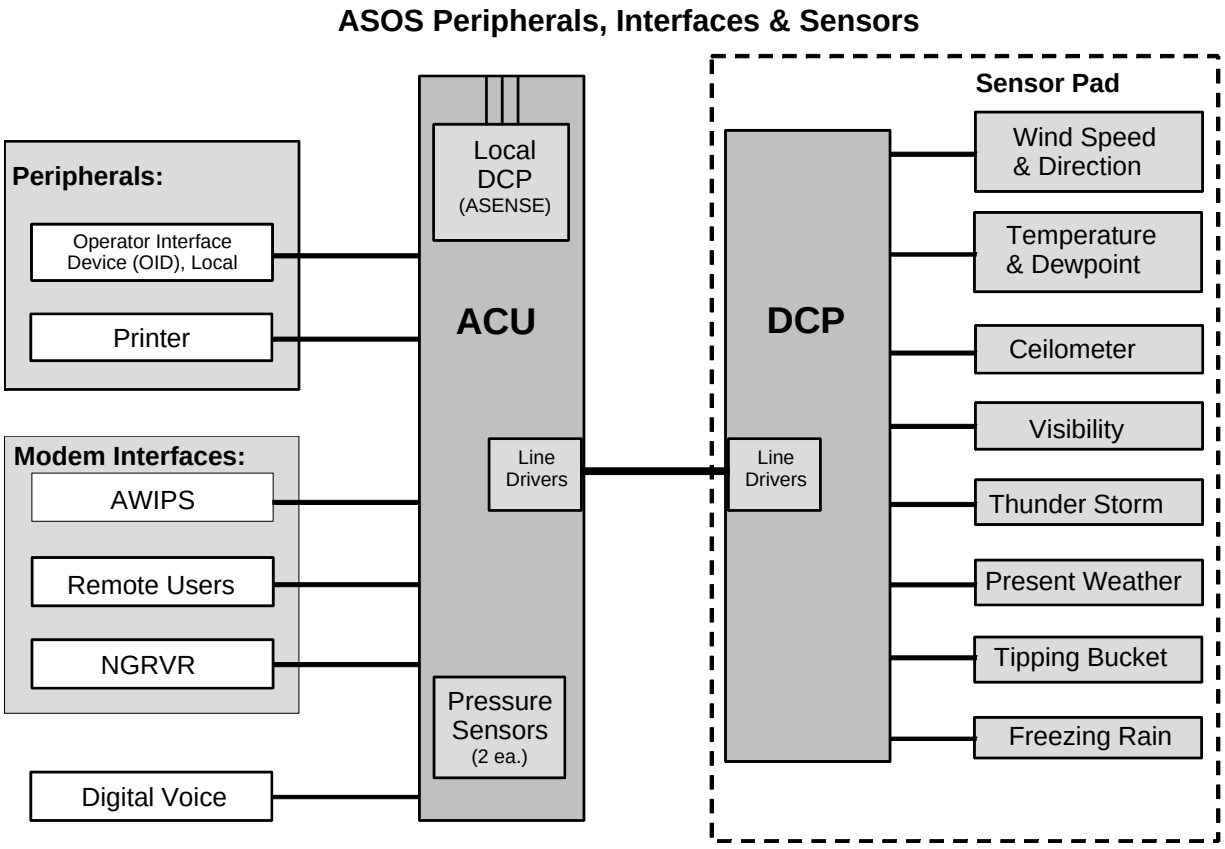


Figure 2. ST1 ASOS Configuration

During the ST, the current OID and the current VDU of the ST1 ASOS will be used for reference.

2.2.2 WSH

The WSH is located at Silver Spring, Maryland and has one ASOS test system (SCA). The SCA ASOS (see Figure 4) resides on the 6th floor of SSMC2. This system is normally used by ASOS software programmers to develop and test all future ACU software loads/releases. The SCA will be used during the ST to validate the ASOS V2.79D functionality in a unique SCA environment.

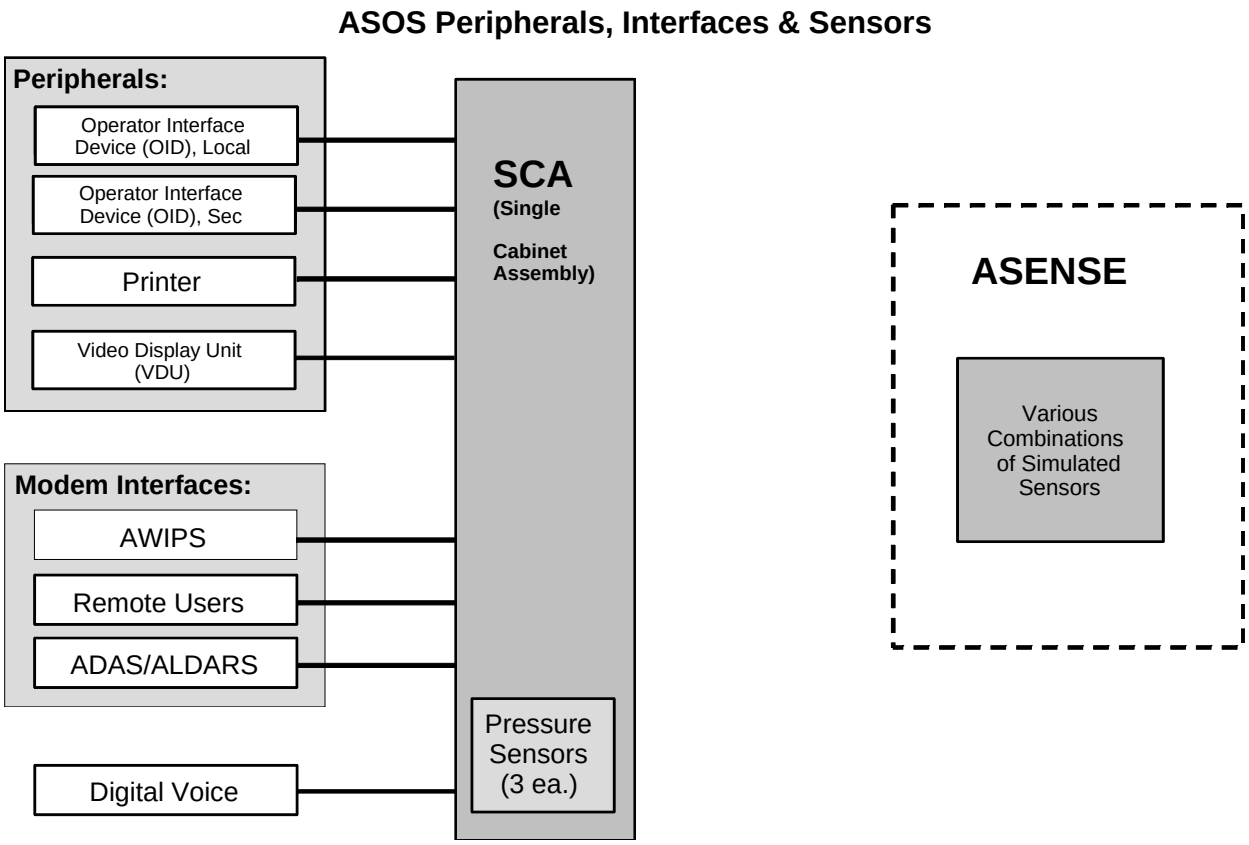


Figure 3. SCA Configuration

During the ST for the SCA ASOS, the OID replacement system (Thin Client + monitor + keyboard) will take place of the current OID, and the VDU replacement system (Thin Client + monitor) will take place of the current VDU.

2.2.3 U.S. Navy's ASOS

The Navy 1 (Gold) ASOS system at the Charleston Naval Shipyard, SC, will be used to evaluate the Mod Notes and to support "free-play" testing of the Thin Clients. The Navy 1 ASOS system is shown below:

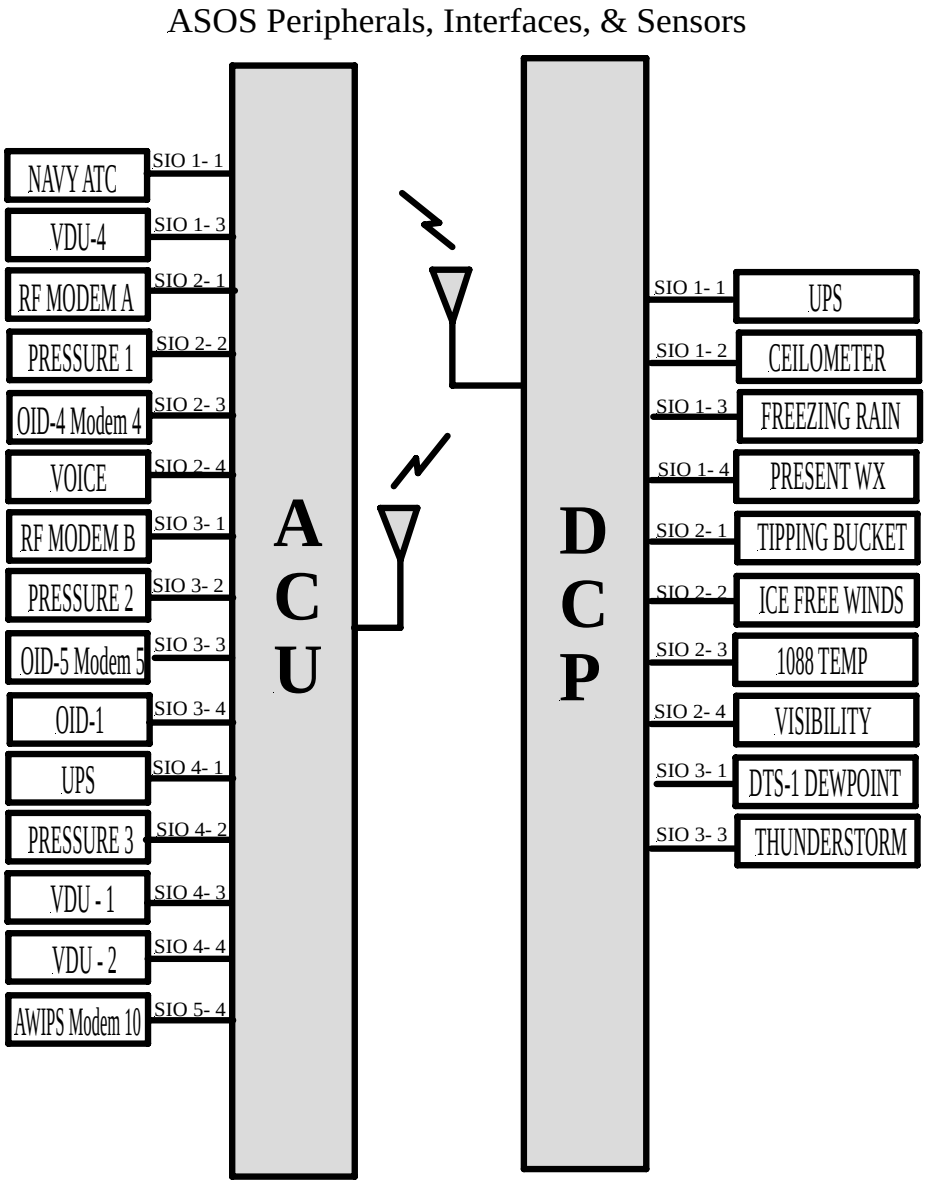


Figure 4. Navy 1 (Gold) ASOS Configuration

During the ST for the Navy-1 ASOS, the OID replacement system (Thin Client + monitor + keyboard) will take place of the current OID-1, and the VDU replacement system (Thin

Client + monitor) will take place of the current VDU-1. **Note**: SPAWARSYSCEN requested only one replacement Samsung LCD monitor from NLSC for the ST. They will use one of their own LCD monitors. They will receive 2 Thin Clients from WSH/OPS12

2.2.4 NWSTC's ASOS

The ASOS system (Class II) at the NWSTC will be used to evaluate the Mod Notes and to support "free-play" testing of the Thin Clients. The configuration for this system is given below:

Class II

AWPAG	Serial # 190711
DTS1	Serial # 3720003
1088	Serial # T0155
PWI	Serial # 0048
IFW	Power supply SN A0125, Sensor SN A0704
CHI	Serial # 87-7728
FR	Serial # 0079
Vis	Serial # A0352

Figure 5. NWSTC Class II ASOS Configuration

During the ST for the Class-II ASOS, the OID replacement system (Thin Client + monitor + keyboard) will take place of the current OID, and the VDU replacement system (Thin Client + monitor) will take place of the current VDU. NWSTC will get 2 Thin Clients from WSH/OPS12 and 2 Samsung LCD monitors from NLSC.

2.2.5 FAA's ASOS

The ASOS system at the National Airway Systems Engineering (NASE) Weather Processors and Sensors (AJW-14A) will be used to evaluate the Mod Notes and to support "free-play" testing of the Thin Clients. During the ST, the OID replacement system (Thin Client + monitor + keyboard) will take place of the current OID, and the VDU replacement system (Thin Client + monitor) will take place of the current VDU. AJW-14A will get 2 Thin Clients from WSH/OPS12 and 2 Samsung LCD monitors from NLSC.

2.2.6 NRC's ASOS

The ASOS system at NRC will be used to evaluate the Mod Notes and to support "free-play" testing of the Thin Clients. During the ST, the OID replacement system (Thin Client + monitor + keyboard) will take place of the current OID, and the VDU replacement system (Thin Client + monitor) will take place of the current VDU. **In addition, NRC will test the Thin Client connectivity to the ACU using various wiring combinations currently employed at the field sites.**

2.3 Test Methodology

The following sections provide a description of how the ST will be conducted. It will be the responsibility of the Test Director to ensure the test is performed as outlined. Any deviation from the test methodology will be documented and provided to the ST testers prior to conduct of the affected tests.

2.3.1 Pre-ST Activities

Prior to ST conduct, OPS24 will develop the ST Plan and test procedures. The Test Director will conduct a "kick-off" meeting for the ASOS TRG detailing what will be tested, how any discrepancies will be documented, and the test schedule. After the "kick-off" meeting, the Test Director will commence the ST.

The start of the ST is contingent upon the delivery of the following:

$ Thin Client units for use in the ST.

$ V2.79D software on a CD (OPS23).

$ Draft Engineering Modification Notes for the Thin Client (OPS12).

$ ST0 and ST1 ASOS systems readiness (SAIC).

$ SCA ASOS system readiness (OPS23).

$ Charleston Naval Shipyard, SC ASOS system readiness (SPAWARSYSCEN).

$ NWSTC ASOS (Class II) system readiness(NWSTC).

$ FAA ASOS system readiness (AJW-14A2, Oklahoma).

$ NRC ASOS system readiness (NRC).

2.3.2 Resources

This section identifies the personnel, documentation, test responsibilities, and division of resources among the ASOS test systems at WSH, SR&DC, NWSTC, and SPAWARSYSCEN. Test personnel from various sections within WSH, NWSTC, FAA, and US Navy will conduct the ST.

2.3.2.1 Hardware/Software

The Thin Client will be tested in accordance with the ST test schedule defined in section 2.1 and the procedures identified in this document.

No specific test will be conducted at the other agencies' ASOSs except for stability test, "free-play", visual inspection of Thin Client displays, and for verification of the Engineering Modification Notes for the Thin Client.

The ASOS software **V2.79D** will be the primary version used for the ST at all participating test facilities. This software version is the current baseline at about 82% of the field sites. All other software versions reside at about 18% of the remaining sites and they should be replaced with V2.79D or a latter version in the future. However, the ASOS software **V2.79W will also be tested** because this version has additional diagnostics features for the Ice-Free Wind (IFW) sensor beyond those in V2.79D.

ST0 ASOS at SR&DC:

ST0 has three DCPs and is configured as a large hub airport system with meteorological discontinuity sensors. It can be re-configured to represent additional ASOS configurations. One of the DCPs is configured with collocated backup visibility and ceilometer sensors. Radio links are used for communications between the ACU

and DCP. ST0 will be used during the ST to:

$ Conduct regression tests related to the normal interaction with the ASOS at the various sign-on levels, including editing and augmenting at the observer and air traffic levels, maintenance actions at the technician level, and system manager level functions.

$ Perform specified validation and regression tests. ST0 will be used to test specified procedures if any of the following are required of the ASOS configuration:
  - Multiple DCPs
  - Physical reconfiguration of sensors or DCPs.

$ ST0 will be configured to emulate unique systems in the field.

ST1 ASOS at SR&DC:

ST1 is configured as a small airport (one DCP) system with a pair of line drivers (digital repeaters with hard wire connections) between the ACU and the DCP. ST1 will be used during the ST to operate as a "control" system to provide side-by-side comparison of the display functions of the Thin Client on ST0 system with those on the existing OID/VDU on ST1. Some tests may be run on this system as long as the date and time are not changed to preserve data integrity. Observations will be checked to assess whether they are representative of site conditions.

SCA ASOS at WSH:

The SCA system in the WSH's ASOS Development Laboratory will be used during the ST for both regression and validation tests as needed.

ASOS Interfaces

The following items, where available and applicable, can be configured as part of the ST:

$ ADAS
$ ALDARS
$ ACE
$ NGRVR
$ WSP
$ AWIPS communication using Local Data Acquisition and Dissemination (LDAD).

2.3.2.2 Documentation

Updated support documentation and test procedures will be used in the ST and reference to these documents will be made as required throughout the test. The list of documentation (with the office of responsibility in parenthesis) and procedures includes, but is not limited to, the following documents:

S System Test Plan for the Automated Surface Observing System Acquisition OID/VDU Replacement using the Thin Client (OPS24).

S System Test Procedures and associated data sets (located at each ASOS Test System) (OPS24).

S NWS Engineering Modification Notes for the Thin Client (OPS12).

2.3.3 Personnel and Responsibilities

The following describes the major roles and responsibilities of the test personnel.

Test Director - Ensures all tests defined for the ST are completed and the results properly documented in the ST report. Responsible for collecting and presenting all test trouble reports to the TRG for classification. Following completion of the ST, the Test Director will call a “wrap-up” meeting for the TRG, detail to the ACCB Chair what was tested, report the ST conclusions, and recommend whether to proceed with the OT&E. Ensures all test trouble reports documented and classified during the ST are forwarded to the proper WSH organization or board for adjudication.

Test Coordinator - Responsible for the daily conduct of the ST to ensure testers assigned are present, test procedures are conducted, a log of all completed test procedures is kept (see Attachment 4), test trouble report forms are provided to the testers on duty, and all completed forms are provided to the Test Director each day; informs the Test Director of any problems encountered not resolved and briefs the director on the status of the test; writes the ST report to document the test results and recommendations.

Test Team Member - Responsible for performing individual test procedures as assigned; documents the results of each test and completes trouble report forms when problems/discrepancies are observed. Provides the test coordinator with comprehensive technical information on how the tests were conducted and any problems encountered. For interface testing, the tester is responsible for the setup of the various FAA and NWS communication interfaces. Ensures that all observations are provided to the assigned WSH personnel for analysis.

Electronics Technician (El Tech) - Responsible for maintaining the ASOSs under test, installing software and other hardware as appropriate, and commenting on NWS Engineering Modification Notes used during the installation of software/hardware. Configures the ASOS test system(s) for individual tests, reports any problems observed to the test coordinator, and takes maintenance action when hardware failures occur.

Data Analyst - On request by the Test Director, responsible for reviewing all METAR/SPECI observations and Standard Hydrometeorological Exchange Format (SHEF) products for correctness.

The ST test team will consist of the following personnel:

Table 3 - Test Personnel

Name	Function	Phone
Khien Nguyen (OPS24)	Test Director, Primary	301-713-0326 x177
Jerald Dinges (OPS24)	Test Director, Alternate	301-713-0326 x160
Richard Parry (OPS22)	Data Analyst	301-713-0293 x 109
Bryan Moore (Prism)	Test team member	301-713-0326 x176
Joseph Fiore (OPS24)	Test team member	301-713-0326 x119
Jennifer Dover (SAIC)	Test team member (SR&DC coordinator)	703-661-1259
Dave Eckberg (SAIC)	Test team member (Electronics technician)	703-661-1288
Brian Rice (SAIC)	Test team member	703-661-1259
R. Retzlaff (NWSTC)	NWSTC	816-880-9368
Wayne Knight (U.S. Navy)	Test team member	843-218-4818
Tuyen Kieu (FAA)	Test team member	202-267-9435
Raymond Bahavar(AJW-14A2)	Test team member	405-954-9640
Mark Russo	Test team member	816-823-1057 x 252

2.3.4 Installation Procedures Validation

The ST will commence at WSH and SR&DC concurrently. V2.79D software and the Thin Client will be installed by a designated el tech using the NWS Engineering Modification Notes provided by the Maintenance Branch (OPS12).

After the software is initialized, testers will verify that all station constants and information are correct. The testers will compare the AOMC site-specific data files against the station constants to ensure their agreement.

After the V2.79D software and the Thin Client are installed, the ASOS test systems will operate unattended for 3 days to confirm stability prior to the initiation of: 1) conduct of formal regression test procedures, 2) conduct of formal validation test procedures; and 3) "free-play" operation. The "free-play" will consist of experienced ASOS users interacting with the ASOS to validate system performance and quality of the observations.

2.3.5 Test Conduct

Prior to ST commencement, the Test Director will conduct a ST readiness review with the TRG to ensure all the prerequisites are in place before the ST can be started.

At the start of the ST, the Test Team will install the ASOS V2.79D software on all primary test systems (ST0, ST1, SCA), in accordance with the instructions contained in the Engineering Modification Notes.

NWSTC, NRC, SPAWARSYSCEN, and FAA will install the Thin Client(s) in accordance to the Draft Engineering Mod Notes for the OID and VDU replacement (Attachments 4, and 5) to validate the contents of the Field Modification Kit (FMK) and the Mod Notes. The modification notes will be evaluated and comments forwarded to the test director.

The ASOS systems at WSH and SR&DC will be the primary test systems. These systems will be configured to simulate configurations found in use today at the field sites. In particular, the highlighted configurations in the two tables below will be the prime candidates for the ST because they represent the configurations at the majority of the field sites. The remaining configurations are rare and they will be examined during the OT&E.

Table 4 - OID Cable Connection Configurations

Cases	From ACU	Interface equipments	To OID Thin Client
A1	DB-25	Hardwire (Telco twisted pair)	DB-25P, DB-25F to RJ-45
A2	DB-25	Hardwire (200 ft. RS-232, CAT5)	DB-25P, DB-25F to RJ-45
A3	DB-25	Modem, 200ft RS-232, Modem	DB-25P, DB-25F to RJ-45
A4	DB-25	Leased phone line with UDS V.3225 standalone modem**?**	DB-25P, DB-25F to RJ-45
A5	DB-25	Leased line with CODEX modem**?**	DB-25P, DB-25F to RJ-45
A6	**RJ-11**	Hardwire (Telco twisted pair)	RJ-11 to DB-25P, DB-25F to RJ45

Table 5 - VDU Cable Connection Configurations

Cases	From ACU	Interface Equipments	To VDU Thin Client
B1	RJ-11	Hardwire(Telco twisted pair)	RJ-11 to DB-9F or DB-9F
B2	RJ-11	Hardwire (200 ft. RS-232, CAT5)	RJ-11 to DB-9F or DB-9F
B3	RJ-11	Leased phone line with UDS V.3225 standalone modem**?**	RJ-11 to DB-9F or DB-9F
B4	RJ-11	Leased line with CODEX modem**?**	RJ-11 to DB-9F or DB-9F
B5	**DB-25**	Hardwire (200ft. RS-232, CAT5) with DB-25 **signal splitter**	RJ-11 to DB-9F or DB-9F

Table 6 - Test Cases at SR&DC

Test No.	**No. of OIDs**	**No. of VDUs**	**Cable Conf.**	**Software versions**	**Stabil-ity tests**	**Key-board tests**	**Power Loss tests**	**Comm. Loss tests**	**Regression tests**
1	2	2	A1+B1	V2.79D	72hrs	Yes	Yes	Yes	**Yes**
2	2	2	A2+B2	V2.79D	3hrs	Yes	Yes	Yes	**Yes**
3	2	2	A1+B1	**V2.79W**	3hrs	Yes	Yes	Yes	**Yes**
4	2	2	A1+B2	V2.79D	3hrs	Yes	Yes	Yes	No
5	2	3	A1+B5	V2.79D	3hrs	Yes	Yes	Yes	No
6	2	3	A6+B5	V2.79D	3hrs	Yes	Yes	Yes	No
7 **?**	2	2	A4+B1	V2.79D	3hrs	Yes	Yes	Yes	No
8 **?**	2	2	A5+B1	V2.79D	3hrs	Yes	Yes	Yes	No
9 **?**	1	1	A1+B3	V2.79D	3hrs	Yes	Yes	Yes	No
10 **?**	1	1	A1+B4	V2.79D	3hrs	Yes	Yes	Yes	No

Notes:

1) We assume a typical OID connection to the ACU uses the DB-25 connector and

a typical VDU connection to the ACU uses the RJ-11 connector. Therefore, we put more emphasis of testing the DB-25 with the OID and RJ-11 with the VDU.

2) We will conduct the test cases numbers 7,8,9, and 10 only if additional equipments and configuration information can be obtained.

3) Table 6 above only shows the typical interface equipment configuration at the sites. There are many other possible interface equipment configurations but they will not be tested at SR&DC. The NRC will test those configurations.

4) We cannot test the FTI or fiber optic configurations. These will be validated during the OT&E.

5) VDUs can use any of the above connections plus some sites use multiple VGA displays.

The following sections describe the types of tests performed on each of the ASOS test systems and their respective interfaces used during the ST.

2.3.5.1 System Stability Test

This test will be conducted after the necessary software and hardware have been installed on the ASOS test system. A 72-hour stability test (no “hands-on” tests performed) will be conducted. The displays on the OID/VDU Thin Clients will be inspected from time to time verify the system is stable and the displays are normal (i.e. no frozen screens, no loss of displays, no extraneous characters, screen flashing during METARs and SPECIs, and audible alarms during these events).

2.3.5.2 Keyboard Tests

All operational key strokes on the existing OID keyboard will be verified to have equivalence on the new thin client OID keyboard (Attachment 2).

2.3.5.3 Power Outage Tests

Simulated power outages will be induced to verify the Thin Client can recover when power is resumed. The following **individual scenarios** will be tested:

- **Loss of power to the VDU Thin Client only** (disconnect the power to the VDU Thin Client then reconnect after a few minutes) - The VDU display should recover automatically after the power is resumed.

- **Loss of power to the OID Thin Client only** (disconnect the power to the OID Thin Client then reconnect after a few minutes) - The OID display may

need to be resynchronized with the Thin Client by this procedure: **1) Press and hold “0” key down until “HELP” screen appears then release the key and 2) Press and hold “0” key down until “OID” screen appears then release the key.**

- **Loss of power to both the OID and the VDU Thin Clients only (**disconnect the power to the OID, VDU Thin Clients then reconnect after a few minutes). The VDU display should recover automatically after the power is resumed. The OID display may need to be resynchronized with the Thin Client by this procedure: **1) Press and hold “0” key down until “HELP” screen appears then release the key and 2) Press and hold “0” key down until “OID” screen appears then release the key.**

- **Loss of power to the ACU only** (disconnect the power to the ACU then reconnect after a few minutes; power to the OID and VDU Thin Clients remains available) – The OID and VDU displays should recover automatically after a few minutes.

- **Loss of power to both the ACU and the Thin Clients** (disconnect the power to the OID, VDU Thin Clients, and ACU then reconnect after a few minutes) – The VDU display should recover automatically after the ACU warm-start. The OID display may need to be resynchronized with the Thin Client by this procedure: **1) Press and hold “0” key down until “HELP” screen appears then release the key and 2) Press and hold “0” key down until “OID” screen appears then release the key.**

2.3.5.4 Loss of Communication Tests

Simulated losses of communication between the ACU and OID/VDU Thin Clients will be induced to verify the Thin Clients can recover after communication link is reestablished. The following **individual scenarios** will be tested:

- **Loss of communication to the OID Thin Client only** (unplug cable connection from ACU to OID Thin Client for a few minutes then reconnect) - The OID display should recover automatically after a few minutes.

- **Loss of communication to the VDU Thin Client only** (unplug cable connection from ACU to VDU Thin Client for a few minutes then reconnect) - The VDU display should recover automatically after a few minutes.

- **Loss of communication to both the OID and VDU Thin Clients** (unplug cable connections from ACU to both OID Thin Client and VDU Thin Client for a few minutes then reconnect) - The OID and VDU displays should recover automatically after a few minutes.

2.3.5.5 Regression Tests

All regression tests described in the Attachment 1 will be performed for each OID/VDU configuration. All regression tests will be performed on both ST0 and ST1 system so that a side-by-side comparison of the user screens with the existing OID/VDU and the new Thin Client is available. The test procedures will stress the edit and user functions of the OID including induced failures to test the recovery. **The tester will annotate any difference in the display outputs or functions between the old OID/VDU and the new Thin Client. These include the general appearance and color of the displayed information, and the alarm sounds during the transmission of the HOURLY's and SPECI's.**

Any abnormalities or indications of non-compliant functional operations observed during the ST will be logged and called to the immediate attention of the ST Director. The Test Director will present the discrepancies (i.e., TTR) to the TRG for adjudication. The Test Director will forward all discrepancies to the ASOS Software manager for resolution. A copy of any discrepancies still pending at the conclusion of the ST will be provided to the OT&E Director as "Known Problems". Any critical problems may result in the TRG suspending the ST until they are fixed.

2.3.5.6 Real-time Monitoring of Observations

Testers will monitor observations/products as they are generated by ASOS, paying particular attention to any observations containing remarks or additive data (e.g., precipitation amounts, maximum/minimum temperatures, and three-hour pressure changes) and observations generated during periods when failed sensors are being backed up (either by the observer or the backup sensors). For observations containing remarks or additive data, review the 5-minute observations and the 1-minute data to verify their appropriateness and accuracy of the remarks. Periodically call the FAA voice phone, or turn up FAA voice speaker, and verify the observations (including the required remarks) are being voiced properly.

2.3.5.7 Review of Observations

Periodically review the observations in the same manner in which an observer would check the observations taken during the previous shift. For example, check temperature, dewpoint, wind shifts, pressure remarks, variable ceilings, and visibilities. Determine whether specials were taken properly. Evaluate the consistency of precipitation and temperature data from hourly data through 3-hour, 6-hour, daily, and monthly data. Specifically:

- **o** Hourly/Special Observations -- During each shift, review the ASOS METARs and SPECIs from the previous shift.

- **o** Daily Summaries -- Once per day, review the daily summary page to verify

consistency with the additive data appearing in the hourly observations. Note: if the daily summary has been manually edited, agreement cannot be expected.

- **o** Monthly Summaries -- Periodically review the monthly (to date) page to verify consistency with the daily pages.

2.3.5.8 Review SYSLOG Messages

Periodically review the SYSLOG, verifying that all messages correctly reflect system status.

Follow up on all "CHECK THE SYSLOG" messages whenever they appear at the bottom of the OID One Minute display. Document any messages which are not routine.

Whenever a maintenance flag ($) is appended to a METAR or SPECI, check the SYSLOG to verify that the $ is warranted, determine the cause of the $, and take appropriate action. Actions range from signing on as "Technician" and clearing a data quality error to requesting maintenance.

2.3.5.9 Problem Reporting

Testers will use the TestTrackPro software to enter the TTR's into database as soon as possible so that the information is available to the test team and the software developer in a timely manner. User accounts and passwords will be available for the test members to access the TestTrackPro by using either the work station located near ST0 and ST1 or the website (http://webdev1.weather.gov/ttweb/login.htm).

2.3.6 Post-ST Activities

Following completion of the ST, the Test Director will conduct a final meeting for the TRG detailing what was tested and a summary of any discrepancies found, major findings, and recommendations. The TRG will review the materials presented by the Test Director and make a recommendation to the ASOS Software manager whether to proceed with the OT&E. After the final meeting, the Test Director will prepare a report of all test activities, including details of any deficiencies. The report will include findings and final recommendations. A copy of all outstanding deficiencies will be provided to the OT&E Test Team and the TRG.

3.0 Test Recommendations and Report

At the conclusion of the ST, the TRG will convene the ST wrap-up meeting to review the findings of the ST and to recommend whether to proceed with the OT&E. The decisions of the TRG are based on simple majority among the voting members. The voting members of the TRG are listed in Table 1.

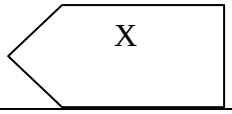
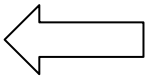
A formal ST Report will be generated by OPS24 to document the TRG recommendation, the test status, and all problems found during the ST.

Attachment 1 - **ASOS Thin Client REGRESSION TESTS CHECKLIST**

#	TEST #	Test Description	Duration	Pass/ Fail	Date	Site
1	02_18	**Sign On/Off Function Verification**	15 min			
2	02_01	**UI Help (We may have a problem in step 137-138)**				
3	02_04	**Command - Observation -** The CMD-OBS function allows the observer to generate corrected METAR/SPECI reports, transmit a pending SPECI before the edit time expires, and cancel a pending SPECI report before it is transmitted.	30 min			
4	06_13	**Review 5-MIN Screen -** This procedure verifies characteristics of the REVUE RPT 5MIN Screen	20 min			
5	02_14	**Review-Sensor** - This procedure tests the REVUE-SENSR function is available to all users except the Air Traffic Controller (ATC). The REVUE-SENSR function enables the user to view the 12 hour archive of raw sensor data, the last 10 minutes of algorithm processed sensor data, and sensor status information such as turning report processing on or off and whether the sensor is in automated or manual mode.	15 min			
6	02_15	**Review SYSLOG** - This procedure tests the ASOS System Logging capability.	15 min			
7	02_17	**TWR Function Verification**	15 min			
8	02_19	**EDIT Function Verification**	30 min			
9	03_01	**SPECI Generation** during hourly edit time and during edit time of another SPECI.	45 min			
10	04_30p	**Visibility Data Validation**	30 min			
11	09_01	**GENOB Function Verification**	1 ½ hrs			
12	10_01	**HOT KEY User Verification**	15 min			
13	11_06	**Tornado Hot Key** - Tests generation of tornado through different methods and combinations.	20 min			
14	14_05p	**Obstruction to Vision Procedure -** Tests the generation of HZ, BR, FG, and FZDZ.	10 min			
15	04_33p	**Present Weather Edit/Augmentation**	1 ½ hrs			

Attachment 2 - OID Keyboard Table

Functions	Existing OID Keyboard Operational Keys	New OID Keyboard Key Availability (Yes/No)	Comments
Key pad on the right side of the keyboard			
	KEY0		
	KEY1		
	KEY2		
	KEY3		
	KEY4		
	KEY5		
	KEY6		
	KEY7		
	KEY8		
	KEY9		
Arrow keys UP, DOWN, RIGHT, LEFT			
	UP_KEY		
	DOWN_KEY		
	RIGHT_KEY		
	LEFT_KEY		
Edit keys			
	ENTER_KEY		
	INSERT_KEY		
Delete one character at a time	REMOVE_KEY	DELETE KEY	
	PREV_KEY		
Function keys at top row of the keyboard			
	F6_KEY		
	F7_KEY		
	F8_KEY		
	F9_KEY		
	F10_KEY		
Temporary Audible Alarm Disable	F19_KEY or F11_KEY	F11_KEY	
Permanent Audible Alarm Disable/Enable	F20_KEY or F12_KEY	F12_KEY	
	FUNCTION_HELP_KEY or “0” KEY	“0” KEY	Only 0 key is available on new keyboard
Other keys			
Regular alpha-numeric characters	Work as designed QWERTYUIOP[]\ASDFGHJKL;’ZXCVBNM,./ Shift:	Works as designed QWERTYUIOP[]\ASDFGHJKL;’ZXCVBNM,./ Shift:	No Shift {} on either keyboard, no <> on old OID keyboard

	!@#$%^&*()+:",.?	!@#$%^&*()+:"<>?	
Special Keys			
?	SELECT	Not Available	
?	FIND	Not Available	
?	NEXT SCRN	Not Available	
?	Composite Character	Not Available	
Delete and back space			On new keyboard the backspace arrow must be pressed and held a few seconds.
F3	F3 (OID setup)	Disabled/ Not Available	

Attachment 3 - ASOS Test Trouble Report

TYPE OF DEFECT:
__System Deficiency
__Enhancement
__Modify Current Feature
__Documentation/Procedure
__Hardware
__Watch Item

TEST ACTIVITY:
__FAT __SAT __OT&E
__Demonstration __Other

PRIORITY: __Emergency __Urgent __Routine

SUBSYSTEM/COMPONENT:
_Algorithm _Comms _Sensor _Simulator
_User interface _Voice _Other

REPEATABILITY:
__Could not repeat __Didn't try
__One time occurrence __Sometimes __Always

CONFIGURATION/TEST DATA:
__Live data feed __Simulator

SEVERITY:
__No Impact
__Cosmetic
__Inconvenience
__System Up -w/no workaround
__System Up -w/workaround
__CRASH - w/no workaround
__CRASH -w/workaround

ATTACHMENT: __ pages

TTR NO: *(Assigned by Test Track program)*

LOCATION (SID): _____ **SOFTWARE VERSION:**

TITLE/SUMMARY:

DATE/TIME DISCOVERED: _____ **ORIGINATOR:**

DESCRIPTION, CAUSE OF PROBLEM:
(References: ECPs/RCs/OTRs:_____ Test procedure/steps:____)

Attachment 4 - Test Logs

The following log will be at each ASOS test system. The test team member will complete this form indicating the date/time each test is conducted, the name of each test procedure completed, and the tester's name. This will be a record to verify that all test procedures were completed, when they were performed, and by whom.

TEST LOG

SYSTEM: _____

DATE	TIME	PROCEDURE	PERSON	P/F

ATTACHMENT 5

ASOS MODIFICATION NOTE #
Maintenance, Logistics, and Acquisition Division
W/OPS12: TMR

SUBJECT:	**Replacement of Cathode Ray Tube (CRT) based Operator Interface Device (OID).**
PURPOSE:	To replace obsolete and failing Cathode Ray Tube terminals with modern thin client and flat panel displays.
SITES AFFECTED:	All sites with failed CRT OID terminal.
AUTHORIZATION:	The authority for this note is Request for Change RC11063 (NWS712) by National Weather Service Headquarters direction.
VERIFICATION STATEMENT:	This procedure was tested and verified at sites listed in Attachment C.
ESTIMATED COMPLETION DATE:	As required when CRT-based terminals fail. (During the next scheduled 4 month preventive maintenance visit.)
TIME REQUIRED:	Approximately 0.5 hour per terminal including time to unpack and read the display manual.
ACCOMPLISHED BY:	NWS and/or contractor electronics technicians.
EQUIPMENT AFFECTED:	ASOS OID CRT-based terminals.
SPARES AFFECTED:	Locally obtained small parts.
PARTS/MATERIALS REQUIRED:	List all parts (CDs for software notes) required for the installation of this note is given in Attachment B.
SOURCE OF PARTS/MATERIALS:	Materials will be obtained by requisition from the National Logistics Support Center (NLSC)
DISPOSITION OF REMOVED PARTS/MATERIALS:	*The removed OID will be returned to NRC/NLSC for disposition. Disposition of unused cabling and other unnecessary materials shall be done locally.*
TOOLS AND TEST EQUIPMENT REQUIRED:	Standard NWS Electronics Technician's tools
DOCUMENTS AFFECTED:	EHB-11
PROCEDURE:	Attachment A: Installation Instructions of Thin Client terminal for OID.
TECHNICAL ASSISTANCE:	For questions or problems pertaining to this note, contact ASOS at 301-713-1835 x147 or x170.

REPORTING INSTRUCTIONS: Report the completed modification using the Engineering Management Reporting System (EMRS) according to the instructions in EHB-4, Maintenance Documentation, Part 4, and Appendix D. Include the following information on the EMRS report:

Maintenance Description (block 5): **Specific entries**

Equipment Code (block 7): **code**

Serial Number (block 8): **serial number**

Maintenance Comments (block 15): **Specific entries**

Mod No. (block 17a):

A sample EMRS report is provided as attachment **B**.

Mark S. Paese
Director, Maintenance, Logistics, and Acquisition Division

Attachment A - Instructions for CRT Terminal Replacement with Thin Client
Attachment B - Required Parts for the Thin Client Installation
Attachment C - Sites Used for Test and Verification of Procedure
Attachment D - EMRS Report

ATTACHMENT A - Instructions for CRT Terminal Replacement with Thin Clients

A.1 Preparation to remove the CRT terminal

1. Read the entire Mod Note before proceeding.
2. Install the thin client and associated parts as soon as possible after the CRT terminal fails.
3. Obtain permission from Airport authorities to activate a second OID or to temporarily deactivate the ASOS. Refer to Mode Note 12 for additional guidance concerning installing an OID.
    1. Log on as Tech
    2. Key the MAINT screen.
    3. Key the ACTION page.
    4. Key START - stop here and perform the modification.
    5. Disconnect the old CRT terminal (probably a Wyse) power cable from the AC power outlet.
    6. Disconnect the RJ11 cable from the DB25M-to-RJ11 adaptor and also disconnect the keyboard.
    7. Remove the DB25M-to-RJ11 adaptor from the old CRT terminal.
    8. Remove the old CRT terminal from the console and place them in a location where they can be prepared for safe recycling or re-use at NLSC.
4. Mounting the thin client and the flat panel display.
    1. The thin client that will be used for the OID is ASN#. Parts for this procedure should include the AXEL M75C thin client, mounting brackets, a PS/2 keyboard, a Samsung SyncMaster 940BX or later model flat panel display, and all necessary cables and adaptors. ***NOTE:*** *There are many flat panel monitors that might operate properly with the thin client, but some flat panel monitors are specifically designed to operate with Microsoft Windows ™ or Apple ™ Mac computers, and they might not operate with the thin client.*
    2. The Samsung SyncMaster ™ 940BX may be placed on top of the AXEL thin client. The thin client is small and sturdy enough to hold the weight of the terminal.
    3. If some other mounting arrangement is desired, there are four corner brackets for the AXEL to be mounted on a wall or upside-down under a desk. There are no ventilation distance requirements for the AXEL thin client.
5. The back panel of the AXEL thin client shown in Figure A-1 has two RJ45 RS232 serial ports that are labeled AUX 1 and AUX 2. Only AUX1 will be used for the OID. An RJ45 to DB25F is the preferred adaptor to use in this installation. There is also a RJ45 to DB9P adaptor that may be used for the serial data connection in certain situations. The thin client also has a PC-style Video Graphics Adaptor (SVGA) HD15 connector, an Ethernet RJ45 connector (not used), a PC-style DB25F printer connector (not used) and a European standard AC power connector that can accept 100 to 240 VAC at 0.1 to 0.2 Amps. ***NOTE:*** *The power switch is a rectangular pushbutton switch on the back.*

Figure A-1

4. Mount the thin client on the desk in the operating position as shown in Figure B-1 unless the preferred location for mounting is under the desk or secured to a cubicle wall. When the thin client is mounted horizontally at the operating position, the flat panel display may be placed directly on top of the thin client.
5. Connect the keyboard to the PS/2 keyboard connector on the back panel.
6. Connect the SVGA connector to the HD15 connector on the back panel.
7. Insert the RJ45 to DB25F or RJ45 to DB9P adaptor into the AUX 1 RJ45 socket.
8. Insert the power cord (European style cord) into the three prong power connector.
9. Plug the power cords for the thin client and the display device into a surge protected power outlet if available. ***Note:*** *Surge protection for the devices is desirable.*
10. Plug the DB25P to RJ11 adaptor into the DB25F connector on the AUX 1 cable and tighten the retaining screws. (The RJ45 to DB9P adaptor may be used if necessary.)
11. Plug the OID RJ11 silver satin cable from the ACU or SCA into the RJ11 to DB25P adaptor.
12. Press power pushbutton switch on the thin client and turn on the display.
13. Allow the thin client to boot up, and adjust the display according to it's instructions to obtain the optimum display (the default pixel setting from the thin client is 800 by 600. Modern Flat panel displays normally have an auto-adjust feature that is usually adequate. ***Note****: Wide screen flat panel displays are not necessary!*
14. Power up the ACU if it had been powered down.
15. Press the Number Pad Zero (0) key and hold it down until the *Help Screen* is displayed and quickly release the Zero key as soon as the *Help Screen* is displayed. (There might be some extra Zero Key requests sent to the ACU buffer, which will cause the *Help Screen* and the *OID Screen* to alternate a few times.)
16. If the display settles down to the *Help Screen* then press and hold the Zero Key until the *OID Screen* is displayed, and release the key immediately. Once this initial "synchronization period" at power up has been completed the thin client should operate with one tap of the Zero key to switch between the *Help Screen* and *OID Screen.*
17. Key the MAINT screen.

18. Key the ACTION page. Select FMK and enter the FMK# (assigned for this Mod.), Select EXIT.
19. Check the SYSLOG and verify the FMK message. Notify the AOMC via telephone that FMK??? Is complete. Return all replaced parts as S100-FMK???OLD. This should include the old CRT terminal and the 25 pin male to RJ11 adaptor, unless it is used in this terminal replacement.

ATTACHMENT B - Required Parts for Thin Client Installation

B.1 OID Replacement

1. The parts required for this modification are listed below.
2. AXEL M75C (ASN#) thin client shown in Figure B-1.

Figure B-1

3. The AXEL M75C includes the following parts.
    20. Power cord.
    21. Keyboard.
    22. RJ45 to DB25F adaptor as shown in Figure B-6. (See cabling recommendations at the end of this procedure.)
    23. DB25P to RJ11 adaptor should already be available on site. A DB9F to RJ11 adaptor as shown in Figure B-4 and Figure B-5 is supplied with this FMK.
    24. Instruction manual on CD (requires Adobe Acrobat™) to be run on a PC.
    25. Four corner brackets for mounting the thin client on a side wall or under a desk.
    26. If the thin client is mounted by using the brackets, four screws should be obtained locally.
    27. NOTE: The flat panel display (ASN#) must be ordered separately from NLSC.
    28. NOTE: A surge protected power strip must be obtained locally.
    29. Figure F-2 shows the connectors on the back panel of the thin client that will be used. Those include the power connector, the SVGA connector, the KEYB (keyboard) connector, and the AUX1 serial data connector.

Figure B-2

30. Figure B-3 shows AUX2, the mouse connector, the parallel output connector, and the Ethernet port. These connectors will not be used.

Figure B-3

31. Figure B-4 shows two photos of the RJ45 to DB9M adaptor that plugs into AUX1, and the gray DB9F to RJ11 adaptor plugs into the previously mentioned adaptor connector.

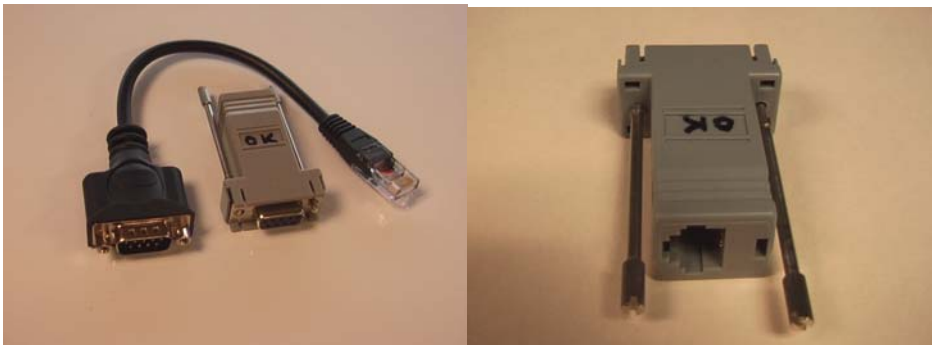


Figure B-4

32. Figure B-5 shows a detailed view of the DB9F to RJ11 adaptor. This device is currently being bought from a commercial vendor, but the individual wires must be inserted into the proper pin positions. Future adaptors will probably be molded devices that do not require such assembly.

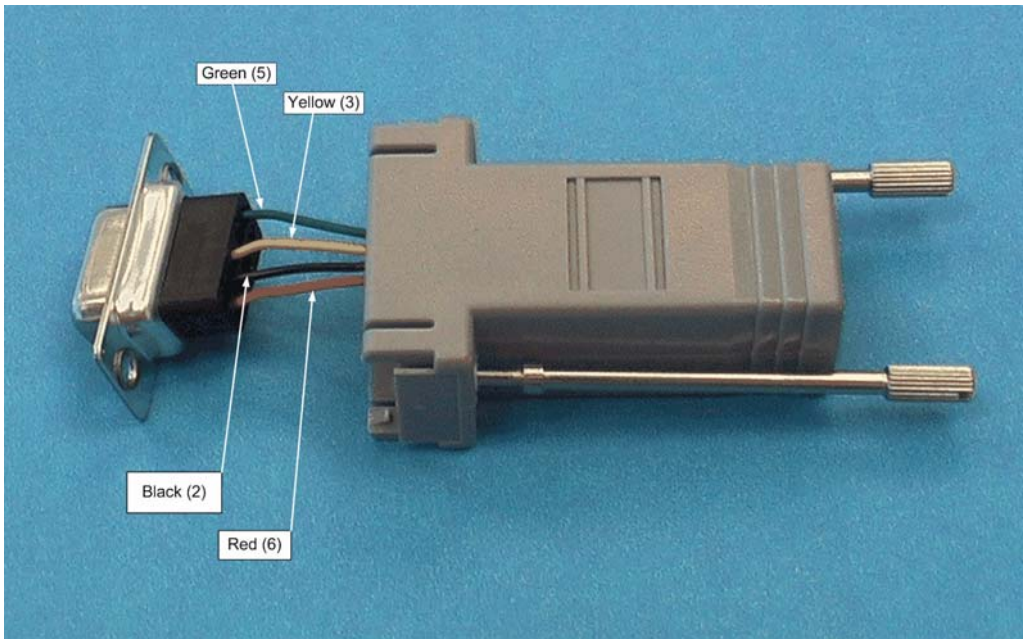


Figure B-5

33. Figure B-5 shows a detailed view of the DB9F to RJ11 adaptor. This device is currently being bought from a commercial vendor (www.cablestogo.com, CTG #02919), but the individual wires must be inserted into the proper pin positions. This device is designed for a 6 pin RJ12, but the RJ11 fits with no problem. There are two wires that are not used: blue and white. Other vendors supply a similar product. Future adaptors will probably be molded devices that need no such assembly.

34. The connector pin-out conforms to PC standard DB9 serial port. Pin 2 (Black) is Rxd, pin 3 (Yellow) is Txd, pin 5 (Green) is ground, and pin 6 (Red) is Data Set Ready (DSR). DSR is not used by the Acquisition Control Unit (ACU).

35. The RJ45 to DB25F adaptor is shown in Figure B-6. ***Note:*** *This adaptor is the preferred adaptor to use for OID connection.* It should mate with existing DB25M connectors from the ACU. Use the standard DB25M cable or cable adaptor if this device is used on the thin client OID; the ACU needs only Transmit Data, Receive Data, and Signal Ground.

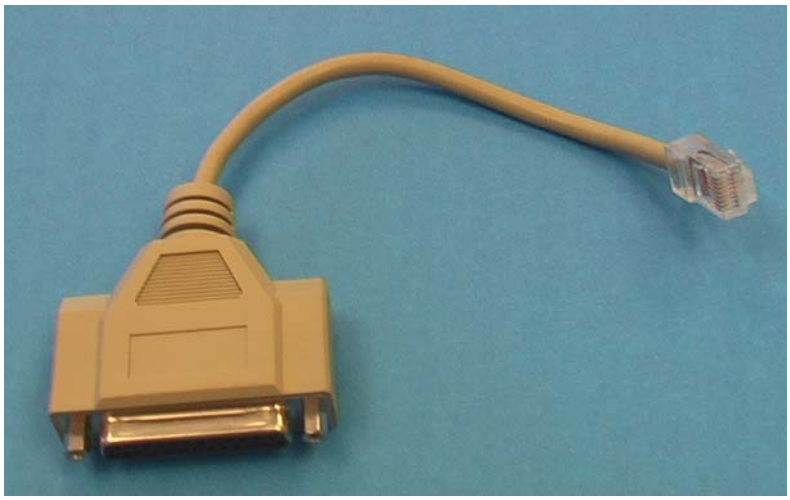
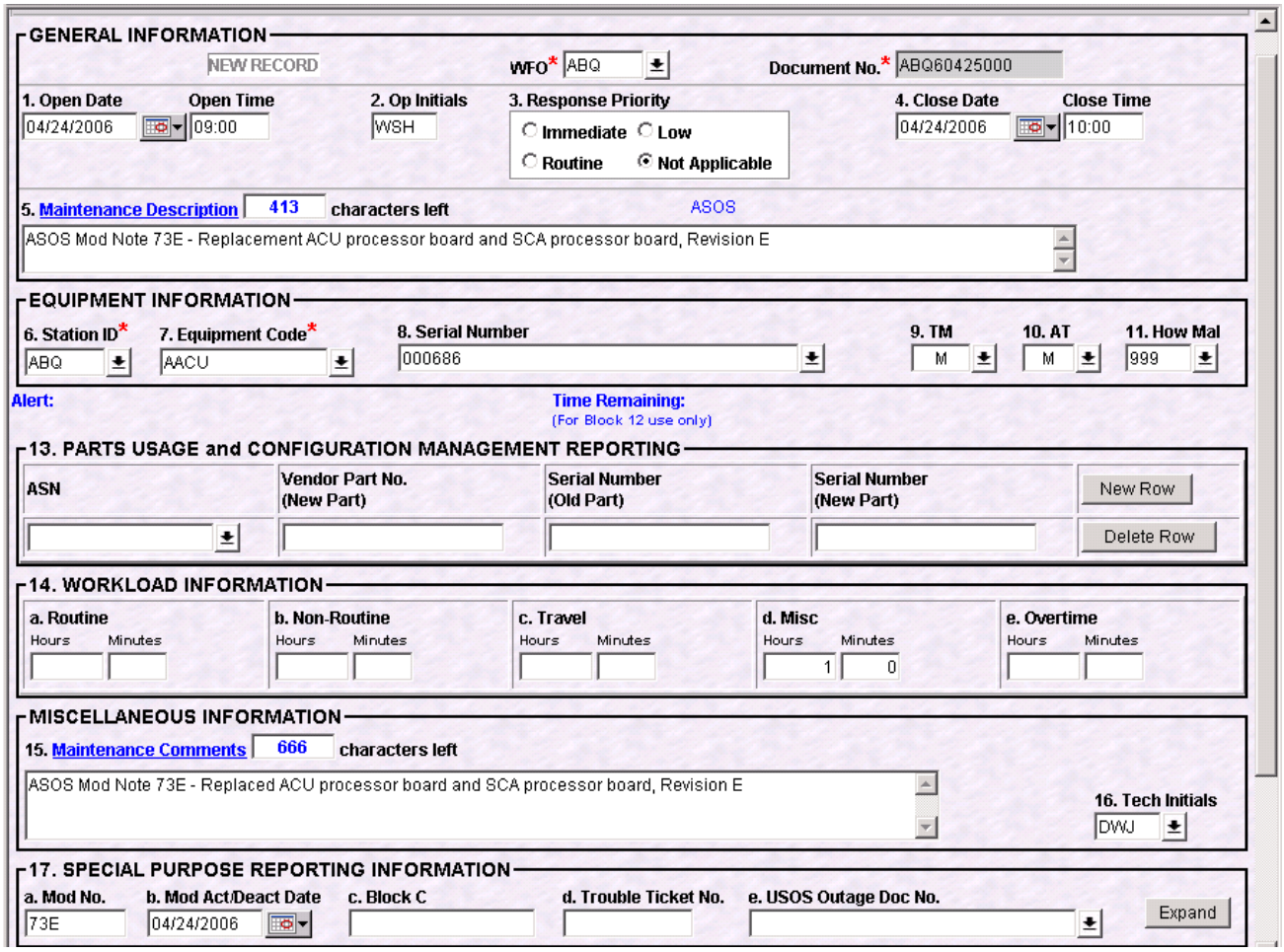


Figure B-6

ATTACHMENT C - Sites Used for Test and Verification of Procedure

4. **Sterling, VA (LWX) -** (poc - Dave Eckberg, Bryan Moore)
5. **SPAWAR System Center, Charleston, SC** (poc = Wayne Knight)
6. **Southern Region - Huntsville, AL - *TWO LOCATIONS*** (poc = Brian Burgess)
7. **Central Region - Chicago, IL - ORD** - (poc = Tom Townsend, Curt Tweed, and Walter Cowen)
8. **Central Region - IND** - (poc = Curt Tweed and Walter Cowen)
9. **Eastern Region - IAD** - (poc - Authur Patrick)
10. **Eastern Region** - **FAY** - (poc - Karl Lenzen)
11. **WESTERN REGION - PDT** (poc - Johnny Blagg)
12. **WESTERN REGION - MSO** (poc - Ron Blumb)

ATTACHMENT D - Sample EMRS Report



GENERAL INFORMATION

NEW RECORD | WFO*: ABQ | Document No.*: ABQ60425000

1. Open Date	Open Time	2. Op Initials	3. Response Priority	4. Close Date	Close Time
04/24/2006	09:00	WSH	○ Immediate ○ Low ○ Routine ◉ Not Applicable	04/24/2006	10:00

5. Maintenance Description: 413 characters left — ASOS

ASOS Mod Note 73E - Replacement ACU processor board and SCA processor board, Revision E

EQUIPMENT INFORMATION

6. Station ID*	7. Equipment Code*	8. Serial Number	9. TM	10. AT	11. How Mal
ABQ	AACU	000686	M	M	999

Alert: — Time Remaining: (For Block 12 use only)

13. PARTS USAGE and CONFIGURATION MANAGEMENT REPORTING

ASN	Vendor Part No. (New Part)	Serial Number (Old Part)	Serial Number (New Part)	New Row / Delete Row

14. WORKLOAD INFORMATION

a. Routine Hours	a. Routine Minutes	b. Non-Routine Hours	b. Non-Routine Minutes	c. Travel Hours	c. Travel Minutes	d. Misc Hours	d. Misc Minutes	e. Overtime Hours	e. Overtime Minutes
						1	0		

MISCELLANEOUS INFORMATION

15. Maintenance Comments: 666 characters left

ASOS Mod Note 73E - Replaced ACU processor board and SCA processor board, Revision E

16. Tech Initials: DWJ

17. SPECIAL PURPOSE REPORTING INFORMATION

a. Mod No.	b. Mod Act/Deact Date	c. Block C	d. Trouble Ticket No.	e. USOS Outage Doc No.	Expand
73E	04/24/2006				

ASOS MODIFICATION NOTE #
Maintenance, Logistics, and Acquisition Division
W/OPS12: TMR

SUBJECT:	**Replacement of Cathode Ray Tube (CRT) based Visual Display Unit (VDU).**
PURPOSE:	To replace obsolete and failing Cathode Ray Tube display devices with modern thin client and flat panel displays.
SITES AFFECTED:	All sites with failed CRT VDU terminal.
AUTHORIZATION:	The authority for this note is Request for Change RC11063 (NWS712) by National Weather Service Headquarters direction.
VERIFICATION STATEMENT:	This procedure was tested and verified at sites listed in Attachment C.
ESTIMATED COMPLETION DATE:	As required when CRT-based terminals fail. (During the next scheduled 4 month preventive maintenance visit.)
TIME REQUIRED:	Approximately 1.0 hour per terminal including time to unpack and read the display manual.
ACCOMPLISHED BY:	NWS and/or contractor electronics technicians.
EQUIPMENT AFFECTED:	ASOS VDU CRT-based displays.
SPARES AFFECTED:	Locally obtained small parts.
PARTS/MATERIALS REQUIRED:	List all parts (CDs for software notes) required for the installation of this note is given in Attachment B.
SOURCE OF PARTS/MATERIALS:	Materials will be obtained by requisition from the National Logistics Support Center (NLSC)
DISPOSITION OF REMOVED PARTS/MATERIALS:	*The removed VDU will be returned to NRC/NLSC for disposition. Disposition of unused cabling and other unnecessary materials shall be done locally.*
TOOLS AND TEST EQUIPMENT REQUIRED:	Standard NWS Electronics Technician's tools
DOCUMENTS AFFECTED:	EHB-11
PROCEDURE:	Attachment A: Installation Instructions of Thin Client terminal for VDU.
TECHNICAL ASSISTANCE:	For questions or problems pertaining to this note, contact ASOS at 301-713-1835 x147 or x170.

REPORTING INSTRUCTIONS: Report the completed modification using the Engineering Management Reporting System (EMRS) according to the instructions in EHB-4, Maintenance Documentation, Part 4, and Appendix D. Include the following information on the EMRS report:

Maintenance Description (block 5): **Specific entries**

Equipment Code (block 7): **code**

Serial Number (block 8): **serial number**

Maintenance Comments (block 15): **Specific entries**

Mod No. (block 17a):

A sample EMRS report is provided as attachment **B**.

Mark S. Paese
Director, Maintenance, Logistics, and Acquisition Division

Attachment A - Instructions for CRT Terminal Replacement with Thin Client
Attachment B - Required Parts for the Thin Client Installation
Attachment C - Sites Used for Test and Verification of Procedure
Attachment D - EMRS Report

ATTACHMENT E - Instructions for CRT Terminal Replacement with Thin Clients

E.1 Preparation to remove the CRT terminal

13. Read the entire Mod-Note before proceeding.

14. Install the thin client and associated parts as soon as possible after the CRT terminal fails.

15. Obtain permission from Airport authorities to activate a second VDU or to temporarily deactivate the ASOS. Refer to Mode Note 12 for additional guidance concerning installing a VDU.

    36. Log on as Tech

    37. Key the MAINT screen.

    38. Key the ACTION page.

    39. Key START - stop here and perform the modification.

    40. Disconnect the old CRT display (probably a Wyse) power cable from the AC power outlet.

    41. Disconnect the RJ11 cable from the DB25M-to-RJ11 adaptor.

    42. Remove the DB25M-to-RJ11 adaptor from the old CRT terminal.

    43. Remove the old CRT terminal from the console and place them in a location where they can be prepared for safe recycling or re-use at NLSC.

16. Mount the flat panel display according to the following steps.

    44. The thin client that will be used for the VDU is ASN#. Parts for this procedure should include the ADDS 5700 thin client, mounting bracket with spacers and screws, a PS/2 keyboard, a PS/2 optical mouse, a Samsung SyncMaster 940BX or equivalent flat panel display, and all necessary cables and adaptors.

    45. Mount the thin client such that it has at least 0.75 inches of ventilation space on each side. It may be mounted vertically with the included base stabilizers, under a desk or shelf with the included bracket, or against a side wall with the bracket.

17. The back panel of the ADDS 5700 thin client Figure F-2 has two RS232 serial ports that are labeled *1010 1* and *1010 2* for Port 1 and Port 2. Only Port 1 will be used for the VDU. This is a standard DB9M PC-style serial port connector. A DB9F to RJ11adaptor is used for the serial data connection. It also has a PC-style Video Graphics Adaptor (SVGA) HD15 connector, a DVI connector for use with a digital cable to the display, an Ethernet RJ45 connector (not used), a PC-style DB25F printer connector (not used), and a PC-style AC power connector that can accept 100 to 240 VAC at 1 Amp. The thin client can drive one SVGA CRT or flat panel display and one DVI flat panel display simultaneously.

    46. Install the flat panel display(s) in the operating position.

    47. If you will be mounting the thin client in the bracket and attached to a side wall or under a shelf, then skip the next two steps.

    48. Mount the thin client on the desk in vertical position with its two stabilizers near the operating position. Alternative positions are mounting it under the desk or securing it to a cubicle wall. DO NOT lay the thin client horizontal on a desk and place the Flat Panel

Display directly on top of the thin client. DO NOT place the thin client in an orientation such that is it will not have 0.75 inches of room for ventilation on the sides.

49. If you have mounted the thin client in the vertical position in its base stabilizers, then skip to step j.

CAUTION

50. The ADDS MUST be mounted such that there is at least 0.75 inches ventilation space on the sides. This is to prevent overheating of the thin client and possible failure of the device.
51. When the thin client is mounted in the bracket as shown in Figure F-4, insert the two set-screws into the bottom of the bracket, thus forcing the thin client up toward the top of the bracket.
52. Adjust the thin client such that it touching the inside of the bracket that will be away from the mounting surface.
53. Insert the two set-screws into the top of the bracket and tighten them enough to hold the thin client in place.
54. Pre-drill and insert the four mounting screws through the ¾ inch spacers, but leave enough of the screw and screw head to fit into the four keyhole slots on the thin client bracket.
55. Connect the SVGA connector to the HD15 SVGA connector on the back panel.
56. Plug the power cords for the thin client and the display device into a surge protected power outlet if available.
57. Insert the power cord into the three prong power connector.
58. Plug the DB9F to RJ11 adaptor into the serial Port 1 DB9M connector on the back panel and tighten the retaining screws.
59. Plug the VDU RJ11 silver satin cable from the ACU or SCA into the DB9F to RJ11 adaptor.
60. Press power pushbutton switch on the thin client and turn on the display.
61. Allow the thin client to boot up, and adjust the display according to it's instructions to obtain the optimum display. Modern Flat panel displays normally have an auto-adjust feature that is usually adequate.
62. From an OID, key the MAINT screen.
63. Key the ACTION page.
64. Check the SYSLOG and verify the FMK message. Notify the AOMC via telephone that FMK??? Is complete. Return all replaced parts as S100-FMK???OLD. This should include the old CRT terminal and the 25 pin male to RJ11 adaptor.
65. Execute the log off procedure on the ACU.
66. The VDU should continually update the time in the upper left corner of the screen of the VDU and update the data displayed on the screen once per minute.

ATTACHMENT F - Required Parts for Thin Client Installation

F.1 VDU Replacement

18. The parts required for this modification are listed below.

19. ADDS 5700 (ASN#) thin client shown in Figure F-1.

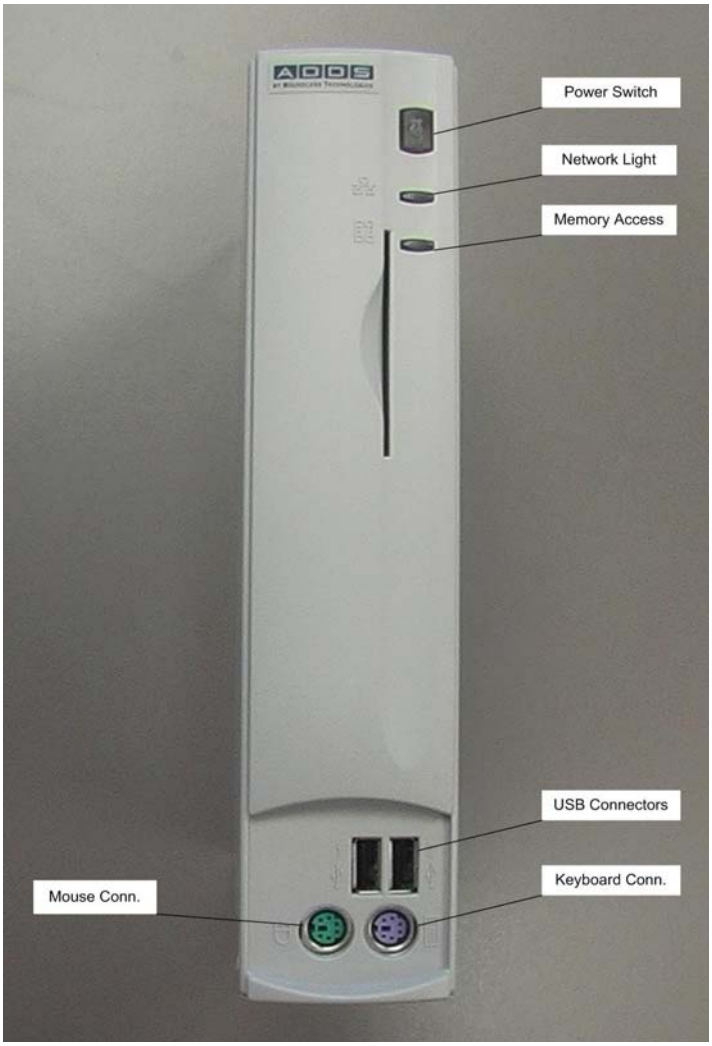


Figure F-1

20. The ADDS 5700 includes the following parts.

    67. Power cord.
    68. Keyboard.
    69. DB9F to RJ11 adaptor as shown in Figure F-5 and Figure F-6.
    70. Instruction manual on CD (requires Adobe Acrobat™) to be run on a PC.
    71. Mounting bracket 0.75 inch spacers and screws for mounting the thin client on a side wall or under a desk.

72. NOTE: The flat panel display (ASN#) must be ordered separately from NLSC.
73. NOTE: A surge protected power strip must be obtained locally.
74. Figure F-2 shows the connectors on the back panel of the thin client that will be used.

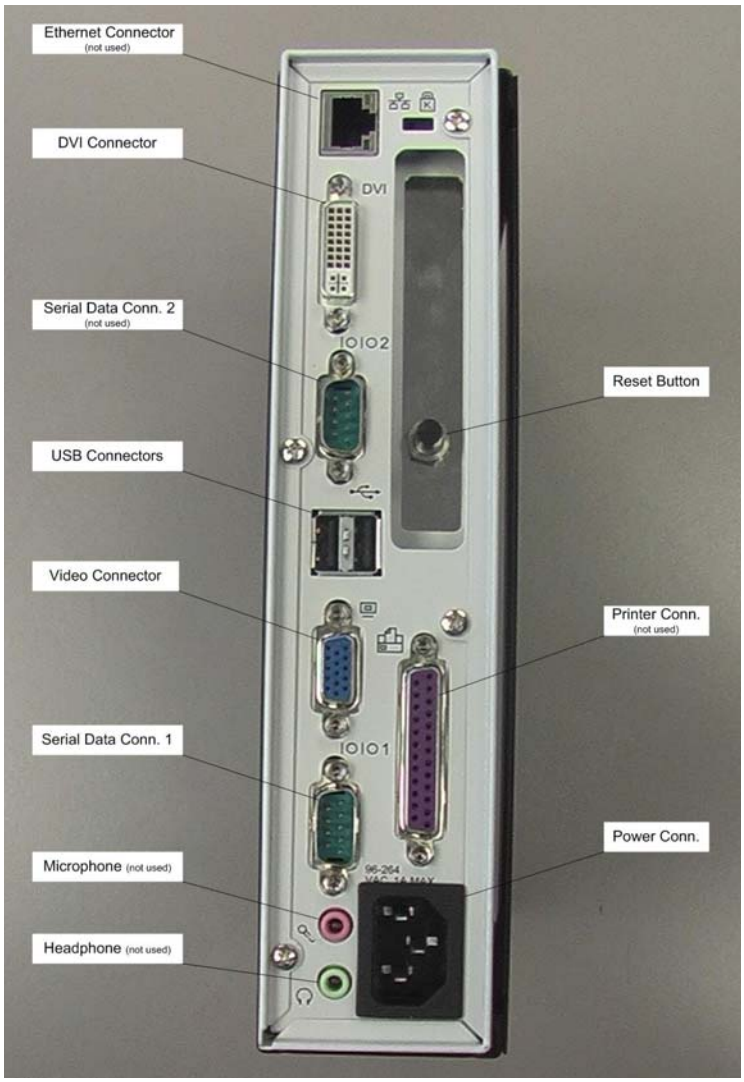


Figure F-2

75. The serial data Port 2, the parallel port, and the Ethernet port that will not be used.
76. Figure F-3 shows the thin client with its mounting bracket.
77. Figure F-4 shows the thin client inside its mounting bracket.

Figure F-3

Figure F-4

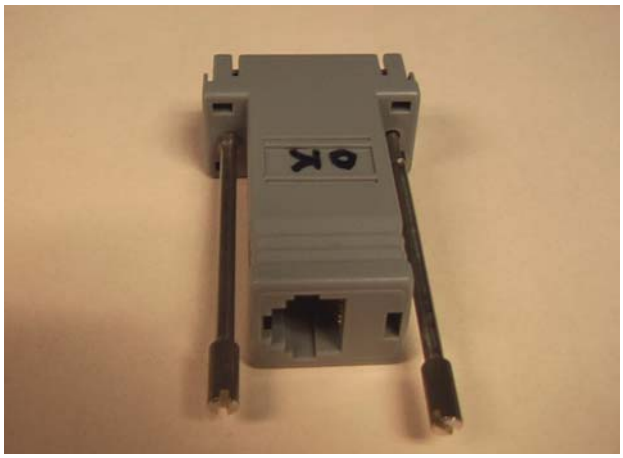


Figure F-5

78. Figure F-5 shows a detailed view of the DB9F to RJ11 adaptor. This device is currently being bought from a commercial vendor (www.cablestogo.com, CTG #02919), but the individual wires must be inserted into the proper pin positions. This device is designed for a 6 pin RJ12, but the RJ11 fits nicely. There are two wires that are not use: blue and white. Future adaptors will probably be molded devices that need no such assembly.

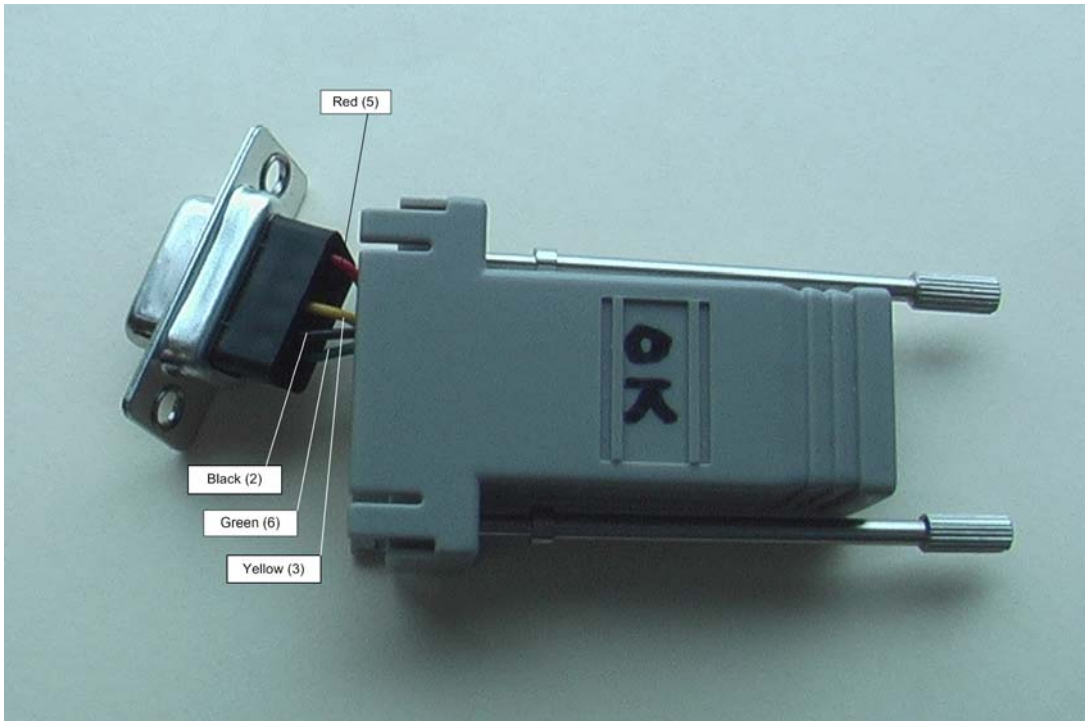


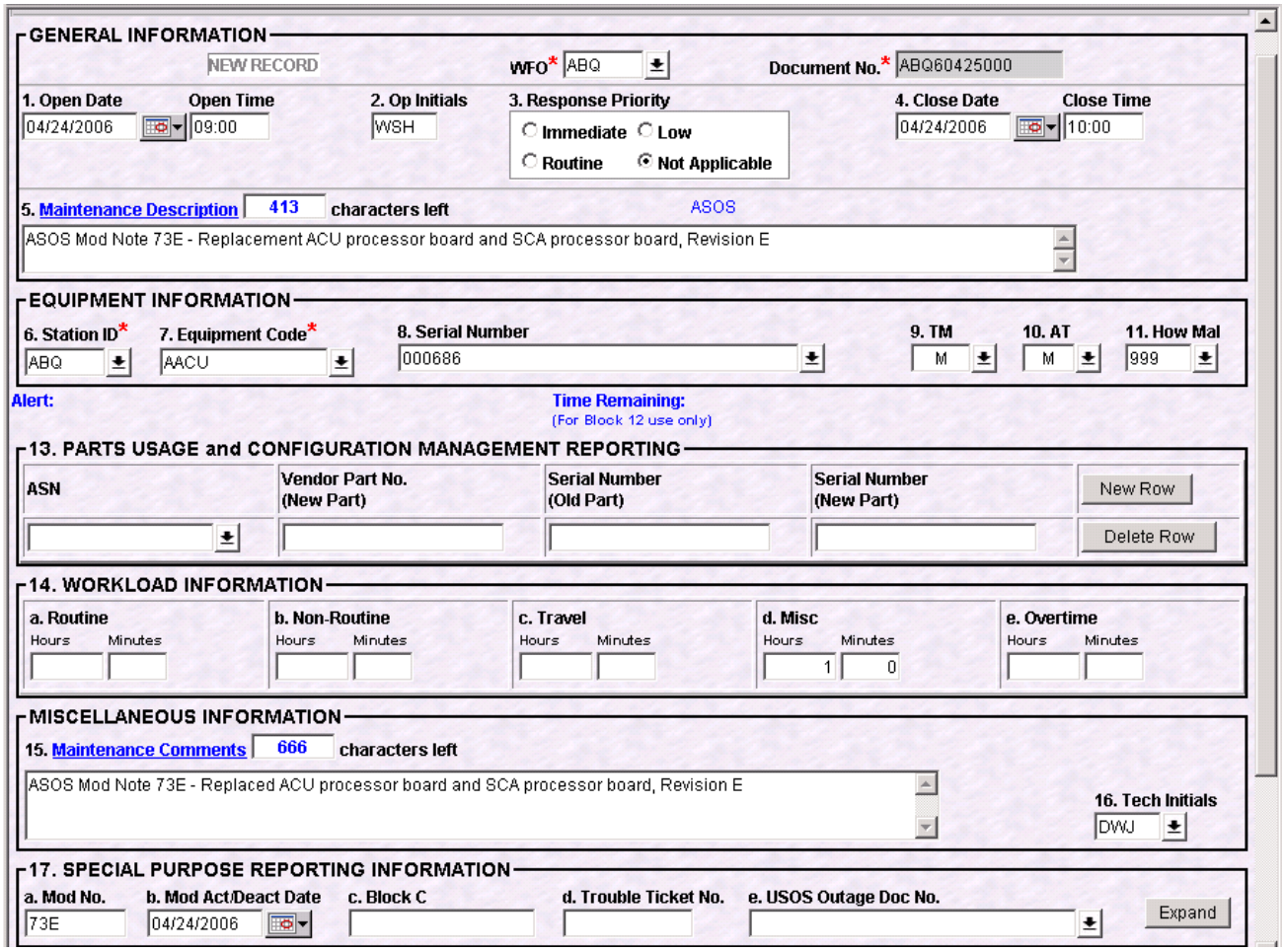
Figure F-6

79. Figure F-6 shows that the pin-out conforms to PC standard serial port. Pin 2 is Rxd, pin 3 is Txd, pin 5 is ground, and pin 6 is Data Set Ready (DSR). DSR is not used by the Acquisition Control Unit (ACU).

ATTACHMENT G - Sites Used for Test and Verification of Procedure

21. **Sterling, VA (LWX) -** (poc - Dave Eckberg, Bryan Moore)
22. **SPAWAR System Center, Charleston, SC** (poc = Wayne Knight)
23. **Southern Region - Huntsville, AL - *TWO LOCATIONS*** (poc = Brian Burgess)
24. **Central Region - Chicago, IL - ORD** - (poc = Tom Townsend, Curt Tweed, and Walter Cowen)
25. **Central Region - IND** - (poc = Curt Tweed and Walter Cowen)
26. **Eastern Region - IAD** - (poc - Arthur Patrick)
27. **Eastern Region** - **FAY** - (poc - Karl Lenzen)
28. **WESTERN REGION - PDT** (poc - Johnny Blagg)
29. **WESTERN REGION - MSO** (poc - Ron Blumb)

ATTACHMENT H - Sample EMRS Report



GENERAL INFORMATION

NEW RECORD | WFO* ABQ | Document No.* ABQ60425000

1. Open Date: 04/24/2006 | Open Time: 09:00 | 2. Op Initials: WSH | 3. Response Priority: ○ Immediate ○ Low ○ Routine ● Not Applicable | 4. Close Date: 04/24/2006 | Close Time: 10:00

5. Maintenance Description 413 characters left — ASOS

ASOS Mod Note 73E - Replacement ACU processor board and SCA processor board, Revision E

EQUIPMENT INFORMATION

6. Station ID* ABQ | 7. Equipment Code* AACU | 8. Serial Number 000686 | 9. TM M | 10. AT M | 11. How Mal 999

Alert: | Time Remaining: (For Block 12 use only)

13. PARTS USAGE and CONFIGURATION MANAGEMENT REPORTING

ASN	Vendor Part No. (New Part)	Serial Number (Old Part)	Serial Number (New Part)	New Row / Delete Row

14. WORKLOAD INFORMATION

a. Routine Hours	a. Routine Minutes	b. Non-Routine Hours	b. Non-Routine Minutes	c. Travel Hours	c. Travel Minutes	d. Misc Hours	d. Misc Minutes	e. Overtime Hours	e. Overtime Minutes
						1	0		

MISCELLANEOUS INFORMATION

15. Maintenance Comments 666 characters left

ASOS Mod Note 73E - Replaced ACU processor board and SCA processor board, Revision E

16. Tech Initials: DWJ

17. SPECIAL PURPOSE REPORTING INFORMATION

a. Mod No. 73E | b. Mod Act/Deact Date 04/24/2006 | c. Block C | d. Trouble Ticket No. | e. USOS Outage Doc No. | Expand