



OPERATIONAL ACCEPTANCE TEST REPORT

for

*Automated Surface Observing System
(ASOS)*

Version 2.79B

Acquisition Control Unit Software

March 2006

**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**

Introduction and Background

The Version (V) 2.79B Acquisition Control Unit (ACU) software retains the capabilities of all previous versions, but adds a fix for an ACU spontaneous hard reset problem and removes the Ice-Free Wind (IFW) path error messages from the SYSLOG (although path errors are still tracked on the maintenance page). The two problems are described as follows:

Spontaneous ACU hard resets (identified as a “COLD START” in the SYSLOG) have occurred at a number of ASOS sites with an Automated Lightning Detection and Reporting System (ALDARS) interface. These hard resets have occurred at sites with ACU software V2.7B-6 and V2.79. Although the hard resets are infrequent, all ASOS data (site information, OBS LOG, SYSLOG, daily/monthly summary data, etc.) are lost when a hard reset occurs. Each hard reset requires intervention by the ASOS Operations and Monitoring Center (AOMC) to restart the ASOS and download site information. In some cases, an on-site visit by the Electronics Technician (ET) is also required. The ASOS software contractor has also confirmed the presence of the same problem in V2.79A, which has been fielded to support the IFW sensor and the FAA’s Weather Sensor Processor (WSP) interface.

Some sites with IFW sensors have expressed concern that an excessive number of “path error” messages may fill the SYSLOG and result in more important messages being purged. The IFW path error messages were originally intended for diagnostic purposes and, in the absence of an IFW data quality error, do not indicate a sensor problem.

The V2.79B System Test (ST) was completed October 19, 2005, using ASOSs at Weather Service Headquarters and the Sterling Research and Development Center at Sterling, Virginia. The ST report, “**SYSTEM TEST REPORT FOR THE ASOS Version 2.79B (09/19/05) SOFTWARE**” dated December 1, 2005, and the OAT plan, “**Operational Acceptance Test (OAT) Plan for Automated Surface Observing System (ASOS) Software Version (V)2.79B**” dated September 23, 2005, can be found at:

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

The ST report recommended to the ASOS Test Review Group (TRG) V2.79B be approved for OAT.

Conduct of the OAT

The V2.79B OAT sites were selected to provide a variety of ASOS configurations and operational scenarios with priority given to sites where hard resets with previous software versions have been a problem. Because some V2.79/2.79A/2.79B Operator

Interface Device (OID) displays and observer procedures have been changed from those for

V2.7B-6, the Federal Aviation Administration (FAA) requires a 30-day notification/training process before installation of any of these software versions at sites with FAA or FAA contract observers. To expedite the OAT, the sites selected for participation were limited to unstaffed (FAA Service Level D) sites and those with V2.79/2.79A already installed. A total of 23 sites were initially identified for participation in the OAT:

NWS Eastern Region

CAR Caribou, ME
IGX Chapel Hill, NC
PWM Portland, ME
RIC Richmond, VA

NWS Central Region

BFF Scottsbluff, NE
GFK Grand Forks, ND
GRB Green Bay, WI
LBF North Platte, NE
SLN Salina, KS
TOP Topeka, KS

NWS Southern Region

BAZ New Braunfels, TX
CKV Clarksville, TN
GDP Guadalupe Pass, TX
GUY Guymon, OK
SRQ Sarasota, FL
TRI Bristol, TN

NWS Western Region

GPI Kalispell, MT
GEG Spokane, WA
RBL Red Bluff, CA
SFO San Francisco, CA

NWS Alaska Region

PABR Barrow, AK
PAKV Kaltag, AK

NWS Pacific Region

PHTO Hilo, HI

Although, for various reasons, the V2.79B software was not installed at three of these sites (BAZ, GEG, SRQ), all required site configurations and operational scenarios were represented by at least one OAT site. During the course of the OAT, 20 additional sites were added to solve problems (hard resets, dewpoint sensor problems, etc.) at those specific sites. Those sites were:

ACY Atlantic City, NJ
AUG Augusta, ME
DAW Rochester, NH
ELZ Wellsville, NY
HIE Whitefield, NH
LEB Lebanon, NH
PLB Plattsburgh, NY
BBW Broken Bow, NE

ENW Kenosha, WI
FOE Topeka (Forbes), KS
JKL Jackson, KY
LXT Lees Summit, MO
6R6 Dryden, TX
CNM Carlsbad, NM
FST Fort Stockton, TX
HJO Hanford, CA
INW Winslow, AZ
MAE Madera, CA
RQE Window Rock, AZ
SJM St. Johns, AZ.

A chronology of OAT site installations is provided in Appendix A.

Evaluation of the V2.79B ACU software began on October 3, 2005, with installation at LBF. Several sites (LBF, SLN, BBW, RBL, and ELZ) were installed before the ST was completed – but after most of the testing had been successfully performed. These installations were performed (at the request of either the NWS or FAA Region) to allow the ALDARS interface to be enabled at the site.

Early in the OAT, the FAA requested the opportunity to evaluate the WSP and ASOS Controller Equipment – Information Display System (ACE-IDS) interfaces prior to installation at sites with FAA or FAA Contract staffing. The V2.79B software was installed at ACY and the evaluation was performed at the FAA Technical Center in Atlantic City, NJ. The interface evaluation was completed in late November and installation was approved for all OAT sites on December 1, 2005.

Throughout the OAT, the site focal points monitored ASOS performance with particular attention to verification of the following criteria from the OAT plan:

Stable ASOS operation - The availability of ASOS observations/products and the frequency of warm starts must be consistent with or improved over performance with previous software versions. There must be no spontaneous hard resets.

Production, transmission, and archiving of observations/products - Observations must be representative of conditions (within the limitations of the ASOS sensors), correctly formatted, transmitted successfully, and archived by ASOS.

Interfacing with both NWS and non-NWS systems - ASOS must correctly transmit information for display on the FAA ACE-IDS and the WSP. ASOS must correctly incorporate Runway Visual Range (RVR) information from the FAA's NGRVR system into the ASOS METAR reports. ASOS must correctly incorporate

thunderstorm information from the FAA's ALDARS system into the ASOS METAR and SPECI reports.

Periodic OAT Test Review Group (TRG) meetings (conference calls) were conducted to report the status of the OAT and to adjudicate problems. Minutes of these meetings are available from the Office of Operational Systems, Field Systems Operations Center, Test & Evaluation Branch (OPS24).

OAT Results

The V2.79B software was evaluated from October 3, 2005, through February 1, 2006. During the OAT evaluation period, 2284 cumulative days (75.1 site-months) of operation at 40 sites, there were no hard resets and 58 warm starts. The warm start rate (0.77 per site-month) was consistent with the performance of previous software versions. If HJO (where V2.79B was installed in an unsuccessful attempt to resolve ongoing problems) is not included, the resulting warm start rate (0.59 per site-month) was significantly better than historic rates.

No occurrences of excessive numbers of IFW path error SYSLOG messages were reported.

With V2.79B installed, no problems were noted with the production, transmission, and archiving of observations and products. No problems were reported with the performance of the interfaces with NWS and non-NWS systems.

SYSLOG messages indicated problems at HJO and JKL, two (of 25) OAT sites with IFW sensors. There were unexpected and unexplained occurrences of:

***ST 1792 WJ COMMAND ISSUED TO WIND 425NWS SENSOR**

and

***ST 1793 AVERAGING TIME FOR WIND 425NWS SENSOR CHANGED FROM ... TO ...**

in the SYSLOG. Although this problem was not judged serious enough to justify rejection of V2.79B, it has been assigned to the ASOS software contractor for investigation.

Conclusions and Recommendation

At the February 2, 2006, TRG meeting, based on evaluation of performance at 40 OAT sites, V2.79B was judged satisfactory and the software was recommended for deployment at field sites.

OAT Site Installation Chronology

V2.79B ACU Software – Evaluation through February 1, 2006

The following is a list of test sites operating with the new software along with the total number of days of operation as of February 1:

<u>Installed Sites</u>	<u>Installed</u>	<u>Days of operation</u>	<u>Warm starts</u>
North Platte (LBF), NE	10/03/05	131	
Salina (SLN), KS	10/04/05	130	2
Broken Bow (BBW), NE	10/04/05	130	7
Red Bluff (RBL), CA	10/05/05	129	1
Wellsville (ELZ), NY	10/14/05	110	2
Lees Summit (LXT), MO	10/24/05	100	1
Caribou (CAR), ME	10/25/05	99	2
Guymon (GUY), OK	10/27/05	97	
Topeka-Forbes(FOE), KS	11/03/05	90	1
Atlantic City (ACY), NJ	11/10/05	83	3
Scottsbluff (BFF), NE	11/15/05	78	
Green Bay (GRB), WI	11/15/05	78	
Chapel Hill (IGX), NC	11/16/05	77	4
Guadalupe Pass (GDP), TX	11/22/05	71	1
Fort Stockton (FST), TX	11/23/05	70	
Dryden (6R6), TX	11/23/05	70	2
Carlsbad (CNM), NM	11/29/05	64	2
Barrow (PABR), AK	12/05/05	58	4
Plattsburgh (PLB), NY	12/07/05	56	3
Hilo (PHTO), HI	12/12/05	51	
Kaltag (PAKV), AK	12/13/05	50	1
Whitefield (HIE), NH	12/15/05	48	1
Rochester (DAW), NH	12/19/05	44	1
Kenosha (ENW), WI	12/23/05	40	4
Jackson (JKL), KY	12/28/05	35	1
Bristol (TRI), TN	01/04/06	28	1
Portland (PWM), ME	01/04/06	28	
Richmond (RIC), VA	01/04/06	28	
Clarksville (CKV), TN	01/05/06	27	
Topeka (TOP), KS	01/05/06	27	
Hanford (HJO), CA	01/06/06	26	14
Grand Forks (GFK), ND	01/06/06	26	

Lebanon (LEB), NH	01/06/06	26
Augusta (AUG), ME	01/09/06	23
San Francisco (SFO), CA	01/12/06	20
Madera (MAE), CA	01/23/06	9
Kalispell (GPI), MT	01/25/06	7
Winslow (INW), AZ	01/25/06	7
St. Johns (SJN), AZ	01/25/06	7
Window Rock (RQE), AZ	01/26/06	6

75.1 site-months (2284 site-days)

58 warm starts

0.77 warm starts per month