

4.0 Phase 1 OT&E Summary - ASOS Software V3.05/3.051/3.06

4.1 Test Objectives

The testing was completed and the results are valid for ASOS Software V3.05, V3.051, and V3.06; any reference to the software version in this summary applies to all three of these versions. All of the documents described in the following sections can be found at this link:

http://www.weather.gov/ops2/ops24/documents/asos_v3.htm

The OT&E test objectives were to validate:

A. Installation instructions for V3.06ACU software/DCP V2.0 EPROMS.

Evaluation Criterion: The NWS Engineering Modification Notes (Mod Notes) must be complete and accurate, providing all information required for successful installation. (NOTE: NWS Mod Note 80G will be used to install the ASOS ACU firmware V3.06 and DCP V2.0 EPROMS upgrades). An overall “Satisfactory” rating must be obtained from the collection of completed on-line questionnaires for the questions pertaining to this test objective.

- **successfully completed** – completed questionnaires and comments on installation instructions will be provided to OPS12.

B. ASOS ACU V3.06 firmware and DCP V2.0 EPROMS do not negatively affect ASOS operational systems.

Evaluation Criterion: All methods of ASOS communications are still functional, METARS/SPECIs continue to be transmitted correctly, OID interfaces for all screens and user levels are still functional, including the collection of SYSLOGS in case there is a problem. An overall “Satisfactory” rating must be obtained from the collection of completed on-line questionnaires for the questions pertaining to this test objective. Comments will be forwarded to W/OPS24.

- **successfully demonstrated** - completed questionnaires from Survey Monkey, and any other comments from the field sites will be provided to OPS12.

C. New security upgrades: 5 new security RCs’ function as designed. See the ASOS Software Release Note for more detail (link in section 4.2).

Evaluation Criterion: Upon installation of V3.06 firmware at each site, the sites will use the current passwords (**must be entered in CAPS once V3.06 is installed**) for 60 days. Just prior to 60 days, OPS12 will dial into each OT&E site using a script file and change the passwords for the system manager (SYS), technician (TEC), remote access (RAC), and critical regional

password (CRIT- for station elevation changes when required) to the 1st new 12 character password from the password table for each region. OPS12 will continue this process every 60 days from that point on. The Standard Operating Procedure (SOP)

“Operating Procedures for ASOS Password Management” is available by clicking on the miscellaneous documents drop down menu from the link referenced in section 4.1 and selecting the file: **3/01/12 - Operating Procedures ASOS Password Mgmt v3.05**

The new passwords will be taken from an encrypted password table provided by SFSC. The 5 new security upgrades will need at least two sixty day cycles to test password expiration. Near the end of the first 60 day cycle, verify that OPS12 can dial into each Phase 1 site and change the passwords for the four user groups (TEC, SYS, RAC and CRIT). This will occur prior to the 60 day expiration for the passwords and at approximately 50-60 day intervals after that. Validate the audit log (AUDLOG) contains correct information about password changes. See section 4.2.8 for more details.

- **successfully demonstrated** - All Phase 1 OT&E sites have successfully changed to the new 12 character passwords at least two times during the OT&E. More details on the 5 new security upgrades can be found in section 4.2.8.

D. ASOS ACU V3.06 firmware and DCP V2.0 EPROMS interface properly with all systems interfaced to ASOS.

Evaluation Criterion: The ASOS software under test must interface properly with all communication configurations including dial-up, GTA, ADAS/FTI, WSP, ATIS, RVR, and AWIPS/AFOS.

- **successfully demonstrated** - OPS24 did not receive any negative comments or feedback from any of the Phase 1 OT&E sites that indicated that any of these interfaces did not work during the OT&E. OPS24 listened to GTA radio at SFSC and in Silver Spring. The WSP interface will be tested during Phase 2B of the OT&E.

E. Meteorological Requirement: Ice Accretion Algorithm.

Evaluation Criterion: NWS staff at Weather Service Headquarters (WSH) will analyze cases of ice accretion for freezing rain events that occur at OT&E sites during the cold season (November 2011-April 2012).

- **successfully validated** – see section 4.2.1 for more details

F. Meteorological Requirement: Ice Free Wind (IFW) Sensor Quality Control (QC) Algorithm

Evaluation Criterion: NWS staff at WSH will analyze cases or events when the IFW Sensor QC Algorithm is “tripped” due to birds or other objects that pass through the sensors sample volume and contaminate the data.

- **successfully validated** see section 4.2.2 for more details

G. Meteorological Requirement: Validation of Precipitation Accumulation.

Evaluation Criterion: NWS staff at WSH will analyze cases or events when conditions are right for potential false precipitation accumulation from the AWPAG or Tipping Bucket.

- **in progress** - see section 4.2.3 for more details

H. Meteorological Requirement: Change Thunderstorm Reporting Threshold for Specials

Evaluation Criterion: NWS staff at WSH analyzed cases of thunderstorms from sites with the ALDARS network to make sure SPECI’s are generated when the thunderstorm changes from in the vicinity (“VCTS”) to activity at the site (“TS”) and when the thunderstorm changes from activity at the site (“TS”) to in the vicinity (“VCTS”). Chosen sites where the observer edits TS and VCTS will also be evaluated.

- **successfully validated** see section 4.2.4 for more details

I. Meteorological Requirement: Sky Condition Algorithm in IFR Conditions.

Evaluation Criterion: NWS staff at WSH will analyze cases of sky condition from the OT&E sites during Instrument Flight Rule (IFR) (ceiling <1000FT) conditions to verify that the sky condition algorithm is working properly.

- **successfully validated** see section 4.2.5 for more details

J. Evaluation of New Capabilities.

All of the new capabilities at the D and O level sites were validated successfully during Phase 1 of the OT&E. The remaining new capabilities were validated during ST, and will be validated in Phase 2 of the V3.06 OT&E at the A, B, and C level sites (with observers or air traffic controllers present). More details on the new capabilities and OTR fixes that were validated during Phase 1 of the OT&E can be found in section 4.2.6 and 4.2.7.

K. Evaluation of Reverting Back to Previous Software Version.

Evaluation Criterion: During the OT&E, one OT&E site was to be chosen at random to revert back to the previous load of ASOS software (V2.79Y) to verify that the older version V2.79Y can be loaded and that the AOMC can download the correct passwords from the previous version of software.

- **Successfully validated** – several OT&E sites chose to revert back to V2.79Y when the critical TTR 295 was discovered. All sites successfully reverted to V2.79Y, but a critical lessoned was learned: the sites MUST remember their old V2.79Y (last 8 character password before installing V3.06) when reverting back to V2.79Y from V3.06. OPS23 helped AOMC in providing the sites with the correct 8 character passwords to the sites reverting back to 2.79Y. This caused a work load issue for OPS23 and AOMC. Please see the lessons learned section 4.4 for more details.

4.2 Summary of Data Analysis

OT&E Test Plan

Since the start of the OT&E in early October 2011, OPS24 and OPS22 have performed extensive data analysis on the four new meteorological requirements (new or modified algorithms) that are part of V3.06. These new meteorological algorithms were outlined in the OT&E Test Plan which is available on the OPS24 website by clicking on the plans and reports pull down menu from the link referenced in section 4.1 and selecting the file name **11/08/11 - V3.05 OT&E Plan.**

Release Notes

More information about the meteorological algorithm improvements, 58 new capabilities, and 24 OTR fixes can be found in the Release Notes by clicking on the miscellaneous documents pull down menu from the link referenced in section 4.1 and selecting the file name **9/20/11 - Release Notes.**

System Test Results

OPS24 and OPS22 have also analyzed the sky condition algorithm in Instrument Flight Rule (IFR) conditions (Ceilings < 1000FT) to validate that the sky condition algorithm is functioning properly. In addition, OPS24 has completed data analysis on many of the 58 new capabilities and 24 OTR fixes in the software. Some of the new capabilities could not be verified during Phase 1 of the OT&E, but they were validated extensively during System Test (ST). ST results are available to anyone who wishes to view the ST final report by clicking on the plans and reports pull down menu at from the link referenced in section 4.1 and selecting the file name **12/16/10 - V3.05 ST Plan.**

Moving forward, the remaining capabilities and OTR fixes that pertain to Observers (OBS) and Air Traffic Controllers (ATC) will be validated during Phase 2 of the OT&E starting spring of 2012 and lasting through the winter of 2012-2013 at 27 OT&E sites. The following sections (4.2.1 - 4.2.8) summarize the data analysis for the four new meteorological algorithms, and many of the improvements and OTR fixes in the software.

4.2.1 Meteorological Requirement: Ice Accretion Algorithm

The Weather Service Headquarters (WSH) staff goal was to obtain 5-10 cases of ice accretion, to validate and confirm the ice accretion algorithm is functioning properly. There were 5 cases of ice accretion at the Phase 1 OT&E sites from October 2011- late February 2012. The sites that experienced ice accretion during the OT&E were: BFD – Bradford, PA (2 cases 12/28/11 and 1/16/12), GDP – Guadalupe Pass, TX (1 case – 12/23/11), KNAK - Annapolis, MD (1 case 1/21/12), and ANJ – Sault Ste. Marie, MI (1 case – 1/23/12). Analysis of the data indicated that the ASOS Meteorological Event (AMR) values (available by downloading via Direct Command Mode (DCM)) and corresponding Ice Accretion Remarks in the METARs/SPECIs were being calculated correctly by the algorithm. The summary of this data is available by clicking on the Data Analysis pull down menu from the link referenced in section 4.1 and selecting the excel spreadsheet file name: **IceAccretion_V305_OTE**

This spreadsheet compares the expected results to the actual results of ice accretion amounts for the 5 cases (in separate tabs in the spreadsheet) analyzed during the OT&E. The case from GDP on 12/23/11 was a good ice accretion case (large accretion of ice), with a 6 hourly accretion of 0.32” (I6032). The case at NAK on 1/21/12 was also a good ice accretion case (large accretion amount, with a 6 hourly accretion of 0.17” (I6017). The other three cases had less ice accretion, and the algorithm also performed as designed in these cases.

4.2.2 Meteorological Requirement: Ice Free Wind (IFW) Sensor Quality Control (QC) Algorithm

The WSH staff goal was to analyze 5-10 cases of wind data from those sites that experience high bird activity (or other types of obstructions in the path of the IFW sensor) to validate and confirm the IFW Sensor QC Algorithm is functioning properly. There were 55,237 5 second wind samples rejected (bracketed [] as questionable) at the Phase 1 OT&E sites from October 2011 to late February 2012. The summary of this data is available by clicking on the Data Analysis pull down menu from the link referenced in section 4.1 and selecting the file name:

Results_IFW5SEC_Rejected_Samples_OUT_Count

An analysis of these rejected IFW samples and corresponding METARs/SPECIs was performed by OPS22 and OPS24 to determine the approximate frequency of occurrence of rejected wind samples, and the approximate frequency of occurrence of rejected wind samples during a METAR which would cause the wind to be missing in the METAR. The estimates indicated that the frequency of wind sample rejected was approximately 0.2%, and that frequency of missing wind in the METARs was approximately 0.083%.

20 IFW QC cases were obtained during Phase 1 of the OT&E. Analysis indicated that the pattern of IFWS data and the distribution of the IFWS data errors was consistent with that caused by large birds roosting on the sensor in 8 cases and consistent with a contaminated sample volume in 3 cases. A table summarizing these events and the sites that they occurred can be found by

clicking on the Data Analysis pull down menu from the link referenced in section 4.1 and selecting the file name:

IFWS_QC_Cases_022912

More detailed information about the IFW QC algorithm can be found in the summary written by OPS22 by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named: **QC_alg_summary**

In addition, even more detailed information on the IFW QC algorithm can be found in the Release Notes (see section 4.2 for the link to this document). During Phase 2A and 2B, OPS22 and OPS24 will continue analyzing IFW QC cases. The spring time is period of high bird activity and a time of often strong gusts and variable winds. OPS22 and OPS24 will pay close attention to IFW QC cases where "good" data (i.e. a legitimate wind speed or wind gust) is rejected by the algorithm. This should not happen very often, and it will be tracked. However, the benefit of eliminating wind data contaminated by birds or other obstructions should far outweigh the elimination of a very small amount of "good" wind data.

4.2.3 Meteorological Requirement: Validation of Precipitation Accumulation

The goal of the staff at WSH was to analyze 5-10 cases to validate the Validation of Precipitation Accumulation Algorithm. This algorithm is also known as the "false tip" algorithm. The WSH staff looked for conditions that might cause a false accumulation in precipitation to occur. If these conditions existed, the WSH staff then analyzed the 12 hour archive from the sites that had a potential to report False Precipitation Accumulation, to see if the False Precipitation in the 12 hour archive is bracketed (i.e. [0.01]), and that bracketed data does NOT get added to any precipitation accumulation values; hourly precipitation (Prrrr), 3 hourly, 6 hourly (6rrrr), daily total precipitation (7rrrr), Daily summary total precipitation, Monthly Summary total precipitation, Daily Summary Message (DSM), or Monthly Summary Message (MSM).

No cases of false precipitation accumulation were obtained from the Phase 1 sites during OT&E. However, during System Test (ST) at the Sterling Field Support Center (SFSC); while running a test procedure to check FTI communication between the FAA Tech Center in Atlantic City and SFSC; a dataset of actual ASOS precipitation data (LEDWI and AWPAG) was run through the ST0 ASOS using ASENSE. This data set contained a case of "invalid precipitation" that was correctly bracketed [] by the algorithm in the 12 hour archive, and the data was not used to calculate any precipitation accumulation values.

In addition, OPS24 successfully tested the Validation of Precipitation Algorithm on April 20, 2012 at SFSC using the ST0 ASOS. OPS24 made sure all sensors were configured and operational (especially the LEDWI and AWPAG). Then, OPS24 checked to make sure that there was no present weather (i.e. LEDWI was NP, no edited present weather) and that there was no precipitation reported in any field (Pgroup, 3group, 6group,7group) in METARs, SPECI's, and 5

Minute OBS, SHEF, DSM (for the day up to the time the test was started), and made note of the Daily and Monthly summary precipitation amounts to date. Next, water was poured into the AWPAG over a series of minutes (during 2 separate 15 minute intervals - to test the 15 minute SHEF amount).

Next, OPS24 returned to the ST0 ASOS OID and printed out the 12 -hour archive precipitation page that showed that the precipitation record during the time water was poured into the AWPAG was bracketed: [.07], etc. All other precipitation fields did not have a precipitation remark or accumulation from the water that was poured into the gauge during this time. The METARs and SPECI's for April 20, 2102 and April 21, 2012 were retrieved, and there were no precipitation remarks in the observations: Pgroup, 3group, 6group, and 24 hour (7group). The SHEF, 15 minute precipitation amounts, DSM, MSM, Daily, and Monthly pages were archived printed out to make sure that none of the precipitation got recorded in any precipitation value. OPS24 feels quite confident that this algorithm is functioning as designed. OPS24 will continue to look for actual cases of invalid precipitation accumulation from the OT&E sites during Phase 2A and 2B of the V3.06 OT&E.

4.2.4 Meteorological Requirement: Change Thunderstorm Reporting Threshold for Specials

The goal of the staff at WSH was to analyze 5-10 cases to validate the Change to Thunderstorm Reporting. The WSH staff, in conjunction with OT&E sites that are connected to the FAA's ALDARS system, analyzed SPECI Observations during thunderstorms to make sure that SPECI's were generated when a thunderstorm (TS) began or ended at a site (within 5NM), or a thunderstorm in the vicinity (VCTS) began or ended (6NM to 10NM) at a site, or the thunderstorm changed from VCTS to TS and vice versa. **214 cases of VCTS and TS SPECI's** have been obtained from the download of the METAR/SPECI's at the OT&E sites from early October 2011 until late February 2012. Files with examples of these 214 SPECI's are available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named:

Results_TS_VCTS_OUT_Count

4.2.5 Sky Condition Algorithm in IFR Conditions

The goal of the staff at WSH was to analyze 5-10 cases of sky condition from the OT&E sites in Instrument Flight Rule (IFR) conditions (ceilings < 1000FT) to validate the sky condition algorithm. WSH staff analyzed 5 cases of raw ceilometer data (IFR conditions) in the 12 hour archive, and used it to determine if the sky condition in METARs and SPECI's were correct. 3 cases were from ANJ - Sault Ste. Marie, MI, and 2 cases were from BFD - Bradford, PA. In all 5

cases the ASOS sky condition algorithm performed as expected in IFR conditions. The data from these 5 cases is available upon request.

4.2.6 Evaluation of New Capabilities

The following new capabilities (improvements) in V3.06 were validated during the OT&E:

4.2.6.1 Transmit Specials at Anytime – Allows for SPECI's to be generated during the METAR edit time. 1014 SPECI's were transmitted during METAR's at the Phase 1 OT&E sites from early October 2011 until late February 2012. The file with examples of these 1014 SPECI's are available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named: **Results_SPECI_During_METAR_OUT_Count**

9071 SPECI's were generated at any time during the OT&E from October 2011 to late February 2012. The file containing these 9071 SPECI's are available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named:

Results_SPECI_all_OUT_Count

4.2.6.2 Include Temp/Dew Remark in All OBS – The “T-group” will now be included in all Observations (METARS and SPECIS). During the OT&E there were 102 METAR or SPECI observations that showed the T-group. The file with this data is available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named:

Results_SPECI_with_Txxxxxx_OUT_Count

4.2.6.3 Remove Additive Data from Specials and METARs transmitted during METAR Edit Period – Only the hourly precipitation remark (Pxxxx group only - not the 3 hour 3xxxx group, or 6 hour 6xxxx group) will be included in SPECI's transmitted during the Hourly (METAR) edit times. 490 SPECI's were transmitted during the METAR edit time at the Phase 1 OT&E sites from early October 2011 until late February 2012. The file with examples of these 490 SPECI's are available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named:

Results_SPECI_With_Pxxxx_during_METAR_OUT_Count

4.2.6.4 Change Daily Summary Product Sky Cover Labels – Sky cover labels in the Daily Summary Product will now be reported in OKTAs. OPS24 dialed into several OT&E sites and confirmed the Daily Summary Product Cloud Cover Labels are in OKTAs.

4.2.6.5 Software Support for Additional ASOSs – An ASOS site that is not required to have a present weather sensor configured will have an “AO1” encoded in the remarks section of the METAR. An ASOS that is required to have a present weather sensor configured will be encoded with an “AO2” in the remarks section of the METAR. Several AO1 sites participated in the OT&E. Those sites are: 1V4 – St. Johnsbury, VT, DMH – Baltimore Science Center, MD, CDJ –

Chillicothe, MO, P28 – Medicine Lodge, KS, and P68 – Eureka, NV. METAR's/SPECI's generated at these sites confirm that the AO1 is in the remarks. An important issue came up during the OT&E regarding AO1 sites. The TEC must toggle the ASOS TYPE (on the SITE PHYSICAL page) from AO2 to AO1 at AO1 sites after V3.06 is installed. This is important, because the Validation of Precipitation Algorithm; which uses the present weather sensor; has a check for "AO1" in it: the algorithm will not run if the site is an AO1 site (no present weather sensor required). If an AO1 site is designated as AO2, all of the precipitation accumulation data (from AWPAG or Tipping Bucket) will be marked as invalid by the algorithm. Data showing the AO1 designation in the remarks section of the METARs/SPECI's is available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named: **Results_SPECI_all_OUT**

4.2.6.7 Change Order of Encoded Remarks for Beginning/Ending Times of Thunderstorms

– The thunderstorm begin/end times will now be encoded after the precipitation remark to comply with FMH-1. 214 cases of VCTS TS SPECI's have been obtained from the download of the METAR/SPECI's at the OT&E sites from early October 2011 until late February 2012. 214 remarks in the METAR/SPECI's show that the Beginning/Ending times for thunderstorms are encoded after the precipitation remarks, and are available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named:

Results_TS_VCTS_OUT_Count

4.2.6.8 Do Not Compute Minutes of Sunshine for Latitudes Greater than 60 – ASOS will no longer compute minutes of sunshine for sites with latitudes greater than 60 degrees. OPS24 has dialed into POR- Portage Alaska on many occasions, and confirmed that ASOS no longer compute minutes of sunshine for POR which is at latitude 60.47 north. Minutes of sunshine appear as "N" in the minutes of sunshine field.

4.2.6.9 Increase the Size of the Cloud Statistic Archive – the cloud archive is increased from 24 hours to 48 hours (96 values). OPS24 dialed into a few of the Phase 1 ASOS sites and obtained the cloud archive via direct command mode. The cloud archive has indeed increased from 24 to 48 hours. These cloud files are available upon request.

4.2.6.10 Store Data that Causes a Data Quality Error in Brackets – All sensor data received that causes a data quality error and all sensor data received when report processing is turned off will be displayed with brackets in the 12 hour archive. OPS24 has hundreds of minutes of 12 hour archive data with brackets [] while the sensor had a data quality error. The data is available upon request.

4.2.6.11 Report Multiple FEW Layers in Sky Field - There were 106 METAR's/SPECI's that contained multiple FEW layers from October 2011-February 2012. These METAR's/SPECI's are available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named:

Results_FEW_OUT_Count

4.2.6.12 Generate Specials for Begin/End Ice Pellets – SPECI's will be generated when an Observer edits Ice Pellets (Begin/End and change of intensity). This winter was extremely mild in the contiguous U.S, and there were no sites in the Phase 1 OT&E with an Observer present, so this improvement could not be verified at any of the Phase 1 OT&E sites. However, this new feature was verified at ST0 and SP1 during the OT&E. This new feature will be verified during Phase 2A and 2B of the 3.06 OT&E.

4.2.6.13 Manual Entry of 000 into Sky Field – 000 (total obscuration) can now be edited into the sky field. This was verified at ST0 and SP1 during the OT&E. This improvement was not able to be verified during Phase 1 OT&E at any of the sites since observers or air traffic controllers were not present, but it will be validated during Phase 2A and Phase 2B OT&E.

4.2.6.14 Add LST label of the Date Field on Physical and OID Screens – To avoid confusion “LST” will be entered next to the date/time field on the Physicals and OID one minute screens. OPS24 dialed into several of the Phase 1 OT&E sites during the OT&E and verified that this new feature is present.

4.2.6.16 Auto Enable/Disable of Freezing Rain Sensor – This new feature was verified during the OT&E by the OT&E sites with a freezing rain sensor using Maintenance Note 39A.

4.2.6.17 Expand Operational Periods for the Freezing Rain Sensor – This improvement expands the date/time periods for turning ON/OFF the freezing rain sensor from six to nine periods. This was verified at the OT&E sites during the OT&E in connection with the Auto Enable/Disable Freezing Rain Sensor improvement using Maintenance Note 39A.

4.2.6.18 Move Pressure Sensors to the Bottom of the Page on the REVUE-SENSR-STAT page – To avoid accidental turning off of the pressure sensors, the pressure sensor prompts have been moved to the bottom of the REVUE-SENSR-STAT page. This was confirmed by OPS24 by dialing into several OT&E sites, and was verified at ST0 and SP1.

4.2.6.19 Store Software Versions for AOMC Uploads – This new feature automatically uploads ASOS software version numbers for the ACU, DCP, and PSOS during AOMC uploads. This was verified by dialing into several OT&E sites during the OT&E, and was verified at ST0 and SP1.

4.2.6.20 Increase Local Ports to Support Testing – Increase the number of local ports on the ACU from 3 to 6. This was verified at ST0 and SP1.

4.2.6.21 Display Last Transmitted METAR or SPECI Report – The OID and VDU will now display the last transmitted METAR/SPECI report along with the current pending METAR/SPECI report. This new feature was verified by OPS24 during the OT&E by dialing into a few OT&E sites, and at ST0 and SP1.

4.2.6.22 Separate Report Processing for Each Sensor – This new feature allows the TEC to turn ON/OFF report processing for sensors with multiple sensors (Ceilometer and Visibility). This was verified at ST0 and SP1 during the OT&E.

4.2.7 A Selected Set of OTR Fixes

- OTR 1001 – If Present Weather Field is in Manual Mode when Freezing Rain Ends and Field is Reset, ASOS will carry Freezing Rain when None Exists – Verified with ASENSE during ST. This OTR fix will also be verified during Phase 2A and 2B of the OT&E.
- OTR 1002 – Edit Log Contains Date Time without any Log Entry – Downloading the EDIT LOG using Direct Command Mode (DCM) contained date entries without any description of the edit. OPS24 analyzed all available EDITLOGs from early October 2011 - Late March 2012 and found no occurrences of an Edit Log entry without a Date Time. This will be further verified during Phase 2A and 2B of the OT&E.
- OTR 1004 – Peak Wind Remark Not Encoded during transmission of Observation – Peak Wind should be encoded in METAR/SPECI observations. This has been verified during OT&E, and 2510 observations had peak wind remarks during the OT&E. The results are available by selecting the Data Analysis pull down menu from the link referenced in section 4.1 and clicking on the file named:

Results PEAK_WIND_in_OBS_OUT_Count

- OTR 1054 – Rounding Negative Temperatures – Negative temperatures for the 24 hour temperature were being rounded down (-1.5 was rounded to -2.0) Now they are rounded up (-1.5 is rounded to -1.0) – Verified with ASENSE during ST.
- OTR 1074 – ASOS ACU Processor Status Nomenclature – the ACU Processor Status Page used the terms WARM and COLD. This was confusing, so it was changed to SOFT and HARD to follow the same convention as the DCP Processor Status Page. OPS24 dialed into BFD - Bradford PA and verified that ACU Processor Status used the terms SOFT or HARD.

4.2.8 Validation of Five New Security Features for Password Management –

Improve Access Security and Password Management - Passwords are checked to adhere to DCO requirements. Passwords will be encrypted before storage and transmission. Passwords will expire in 60 days from the time of creation but expired passwords will continue to be accepted by the system. A warning message will be displayed on the OID screen and generated in the SYSLOG 14 days before the password is to expire. – **Successfully Validated**

Provide a Security Warning Message to Those Accessing ASOS Remotely – – **Successfully Validated**

Audit Logs and Reports - Provide a Warning Banner to those accessing ASOS remotely prior to the prompt for the remote access code. – **Successfully Validated**

Additional Security for Elevation Changes —Before any change can be made to any elevation parameter in the ASOS site’s database via remote access, an additional password must be entered. Such a change will be recorded automatically by ASOS in an event log. - **Successfully Validated**. AUDLOGS are available upon request.

Unsuccessful Login Attempts – A new Audit Log is provided. When a defined event is detected, an entry to the Audit Log will be generated. When anyone dials in to ASOS remotely and doesn’t enter any response it will be counted as an attempt to deny service. ASOS will check the number of attempts to deny service at 5:00 AM LST. If there are five or more attempts then a message will be logged in the Audit Log – **Successfully Validated** – AUDLOGS are available upon request.

- In addition, a test of the process for retrieval of password(s) for a forgotten password was successfully demonstrated during April. An Eastern Region employee, who was on the list of personnel authorized to get passwords, followed the lost password retrieval process and called the AOMC to get the RAC password. After the person was confirmed, AOMC provided the RAC password to the employee. The Password Security flowchart can be found by clicking on the miscellaneous documents pull down menu from the link referenced in section 4.1 and selecting the file: **3/28/12 - V3.06 Password Security Flowchart**

4.3 Test Trouble Reports

The following Test Trouble Reports (TTR's) were generated during Phase 1 of the OT&E, and adjudicated in the following way:

- TTR 278 – Hard Reset of DCP#3 at ST0 Causes Warm Start – OPEN – not critical – may be fixed in a future software load
- TTR 287 – Incorrect Brackets around CHI data in 12-HR Archive with RPT PROC ON – OPEN – not critical – may be fixed in a future software load
- TTR 294 – Extraneous Zero’s in AUDLOG – CLOSED (fixed in V3.051)
- TTR 295 – Pressure Data Missing and Pressure Sensor Response Timeouts – CLOSED (fixed in V3.051)
- TR296 – “T” Group not Included in the SPECI Report – CLOSED (fixed in V3.051)
- TTR 297 – TEC Ability to Remotely Clear Pressure Sensor DQ Errors or Pressure Sensor Response Timeouts and Restore Pressure – CLOSED (fixed in V3.051)
- TTR 298 – Altimeter Continuously Displayed on One Minute Screen with All Pressure Sensors Missing – OPEN – “Watch Item” will continue to be monitored for a repeat of this problem.
- TTR 306 – Unexplained Warm Starts - OPEN – This issue is a long standing problem connected to many TTR’s in the past including (104, 119, 158, 187, and 215). During the OT&E, OPS24 kept a log (in the form of a Word Table) that summarizes the number of

warm starts that occurred at Phase 1 OT&E sites during the OT&E and will be furnished upon request. ANJ – Sault Ste. Marie, MI experienced many more warm starts after V3.05 was installed at their site. OPS24 compared the frequency of warm starts at ANJ in 2011 (V2.79Y) prior to the installation of V3.05 vs. the frequency of warm starts after V3.05 was installed. OPS24 found that the frequency of warm starts increased dramatically once V3.05 was installed. Further investigation of this problem by the Software Branch (OPS23) indicated that the warm starts might be caused by OPS24 dialing into ANJ several times a day to download the high resolution ASOS data for analysis. OPS24 stopped dialing into ANJ for a period of three weeks, and the number of warm starts decreased. In April, OPS24 resumed dialing into ANJ to download the high resolution ASOS data for analysis. OPS24 will keep track of the number of warm starts at ANJ to see if the frequency of warm starts increase. ANJ is also a single cabinet ASOS and this configuration could contribute to the increased frequency of warm starts.

- TTR 309 – Unexplained Freezing Rain Sensor Response Timeouts and 30 or 45 Second Deice – OPEN – not critical – may be fixed in a future software load
- TTR 311 – CL31 Sensor Response Timeouts – OPEN – This TTR can be closed if a **RC – 13221 – CL31 Response Timeout and the setting of the Maintenance Flag** (written by the NWS Southern Region Headquarters and currently in review) gets implemented in a future software load.
- TTR 315 – Warm Start on ACU UPS Page – OPEN – not critical – may be fixed in a future software load

The following Test Trouble Reports (TTR's) and Request for Change (RC) were generated during Phase 1 of the OT&E, and adjudicated in the following way:

- TTR 307 – Cabinet Temp Missing in 10-sec Pressure Archive After Report Processing Turned On – CLOSED (incorporated in V3.06 – Phase 1 OT&E in Progress)
- **RC – 12510- Reduce Warm Starts by FTI Comms** (TTR 207) - CLOSED (an improvement was incorporated in V3.06 – Phase 1 V3.06 OT&E in Progress) – Many sites have experienced chronic warm starts due to FTI communication problems. This RC will reduce the number of warm starts induced by FTI communication problems, but it will not eliminate those types of warm starts. Phase 1 V3.06 OT&E has shown that the number of chronic warm starts due to FTI communication problems has dramatically decreased at the sites experiencing the chronic warm starts. Analysis will continue during Phase 2A and 2B of the V3.06 OT&E.

4.4 Lessons Learned

During the OT&E there were several "lessons learned" that are summarized here:

- Passwords: The “List of Authorized Users” in each region must be coordinated through the regional NWS focal points, and if an employee leaves the NWS or joins the NWS, the table of “authorized users” for that region must be updated. This table must be kept as up to date as possible by the NWS regional focal point, and when the NWS regional focal point is not available, they must designate a temporary focal point for password issues.

This table of authorized users must be sent to SFSC and AOMC as soon as an employee leaves or joins the NWS.

- Passwords: Once the passwords are changed from the current 8 character passwords to the new 12 character strong passwords, all users; NWS Focal Points, WFO focal points, and EL TECHs MUST follow the process outlined in the “flowchart for a misplaced password” that is available on the OPS24 website or follow the process for retrieving a lost password that is outlined in the SOP by clicking on the miscellaneous documents pull down menu from the link referenced in section 4.1 and selecting one of these two files:
3/28/12 - V3.06 Password Security Flowchart

3/01/12 - Operating Procedures ASOS Password Mgmt v3.05

- Passwords: All Users (SYS, TEC, etc.) MUST remember their old/existing 8 Character passwords BEFORE they switch to the new 12 character passwords. After cold boot; for sites with V2.79Y; the user must first log on as a TEC with the default password (entered in CAPS) for the site. Once the ASOS site had dialed into the AOMC and downloaded the EXISTING 8 character passwords, **the user must know what these passwords are.** If they forget the old 8 character password that is stored in AOMC, it will require calls to AOMC to get the password.
- Passwords: Passwords at sites that upgrade from V2.79Y to V3.06 or higher will be changed according to the EXISTING scheduled date of change for the 12 character passwords for that particular region. For example: if site BDF installs V3.06 55 days prior to the next scheduled 12 character passwords for the Eastern Region, they will wait 55 days until their passwords are changed to the next set of regional 12 character passwords. If BDF installs V3.06 1 day prior to the next regularly scheduled change for 12 character passwords, they will wait 1 day to change passwords to the new 12 character passwords.
- Users MUST follow instructions in Mod Note 80G, Maintenance Note 86, and Maintenance Note 39A when installing V3.06. It is very important to read all of the documentation that is being provided to ensure a smooth transition to the new software load. A thorough review of these documents is needed to avoid many of the problems that were encountered during Phase 1 of the OT&E.
- TEC must Cold Boot ASOS prior to installing V3.06, and; at sites with a DCP(s); pull the jumper at the DCP to completely clear the memory prior to installing V3.06. If this step is not taken, the results are unpredictable and the software will not be stable.
- Train users: TEC, SYS on new features of V3.06 including:
 - Turn the Ice Accretion Remark to "ON" on the REVUE-SITE-PHYS page; perhaps on the date when the region automatically turns on the freezing rain sensor. Only the SYS can perform this change.

- TEC must set the “Cal Authorized?” to “Y” when the automated remark “Cal Needed? Y” is generated by the ASOS software on the FZRA sensor page. The TEC should consult Maintenance Note 86 – FZRA Adaptive Baseline Frequency (ABF) for details.
- Make sure that sites designated as AO1 (not required to have a present weather sensor; LEDWI) change (toggle) their site from AO2 to AO1 on REVUE-SITE-PHYS-PAGE. This will assure that the Validation of Precipitation Algorithm does not run- at AO1 sites.
- Users should review the Release Notes, ASOS Security SOP; and other related documents that are available on the OPS24 website; to become familiar with the many changes in V3.06.
- During Phase 1 of the OT&E it became evident that the installation of OT&E sites should only be done Tuesday through Thursday to avoid going into a weekend or holiday with potential issues.

4.5 Conclusions and Plans for Phase 2A and 2B 3.06 OT&E

V3.06 contains many new capabilities including several new or enhanced meteorological algorithms and other enhancements to the ASOS software that are not available in V2.79Y. V3.06 also fixes many OTR’s that have been written against earlier ASOS software loads.

Phase 1 of the OT&E has successfully demonstrated that all of the new capabilities, enhancements, and OTR fixes that apply to D and O level sites are functioning properly or as designed.

The remaining new capabilities, enhancements, and OTR fixes at Level A, B, and C sites will be validated during Phase 2A and 2B of the OT&E.