

**NATIONAL WEATHER SERVICE INSTRUCTION 30-2111
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***Maintenance, Logistics and Facilities
Systems/Equipment Maintenance, NWSPD 30-21***

ASOS MAINTENANCE

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Signed by _____ August 15, 2003
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Automated Surface Observing System Maintenance

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1. Purpose. This chapter sets specific Automated Surface Observing System (ASOS) maintenance procedures and responsibilities and defines National Weather Service (NWS) Headquarters, regional, and field roles.

2. Procedures. Procedures stated in NWS Instruction 30-2101, System Maintenance Management, govern maintenance of ASOS. Maintenance reporting will be according to Maintenance Data Documentation, NWSI 30-2104, Engineering Management Reporting System. NWS field personnel maintain ASOS sites sponsored by both the NWS and the Federal Aviation Administration (FAA). There will be no distinction between NWS and FAA sites in carrying out the responsibilities described in this chapter.

3. Organization. Maintenance support of ASOS is provided within the existing NWS organizational structure. This chapter describes unusual support features.

3.1 ASOS Operations and Monitoring Center (AOMC). The AOMC is part of the Systems Operations Center. The AOMC specialists have duties and responsibilities in operating the AOMC. Day-working analysts augment and support the controller staff. The AOMC provides around-the-clock operational and maintenance support for ASOS. The foreground portion of the AOMC computer system helps in the monitoring and maintenance notification process. The background portion manages clock synchronization and site-specific data with no intervention normally required by the AOMC operator in supporting ASOS.

3.1.1 Maintenance Notification Functions. The Maintenance notification includes the following functions:

- a. Near real-time monitoring of ASOS system products
- b. Single point-of-contact for ASOS maintenance status
- c. Initiation of corrective maintenance action
- d. Remote maintenance diagnostic capability
- e. A trouble desk for tracking and documenting ASOS malfunctions.

The Acquisition Control Unit (ACU) of an ASOS site automatically generates the maintenance flag when a fault is detected or other maintenance is required. The maintenance flag alerts the AOMC that maintenance support is required. The AOMC observation monitoring process identifies ASOS sites whose hourly observations do not reach the NWS Telecommunication Gateway (NWSSTG) by a given time (currently H+15 minutes) and observations received with the maintenance flag appended. The NWSSTG computers compile these data into two files: one with surface meteorological reports (METAR) containing a maintenance flag, and the other containing sites that did not send a METAR by the search time. These files are available to the AOMC in near real-time and immediately after the search time, respectively. The AOMC initiates corrective maintenance action whenever:

- a. The NWSSTG does not receive a high priority site's METAR during the search time or a lower priority site's METAR is missing over two search times. (The number of consecutive missing observations is a user input parameter in the AOMC data base. The AOMC adjusts this parameter based on experience.); or
- b. A site sends its observation with a maintenance flag attached.

When an ASOS malfunction is reported via the toll-free trouble reporting telephone numbers, the AOMC opens a trouble report. The AOMC determines whether and what type of corrective action is needed. If requested, the AOMC will tell the individual reporting the problem when the repair is complete.

The AOMC tracks and documents all reported or detected ASOS malfunctions. When an ASOS site malfunctions, the AOMC investigates by remote dial access to the site. Under certain

conditions, the AOMC remotely clears low priority faults. Otherwise, the AOMC notifies the regionally-designated maintenance point-of-contact of the malfunction. The AOMC provides a projected restoration time based on established criteria (site class and type of failure). When the projected technician notifies the AOMC that the repair is complete, the AOMC closes the trouble report.

3.1.2 Site Data Base Support Functions. The AOMC manages ASOS site-specific parameter files. The parameter files consist of 11 data files required by each ASOS site to function. The AOMC also operates a software configuration management system capable of recreating a version of a site's master files upon request.

The uploading and downloading of an ASOS site's parameter files are automated as much as possible. If any change(s) occurs to any element of a site's 11 data files, the ASOS automatically dials the AOMC to upload the new configuration for storage in the AOMC's data base.

An ASOS site's software requests a time update every 60 days during normal operation. After a system reset/crash has occurred, a new time update is immediately requested. During the next 60 days several updates are obtained.

3.2 Regional ASOS Specialist. The Regional ASOS Specialist is a member of the regional Systems Integration Branch, reporting to the Electronics Program Manager. This specialist provides a regional focus for the program and aids field maintenance personnel.

3.3 ASOS Electronics Technician (ET). The ASOS ET is a member of a field office maintenance staff. Each WFO will have one or more technicians available for ASOS maintenance. These technicians have the prime responsibility for the ASOS located within their county warning area. ETs backup each other within an office when non-ASOS maintenance is being completed.

4. Responsibilities.

4.1 AOMC. The AOMC, upon learning of an ASOS outage or other condition requiring ET action, informs the maintenance point-of-contact. If possible, the AOMC determines the priority of restoration by airport class and failure type (see Appendix B).

4.2 Region. Each region develops and maintains a regional ASOS maintenance plan. This plan includes a listing of ETs, their stations, and their telephone numbers. Regions notify the AOMC promptly of any change in the points-of-contact for maintenance calls.

4.3 Field Office. A field office, upon learning of an ASOS outage, appropriately informs an available ET and follows the policies of NWSI 30-2101, Section 6 for concurrent outages.

4.4 Electronics Technician. The ET, upon learning of a need for ASOS maintenance, restores the system to operation according to the stated priority. The technician contacts the AOMC to close each repair action.

4.5 Ground-to-Air (GTA) Transmitter. NWS personnel maintain and support GTA transmitters for disseminating ASOS observations to in-flight aircraft. The ASOS contractor performs initial installation and test of the transmitters. About 460 sites nationally will receive transmitters, mostly at small airport expansion sites.

5. Documentation.

5.1 Maintenance Reporting. The field office responsible for ASOS accurately documents the time and nature of equipment failures in the Engineering Management Reporting System (EMRS) using WS Form A-26 (top portion), following the instructions in NWSI 30-2104, *Maintenance Documentation*.

5.2 Maintenance and Technical Documents. Maintenance of ASOS equipment will be accomplished following authorized guidance (e.g., technical manuals, modification notes, maintenance notes). Centralized web access to EHB-11 (i.e., maintenance procedures, technical documentation, modification and maintenance notes) is provided at:
<http://www.ops1.nws.noaa.gov/ehbs.htm>.

APPENDIX A - ASOS Maintenance Plan

The NWS maintains all NWS and FAA sponsored systems, but not Department of Defense (DOD) sites. The NWS provides depot repair services for all systems, including DODs.

Maintenance Approach. The NWS has integrated the ASOS maintenance workload into the general ET staff. The dedicated ASOS technicians have been absorbed into the WFO maintenance staff. Each WFO is outfitted with pagers or cellular telephones for rapid communication while on duty and several WFOs have vans to supplement travel requirements. Each WFO will house limited spare assemblies for onsite replacement. Other NWS technicians will have access to this equipment so they can also provide ASOS maintenance support. In Alaska, most ETs will be required to fly to remote sites to perform maintenance.

The NWS National Reconditioning Center (NRC) conducts all depot repair and quality control functions, including warranty tracking and vendor repair, as necessary.

The NWS Training Center (NWSTC) conducts necessary maintenance training for ETs.

The NWS logistics provides equipment, manuals, and any material necessary to support ASOS field and depot maintenance.

Failure notification is normally by the AOMC. The AOMC identifies problems by checking the messages (or lack thereof) from ASOSs on national communications circuits. They also monitor a 1-800 telephone for trouble reports from users. Upon identifying a problem, AOMC determines the priority of the trouble and calls the responsible maintenance point-of-contact. The point-of-contact dispatches the ET.

The ASOS has extensive self-test features and remote maintenance monitoring capabilities. ASOS ETs can dial into a remote ASOS, check its status, and perform various maintenance functions without disturbing operations. By using the remote capabilities of ASOS, the ET usually knows which field replaceable unit is malfunctioning before going to the site.

The ASOS requires quarterly preventive maintenance (PM). ETs conduct PM during repair visits whenever appropriate. ASOS sensors require minimal calibrations.

Area electronics supervisors, electronics technicians in charge, or regional maintenance specialists provide overall field quality control of maintenance.

Resources. A work force equivalent of 63 ETs (several may be contracted) maintain ASOS. All ETs provide maintenance support of the ASOS. Funds are provided for salaries, overtime, travel, transportation, supplies, and certain support equipment. A regional ASOS specialist is staffed in each regional headquarters. Additional positions and funds are provided for the NRC, NWSTC, AOMC, and other logistics and communications support functions.

APPENDIX B - Maximum Outage Times

The ASOS equipment will be restored to full operation within the times shown in the table below, at least 95 percent of the time.

Priority 1. These are safety-related failures. They involve the following sensors and components.

- Pressure
- Wind speed/direction
- Hygrothermometer
- Visibility
- Ceilometer
- Data collection package
- Acquisition control unit
- Freezing rain occurrence¹

Priority 2. These are failures affecting flight operations and forecasting. They involve the following sensors and components.

- Liquid precipitation accumulation
- Snow depth²
- Other forms of present weather
- Operator interface devices (OID)³
- Video display units
- Controller video displays (CVD)⁴

Priority 3. These are low priority failures. They involved the following sensors and components. This priority also applies when all priority 1 and 2 elements are reported correctly, but a maintenance flag is appended to an ASOS product.

- Snow depth² (when snow cannot occur)
- Sunshine switch²
- Printer

¹AOMC treats as priority 1. Station personnel may lower to priority 3 when freezing rain cannot occur.

²Sensor not yet fielded.

³If no OID is working, the failure is priority 1.

⁴If fewer than half of the available CVDs are working, the failure is priority 1.

Maximum Outage Times

TYPE AIRPORT	MAXIMUM FAILURE PRIORITY	OUTAGE TIMES
Service Level A,B, and C Airports Class II	1-Safety-Related	24 hours
	2-Flight Operation/Forecasting	36 hours
	3-Low	120 hours
Service Level D Airport Class I	1-Safety-Related	36 hours
	2-Flight Operation/Forecasting	48 hours
	3-Low	120 hours

An outage is considered to begin when the AOMC is made aware of a failure.

Special Considerations. If a delay is encountered due to the effects of weather, flight schedules (commercial or chartered), or space availability, and the delay could result in an equipment outage time exceeding that specified in the Maximum Outage Times table, the AOMC will be immediately notified. The maintenance activity report (e.g., EMRS) includes the time that equipment exceeded the maximum outage time, and the actions taken to minimize the delay.

Other Than ASOS. Systems designated as Other-Than-ASOS (OTA), which are AMOS and RAMOS replacements, will be maintained to the AMOS and RAMOS restoration requirements. OTAs at airports where an aviation service level is established will be maintained to the service level requirement listed in the Maximum Outage Times table.

APPENDIX C - ASOS Corrective Maintenance

