

National Weather Service Training Center

Automated Surface Observation System Maintenance Course

Course Name: Automated Surface Observing System Maintenance Training Course

Course #: S1003 – ASOS MAINTENANCE

Course Description: The ASOS Maintenance Training Course consists of 12 working days of intensive classroom and laboratory activities providing theory of operation for the Automated Surface Observation Systems of the Weather Service and practical experience performing preventative maintenance, alignments, calibrations, and corrective maintenance on three available ASOS Systems located in the classroom.

Target Audience: National Weather Service Electronics Technicians

Time (days): 12

Max Class Size: 10

1. **References:**

- a. National Weather Service Operations Division Web Site.
<https://www.ops1.nws.noaa.gov/index.htm>
 - i. National Weather Service ASOS Site Technical Manual S100
<https://www.ops1.nws.noaa.gov/Secure/asos/TOCindex.htm>
 - ii. National Weather Service Software User's Manual for the Automated Surface Observing System (ASOS), July 1998
https://www.ops1.nws.noaa.gov/Secure/asos/SW_Manual/SUM%20_60%20Manual.PDF
 - iii. Automated Surface Observing System National Weather Service Ready Reference Guide
https://www.ops1.nws.noaa.gov/Secure/asos/SW_Manual/ASOS%20Ready%20Ref%20Guide.pdf
 - iv. National Weather Service Automatic Observing Equipment Engineering Handbook 11: <https://www.ops1.nws.noaa.gov/Secure/ehbs/EHB11Files/ehb11toc.htm>
 - v. National Weather Service Instruction 30-2111, August 29, 2003 ASOS Maintenance, Automated Surface Observing System Maintenance.
<http://www.nws.noaa.gov/directives/sym/pd03021011curr.pdf>
 - vi. EHB-1: Instrumental Equipment Catalog, Automatic Weather Observing Equipment Alphanumeric Index
<https://www.ops1.nws.noaa.gov/Secure/ehbs/EHB1files/ehb1ssec.pdf>
 - vii. National Weather Service, Southern Region Headquarters Technical Attachments, SR SSD 2000-10, Automated Lightning Detection and Ranging System: An Introduction and Overview. 4/2000
<http://www.srh.noaa.gov/ssd/html/techattachnew.html>
 - viii. ASOS MODIFICATION NOTE 80, REVISION E Maintenance, Logistics and Acquisition Division W/OPS12: MJW/AL
https://www.ops1.nws.noaa.gov/Secure/asos/Mod_Notes/ASOSmodnote80E_S.pdf
 - i. National Weather Service Engineering Handbook 11, Section 2.6 ASOS MAINTENANCE NOTE 79 Operations Division W/OPS12: JD/GLD Getting Solar Noon Data.
https://www.ops1.nws.noaa.gov/Secure/asos/Maint_Notes/ASOSMaintNote79SolarNoonsigned.pdf

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- ii. National Weather Service ENGINEERING HANDBOOK 11 VOLUME 2
SECTION 3.6 ASOS MAINTENANCE NOTE 42 (for Electronics Technicians)
Engineering Division, W/OSO321:WW Interface connection for the Automatic
Terminal Information Service (ATIS) and the Automated Surface Observing
System (ASOS) at unstaffed and part-time Air Traffic Control Towers (ATCT).
8/5/98 https://www.ops1.nws.noaa.gov/Secure/asos/Maint_Notes/Asosmn42.PDF
- i. National Weather Service ENGINEERING HANDBOOK 11 VOLUME 2
SECTION 2.6 Maintenance Note 45 (for Electronics Technicians) Engineering
Division W/OSO321:WW Thumb Screws for the Light Emitting Diode Weather
Identifier (LEDWI) Calibration Tube 10/22/98
https://www.ops1.nws.noaa.gov/Secure/asos/Maint_Notes/Asosmn45.PDF
- ii. Locally developed National Weather Service Training Center Training
Aides. For Training Use Only.
 - a. AWIPS Network.
 - b. Pictures of Fiber Optic Modems, old vs new.
 - c. National Weather Service Student Guide.
 - d. Power Point Presentations:
 - i. Welcome to the National Weather Service Training Center
 - ii. ASOS Safety
 - iii. 1 Chapter 1
 - iv. 2-1 Chapter 2 Section 1
 - v. 2-1 Chapter 2 Section 1 new
 - vi. 2-2 Chapter 2 Section IV
 - vii. 2-3 Chapter 2 Section V
 - viii. 3-1 Chapter 3 Section I
 - ix. 3-2 Chapter 3 Section IV
 - x. 3-2 Chapter 3 Section IV
 - xi. 3-3 Chapter 3 Section IV
 - xii. 3-4 Chap 3.1 pressure
 - xiii. 4-1 Chap 4.1 IFW
 - xiv. 6 Chap 06 Visibility
 - xv. 7 Chap 07 LEDWI
 - xvi. 7.1 Chap 07.1 CL31
 - xvii. 7.2 Chap 07.2 Ceilometer
 - xviii. 8.1 Chap 8.1 DTS1
 - xix. 8.2 Chap 8.2 Temp-Dew
 - xx. 9.1 Chap 9.1 AWPAG

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Suggested Review: Located on the NWSTC ASOS COURSE DESCRIPTION page
<http://www.nwstc.noaa.gov/cgi/course.cgi?course=s1003>

ASOS Web Training : [ACU-DCP](#), [LBC](#), [WINDS](#), [Temp-Dew](#), [DTS1 Dewpoint Sensor](#), [VIS](#), [LEDWI](#)

ASOS video - An Introduction to ASOS (METAR Update) {This video may already be at the station, check with your MIC. Otherwise it can be ordered free of charge from NLSC:

- ASN = XASO-4
- NSN = NWS9-61-340-0006

Method/Media of Instruction: Lecture, Discussion, Demonstration, Laboratory Exercises and system trouble shooting.

Course Objectives: To provide NWS Electronic Technicians with the knowledge and skills necessary to calibrate, perform preventive maintenance, and perform corrective maintenance on the ASOS system including all sensors. Corrective maintenance will be taught to the Field Replacement Unit (FRU) level consistent with the current ASOS maintenance philosophy. Students will understand both the diagnostic and operational levels of ASOS communications software. Students will leave the course with an understanding of the overall concept of the ASOS system.

Learning Outcomes: Upon completion of the course, the student will be able to:

- Monitor and evaluate the ASOS system configuration and status using remote maintenance/status monitoring equipment
- Initialize, and configure the ASOS system in all operational and maintenance modes
- Perform preventive and corrective maintenance on the ASOS system
- Perform a processor software load and backup local configuration data to the AOMC.
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Student Materials: All student materials are provided

Evaluation Criteria: Student progress is monitored using the following items.

- Written Multiple Choice Examination covering System Introduction, Operation, and theory of operation and maintenance for ACU and DCP.
- Written Multiple Choice Examinations covering Sensor and Peripheral theory of operation, maintenance, and system troubleshooting.
- Laboratory manual completion used to guide students through operation, maintenance, verification, and alignment of system components.

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Safety Instructions/Issues: Operating and maintenance personnel must at all times observe all safety regulations as set forth in the NWS Engineering Handbook.

At airport ASOS sites proper airport and runway driving and security practices must be observed.

Special Instructions: Two instructors should be present for Laboratory Exercises.

Course Modules

Lecture	Module #1	Course and Training Center Introduction
Lecture	Module #2	Introduction to ASOS
Lecture	Module #3	System Operation
Lecture	Module #4	Acquisition Control Unit
Lecture	Module #5	Data Collection Package
Lab	Module #6	Lab exercise on Operation, ACU, and DCP
Exam/Critique	Module #7	Review and Examination for Introduction, Operation, ACU, and DCP
Lecture	Module #8	Wind Sensors
Lecture	Module #9	Temperature Dew Point Sensors
Lab	Module #10	Lab exercise on Wind and Temp/ Dew point Sensors
Lecture	Module #11	Visibility Sensor
Lecture	Module #12	Present Weather/LED Weather Identifier (LEDWI) sensor
Lab	Module #13	Lab exercise on Visibility and Present Weather Sensors
Lecture	Module #14	Precipitation Gauges
Lecture	Module #15	Freezing Rain Sensor
Lecture	Module#16	Pressure Sensors
Lab	Module#17	Lab exercise on Precipitation Gauges, Freezing Rain Sensor, and Pressure Sensors
Lecture	Module#18	Ceilometer - Cloud Height Sensor
Lecture	Module#19	Ground to Air Radio
Lecture	Module#20	Codex MODEM for FAA ADAS System and FAA FTI
Lab	Module#21	Lab exercise on Ceilometer, Codex MODEM, and GTA
Lecture	Module#22	Single Cabinet ASOS System
Lab	Module#23	Troubleshooting
Exam/Critique	Module#24	and Examination For ASOS Sensor Theory
Exam/Critique	Module#25	Graduation

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Course Policies:

Attendance, lateness -- Students who arrive late disturb the class. We at the Training Center ask that during your attendance here you take into consideration your fellow employees. Remember that you are in a duty status and accountable to your supervisor.

Class participation – Class participation enhances the learning environment. Many of the students have field experience, and that experience can make learning even more applicable. We encourage you to participate in class and lab discussions, sharing your ideas and experiences.

Missed exams – If during the course you are not able to take the exams during the scheduled time you will need to provide documentation stating as to why and your supervisor will need to be informed. If a personal emergency arises you will need to take care of that first, including your supervisor in the process. Then let the training center know if and or when you will be returning to class. We can then assess whether you need to reschedule and retake the course.

Lab safety – Lab safety will be briefed during the course and reiterated throughout. Safety violations cannot be tolerated. This is due to the nature of the system and the work, more often than not a safety violation effects and places in danger all employees, not just the violator. The student should always ask if in doubt when it comes to safety.

Academic dishonesty – The course exams are to be taken by the individual. The only assistance during the exam comes from the open book, the equipment or clarification from the instructor. If an individual is found being dishonest during an examination they will be removed from the class. The individual's supervisor will be notified and the supervisor and the management staff of the Training Center will develop a recourse for the situation.

Grading – All written tests are multiple choice. There are usually 4 answers to choose from. These answers usually consist of two answers that are completely incorrect, one answer that is closer to the correct (sometimes called a distracter), and one correct answer. The correct answer is validated during the exam critique with the manual, course material or lab procedure.

Available Support Services. The administrative staff of the Training Center is available to assist students on subjects that include but are not limited to; lodging, travel, local information, local doctors and dentists. These staff members are identified during the course introduction.