

Automated Weather Stations (AWS)

Portable or Fixed Compact Weather Stations

Mesotech designs, manufactures, and installs industrial grade Automated Weather Stations for use in meteorological, hydrological, and environmental monitoring worldwide. Our weather stations are scalable and can be configured to meet your needs.

Mesotech's weather stations are known for their reliability, data measurement precision, durability, and their ability to operate in extreme temperature conditions. Our systems are installed worldwide in locations ranging from the sub-zero conditions of the arctic to the hot and arid conditions of the Sahara.

Our stations are highly configurable and expandable:

- Based on our popular MicroDCP datalogger.
- Can measure most commercially available sensors.
- Output message options include phone, cellphone, voice-synthesized phone, satellite, and radio.
- Our stations have been proven in harsh environments.
- Long-term remote operation using batteries and solar panels.
- Expand your station to include more sensors or new sites.
- Expand your data analysis and reporting as needed.

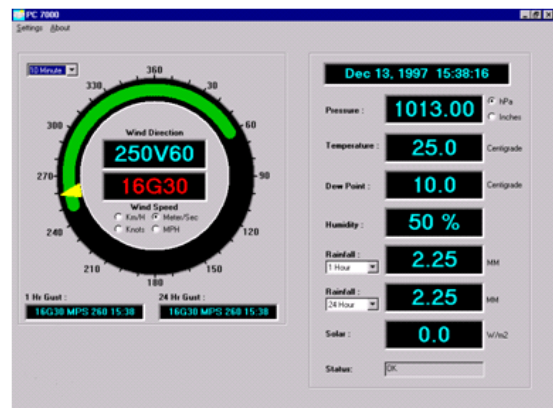
The AWS Architecture

Mesotech's Automated Weather Stations (AWS) combine our powerful, yet versatile *MicroDCP* data acquisition unit with our leading edge *Weather Advisor* software. Using these two core components, we can design for you the perfect remote, portable, or fixed weather station with automated reporting.

Our *MicroDCP* is a compact, affordable data acquisition and control device ideally suited for collecting meteorological and hydrological data. It is a versatile processor that can be used in systems ranging in size from portable stations to national networks. The *MicroDCP* has Plug & Measure™ capability for a large variety of sensors. It is a complete package with sensor interfaces, data processing and logging, communications interfaces, rugged weatherproof housing, and software for display, analysis, and reporting.



The *Weather Advisor* is an easy to use program for weather observation and reporting. The software runs on Windows XP and 2000 computers, and is designed to work with Mesotech's advanced sensors and data acquisition platforms. The program gathers data from one or more field stations and presents the data in a graphical format on the computer's monitor. Data can be logged to the computer's hard drive for analysis at a later time. The *Weather Advisor* automatically constructs standard reports, such as SYNOP and other local formats, which can be edited and approved by you before transmission, logging, or printing.



Data Acquisition and Logging using the MicroDCP

The *MicroDCP* connects directly to analog and digital sensors without the need for external interface components or special programming. Sensor data are sampled and logged at intervals selected by the user. The non-volatile data memory can store 64,000 data values, or up to 500,000 values with the expanded memory options. Wind data are calculated in vector and scalar forms. The internal microprocessor determines weather parameters, generates standard reports, handles local and network communications, and performs self-diagnostic tests.



In a network configuration or as a remote processor, the *MicroDCP* can transmit data to a host computer by several means using its RS-232 and RS-485 serial ports. These include the internal 14.4 Kbps telephone modem, multi-drop wire-line modem, radio or microwave telemetry, and satellite transmitter. The unit is equipped with an external weather-proof connector for off-loading data or viewing real-time data for maintenance activities.

The *MicroDCP* is designed for low current draw from unregulated power sources. It can be powered by a battery, solar or AC generator, or AC/DC power supply. With a 12 VDC supply, the standby current drain is less than 0.5 mA and the active mode drain is less than 55 mA.

The *MicroDCP* is a completely self-contained data collector and processor for automatic stations. It is designed for exposed and severe outdoor weather conditions. All components are contained in a rugged weatherproof aluminum enclosure with sealed cable glands or circular MIL connectors. All exposed surfaces are treated to prevent

corrosion. Internal circuit boards have surface mounted components for improved reliability and are conformal coated to resist damage from moisture. Three-stages of lightning and transient protection are included on all signal and power connections.



Analyzing and Reporting Weather Measurements

You can modify the *Weather Advisor's* operation and presentation. Choices can be made concerning the sensors or stations to be monitored, the units of measure (metric or US customary), data averaging periods, logging intervals, etc. The standard version of the program displays wind speed and direction, wind gusts and variations, barometric pressure, ambient air temperature, dew point temperature, relative humidity, rain fall rate, and solar intensity. Hydrology sensors and other parameters can be added as options.

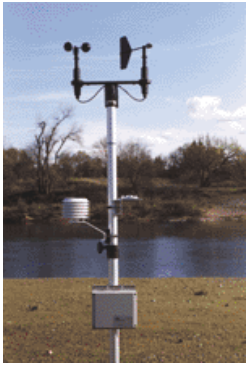
The software works with Mesotech's *MicroDCP* data acquisition platforms to provide you with a fully integrated hardware and software system that is easy to set up and use.

Users find the *Weather Advisor's* graphical interface and network management extremely easy to use and interpret. On-line help provides step-by-step instructions for all functions. You will comfortably operate the program with minimum training and confusion. Data presentation, reporting, and analysis can be accessed with a single mouse click. You don't need to select and resize windows to display the information.

The *MicroDCP* directly connects to the sensors listed below:

| | |
|------------------------|-------------------------------------|
| Wind direction vanes | Cup & propeller anemometers |
| Digital wind sensors | Air, soil, & water temperature |
| Relative humidity | Analog & digital pressure sensors |
| Soil moisture | Tipping & weighing rain gauges |
| Precipitation detector | Pyranometers and radiometers |
| Evaporation sensors | Water level |
| Cloud ceilometers | Visibility and visual range sensors |
| Lightning detector | Ambient light & luminance |
| Voltage sensors | Current sensors |
| SDI-12 devices | Platinum RTD and thermistors |

The screenshot displays several windows from the Weather Advisor software. The top window shows settings for 'Section 1 (page 1)', including 'Precipitation Ind.' (1 - Section 1), 'Auto Ind.' (3 - Manned, No obs.), 'Cloud Base' (2 - 100 - 200), and 'Min. Visibility' (1450). Below this are fields for 'Total Cloud Cover', 'Wind Dir.', and 'Wind Speed'. A second window shows 'Pressure at Station' (1080), 'Sea Level Pressure' (1040), 'Tendency Ind.' (0), and 'Tendency' (0). A third window shows 'Precipitation' (0.3), 'Duration' (5 - 1 hour), 'Present Weather' (0), and 'Past Weather' (0). A fourth window shows '12 Hr. Max. Temp. Ind.' (0 - Pos. or 0) and '12 Hr. Max. Temp.' (55.93). A fifth window shows '12 Hr. Min. Temp. Ind.' (0 - Pos. or 0) and '12 Hr. Min. Temp.' (0 - Pos. or 0). A sixth window shows cloud layer settings for 'Cloud Layer 1' through 'Cloud Layer 4', with 'Amount' (0-0) and 'Type' (/- Not Visible) for each. A final window shows 'Wind Gust Info' with 'Dir.' (0), 'Speed' (0), and 'Max Temp.' (0), and 'Precip info' for 'Today' (0) and '24Hr.' (3.4), with a 'Min Temp.' (0) and a total precipitation value of 555.24003.



The *Weather Advisor* software is capable of connecting to an unlimited number of MicroDCP data acquisition stations. It supports all the MicroDCP's communication options, including high-speed wire lines, fiber cable, telephone modems, and RF telemetry. The collected data and observation reports can be distributed to other computers on a local area network (LAN). The *Weather Advisor* can be run while other programs are active on your computer.

The network server edition of the *Weather Advisor* provides you with the capability to manage a wide area network of workstations and data collection stations. The *Weather Advisor* base station software will automatically retrieve data and reports from remote *Weather Advisor* workstations via telephone modem or RF telemetry. This server edition supports Remote Access Service (RAS) to assist you in maintaining the remote workstations and their local networks. RAS essentially maps the remote workstation as a local file system, allowing you to pass files between LAN's, send email and reports, or upgrade software.

The *Weather Advisor* supports configurations with NT servers and network clustering, hot-standby computers, RAID disk subsystems, and multi-processor architectures. This capability provides a level of performance and redundancy that can meet your strictest requirements for performance, distribution, and reliability. All communications standards are supported, including Ethernet, TCP/IP protocol, redundant high-speed serial links, and Remote Access Service.

The *Weather Advisor* software allows you to fully edit the SYNOP report and other WMO reports, as well as your local reports. Data are automatically installed in a report template, and you can change the parameters or augment the report as conditions require. The digital voice subsystem provides text-

to-speech conversion of the reports using pre-recorded human voices. The report editing capability and voice subsystem are optional modules. The reports and collected data are stored to the computer's hard disk in the standard ODBC database format or CSV spreadsheet format common to Windows data analysis applications. This means you can use your favorite analysis program on the stored files to make your reports.

Wide Range of Applications

Our automated weather stations can be used in a wide range of applications. They are scalable, flexible, expandable, and customizable. Our automated weather stations are being used all over the world and in all types of conditions.

The following are just some of the applications we have done:

Commercial:

- Weather conditions at ski resorts
- Early flood warning systems with sirens
- Weather forecasting at offshore facilities
- Power usage forecasting for power companies
- Monitoring roadway conditions
- SCADA systems at petroleum plants
- Agricultural conditions for a variety of crops
- Wind monitoring for wind turbine generator parks

Military/Government:

- Vehicle mounted weather stations
- Airfield weather monitoring
- Tactical weather observing with GPS
- Synoptic stations with GMS satellite communications for cyclone warning system
- As components of our Airport Weather Advisor installations

Research:

- Agricultural research
- Astronomy research

