Automated Surface Observing System (ASOS)

The Automated Surface Observing System (ASOS) is designed to support aviation operations and weather forecasting activities and, at the same time, support the general needs of the hydrometeorological, climatological and meteorological research communities. ASOS provides continuous minute-by-minute observations, performing the basic observing functions necessary to generate a surface aviation observation, at hundreds of locations (some in remote areas). ASOS, by itself, has never been advertised as a total replacement for the manual observation.

While the automated system and the human observer may differ in their methods of sampling and processing the various weather elements, both produce an observation quite similar in form and content. In some cases, the differences are subtle (pressure, wind, precipitation accumulation, ambient and dew point temperatures), in others (sky condition, visibility and present weather), however, the differences need to be fully understood for optimum utilization of the information provided by ASOS. By integrating ASOS data with Doppler Weather Surveillance Radar (WSR-88D), satellite, and lightning detection networks, meteorologist can now obtain a more accurate and complete depiction of the weather than what can be obtained from a single source.

The table below summarizes the strengths and weaknesses of the human and ASOS observations.

ASOS	Human
Fixed location (time-averaged)	Fixed time (spatial-averaged)
Observations represent 2-3 miles of sensor site	Observations represent horizon-to-horizon
Sensor site may be affected by surrounding land features	Buildings or land features may block 360° view
Continuous - Providing 1-min, 5-min, hourly and special observations	Time constraints - Only create hourly and special observations
Consistent	Affected by lights, buildings and human perception
Standard set of remarks	Inconsistent remarks
Report everything detected by sensors	Intelligence filter

Alan Johnson showing the LBF ASOS site to National Weather Service MITs from North Platte and Hastings. (left to right): Christina Harman, Alan Johnson, David Lawrence, and Heather Stanley.

Heated Tipping Bucket Precipitation Gauge

Anemometer (Wind Speed and Direction)

Hygrothermometer (Ambient and Dew Point Temperature)

Freezing Rain Sensor

Light Emitting Diode Weather Identifier (Precipitation Identification Sensor)

Laser Beam Ceilometer (Cloud Height Indicator)

Data Collection Package

Forward Scatter Visibility Sensor