CASE STUDY

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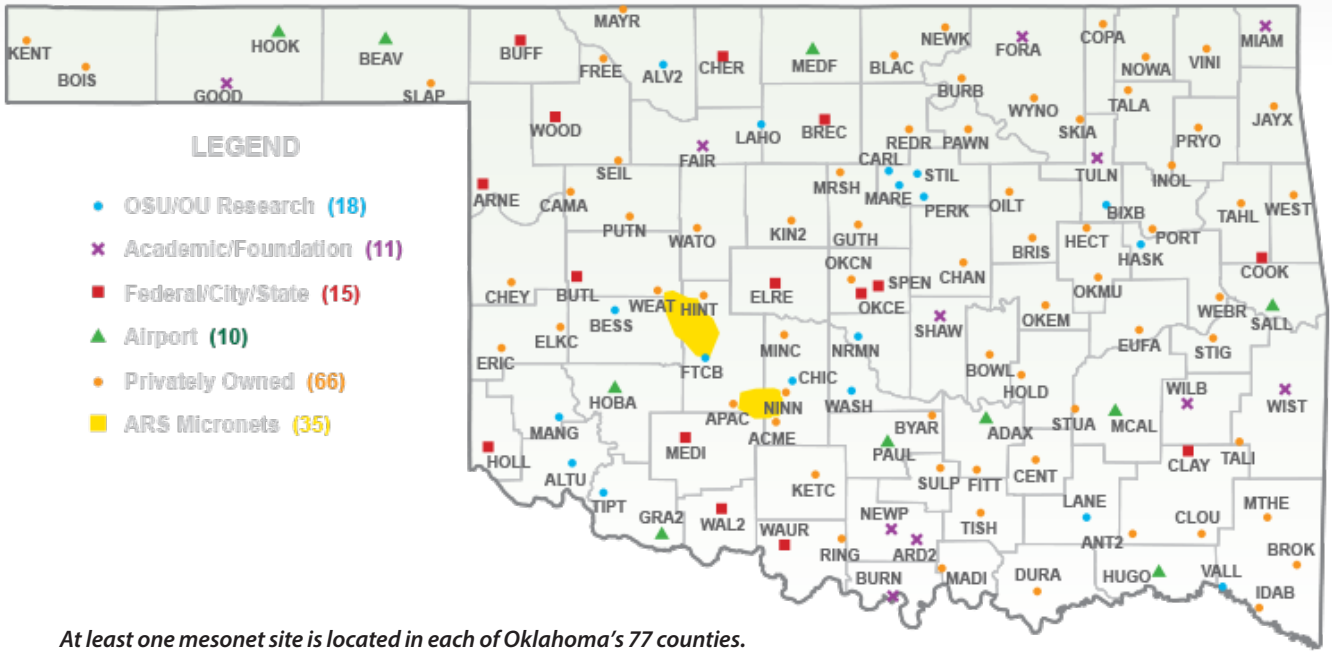
WHEN MEASUREMENTS MATTER

Oklahoma's Statewide Mesonet

Campbell gear helps make timely, useful weather information available to citizens of Oklahoma



At least one mesonet site is located in each of Oklahoma's 77 counties. The map above shows distribution of the automated weather stations.

The Oklahoma Mesonet is a statewide environmental monitoring network developed through the cooperative efforts of Oklahoma State University and the University of Oklahoma. The mesonet is a bold, ambitious project to make timely and useful weather information available to the citizens of Oklahoma.

The mesonet consists of 121 CR6-based automated weather stations that continuously measure an array of weather and soil instruments. An additional 35 mesonet-like stations in dense micronets over the Fort Cobb and Little Washita watersheds are funded by the Agricultural Research Service. Each CR6 stores five-minute data summaries and is polled every 5 minutes. Data are relayed from each remote station to a central processing site. This rapid and reliable data transfer is accomplished using a combination of radiotelemetry (RF500M modems), the Oklahoma Law Enforcement Telecommunications System (OLETS—an agency of the Oklahoma Department of Public Safety), and Campbell Scientific's LoggerNet Datalogger Support Software package.

The central processing site, or base station, is located in the Oklahoma Climatological Survey (OCS) at the National Weather Center in Norman, Oklahoma. The central processing site consists of four instances of LoggerNet Linux for data collection and handling.

The LoggerNet network communication software package provides the operational features associated with two-way communication. This minimizes transmissions required from the

Case Study Summary

Application:
Agricultural and meteorological network

Location:
Oklahoma, USA

Sponsoring Organization:
Oklahoma State University
University of Oklahoma
Oklahoma Climatological Survey

Contributors:
Dr. Ken Crawford, Gary Grimsley, Oklahoma Climatological Survey

Products Used:
CR6-WIFI, CDM-A116, LoggerNet, LoggerNet Linux, RF500M

Communication Links:
RF telemetry, Ethernet

Measured Parameters:
Air and soil temperature, relative humidity, wind speed & direction, barometric pressure, solar radiation, rainfall, soil moisture

central site and allows for real-time communication link status.

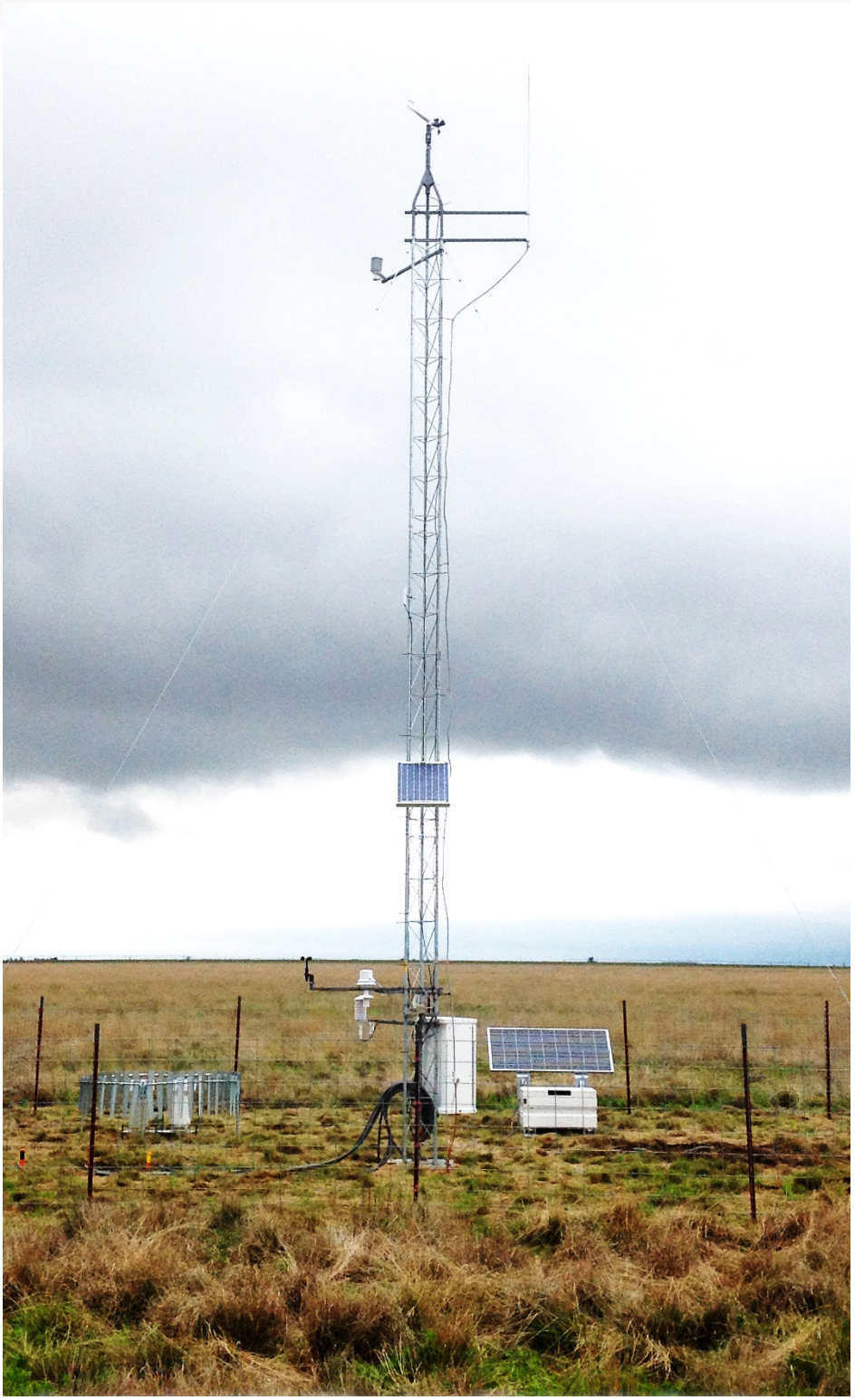
Remote operations executable from the central site include:

- Setting the weather station clock
- Downloading weather station programs
- Retrieving stored data following periods of communication failure
- Conditional selecting of alternate reporting intervals or output variables (This feature is especially useful for the mesonet, which collects one-minute observations during tornadic events.)
- Real-time monitoring of instantaneous measurements

The LoggerNet computers collect data from the OLETS high-speed data link, check for any missing reporting stations, and then send the data to an on-line database system over a TCP/IP link. The database checks the data quality, manages data storage, and assists in disseminating the observations and certain value-added products to a statewide community of users—all within minutes of each observation time.

Data is distributed by the OCS via the Oklahoma mesonet website. (www.mesonet.org)

A 2009 National Research Council report* named the Oklahoma Mesonet as the "gold standard" for statewide weather and climate networks. The mesonet is unique in its capability to measure a large variety of environmental conditions at so many sites across an area as large as Oklahoma. In addition, these conditions are relayed to a wide variety of customers very quickly after the observations are taken.



A mesonet station at Eufaula, Oklahoma, is one of 121 automated weather stations that continuously measure environmental conditions.

* National Research Council, "Observing Weather and Climate from the Ground up: A Nationwide Network of Networks," Washington, D.C., 2009