CentNet

CentNet is EOL’s response to the observational research community’s need for a large number of high-quality, near-surface observations distributed over a large spatial area. CentNet is capable of taking measurements at up to 100 locations and collecting thousands of measurement streams. Wireless communications, digitally integrated sensors, solar power, and internet software tools are used to enable deployments at this scale. After careful evaluation, a combination of commercial and newly-developed sensors have been chosen to create a suite of instruments that will meet this unprecedented and important requirement of the user community. Data communications, power, and mechanical infrastructure have all been designed and tested. CentNet leverages existing EOL software tools for data acquisition, quality-control, and display.
FEATURES
CentNet allows measurements at an unprecedented range of spatial scales, while retaining key features of the current Integrated Surface Flux System, including:

» Direct measurement of turbulence that needs few assumptions
» State-of-the-art measurement quality
» Site flexibility to meet research requirements
» Permanent storage of every data sample

CentNet will also expand existing capabilities by featuring CO₂ and visible and infrared radiation measurements at every location.

Sensors & Measurements

» Turbulence and atmosphere/surface exchange fluxes: 3-D sonic anemometers
» Water vapor/carbon dioxide fluxes: open-path infrared-absorption sensors
» Wind: 2-D sonic anemometers to resolve winds under 0.10 m/s and operate in freezing conditions
» Temperature/humidity: NCAR/EOL aspirated sensor
» Pressure: resolution to measure turbulent fluctuations
» Precipitation: liquid and frozen
» Radiation: incoming/outgoing visible and infrared
» Soil: temperature profile, heat flux, and thermal properties
» Leaf wetness: detection of moisture from dew or precipitation
» Video camera: documentation of changes in surface characteristics

Applications

» Climate research: mapping of air-ecosystem exchange of CO₂ and water; measurement of radiation absorption by leaves
» Meteorology: contributing to numerical model parameterizations, especially treatment of surface exchange and turbulence
» Urban meteorology: determination of dispersal of pollutants, including variation with time and location
» Wind energy: study of site wind energy potential, turbulence loading on blades, effect of wake on agriculture
» Agriculture: measurement of crop productivity, water use
» Hydrology: documentation of patterns of rain and snowfall and how water evaporates into the atmosphere and moistens the ground

Contact
CentNet Lead Scientist
Dr. Steven Oncley
oncley@ucar.edu
303.497.8757