

ARM Climate Research Facility Activities at Pacific Northwest National Laboratory

Through the Atmospheric Radiation Measurement (ARM) Program, the U.S. Department of Energy has funded the development of several highly instrumented ground stations, a mobile facility, and an aerial vehicles program for studying cloud formation processes and their influence on climate change. This scientific infrastructure and the resultant data archive comprise a national user facility known as the ARM Climate Research Facility (ACRF). The ACRF is a valuable national and international asset for climate change research that contributes to a wide range of interdisciplinary science areas including hydrology, ecology, and weather forecasting.

The Pacific Northwest National Laboratory (PNNL) is one of nine national laboratories that work together in support of the ACRF. PNNL scientists are internationally recognized as leaders in assessing climate change, its impacts, and mitigation strategies.

For the ACRF, PNNL's primary responsibilities include:

- » leading the ACRF Technical Director's office
- » leading the ARM Aerial Facility
- » mentoring users on specific instruments
- » hosting the ACRF Data Management Facility.



PNNL leads the ARM Aerial Facility, which coordinates the use of scientific aircraft for global field studies to augment measurements from ACRF surface sites.

ACRF Infrastructure Management Board

- ▶ **Engineering**
Pacific Northwest National Laboratory
- ▶ **Archive**
Oak Ridge National Laboratory
- ▶ **Operations**
Argonne National Laboratory
- ▶ **Aerial Facility**
Pacific Northwest National Laboratory

The **ACRF Technical Director** is the primary point of contact for the ACRF and chairs the Infrastructure Management Board, which is responsible for the ACRF budget and for assessing the needs and status of the facility. The Technical Director's office also includes coordination of field campaigns and public outreach, the Data Quality Office, webpage content management, instrument and software engineering, and overall program budget integration.

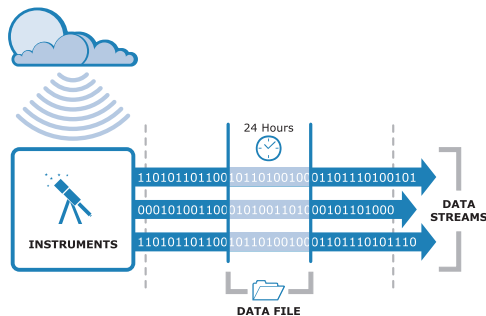
The **Field Campaign Coordinator** acts as a link between the Infrastructure Management Board and the ACRF Science Board to facilitate the selection of field campaigns at ACRF sites.

The **ACRF Communications Team** at PNNL manages the ARM website (www.arm.gov), the primary means of communicating news about the facility to both internal and external audiences. This team also develops a variety of public information materials and provides writing and editing services for program documents.

The **Aerial Facility Technical Director** oversees the logistics, instrument integration, contracting, budget, and outreach activities associated with the use of scientific aircraft for ACRF

field campaigns. Working closely with the Aerial Facility mission scientists, the Aerial Facility office coordinates complex airborne missions around the world to augment measurements obtained at the ACRF surface sites.

Engineering for instruments and software is critical for the ACRF, both for new applications and to keep the existing systems current. Important outcomes are optimizing instrument performance, improving access to data, and maintaining security of data networks.



The **ACRF Data Management Facility** at PNNL receives data from the ACRF sites around the globe—from Barrow on the northern coast of Alaska to Papua New Guinea in the Tropical Western Pacific. Transmitted 24/7 by satellite, these data are packaged into standard data formats, checked for transmission errors, further processed to higher-level data products, and transmitted to the ACRF Data Archive.

The **Data Quality Office** is managed by the ACRF Technical Director but is operated by staff and students at the University of Oklahoma. They inspect ACRF data daily and coordinate data quality descriptions for the ACRF user community.

Instrument Mentors are responsible for the oversight of specific instruments that are part of the measurement suite at all the ACRF sites. The mentors work with the Data Quality Office, ACRF engineering staff, and other program sectors where expertise on

their instrument is required. Mentors for a number of ACRF instruments, including the cloud radar, Raman lidar, and total sky imager, are located at PNNL.



PNNL provides mentoring to users on specific instruments, such as this sky imager, at the ACRF sites.

▶ ABOUT PNNL

Pacific Northwest National Laboratory, a U.S. Department of Energy Office of Science laboratory, solves complex problems in energy, the environment, and national security by advancing the understanding of science. PNNL employs more than 4,000 staff, has an annual business volume of more than \$850 million, and has been managed by Ohio-based Battelle since the Lab's inception in 1965.

For more information about the ACRF, contact:

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www.pnl.gov/atmospheric/programs/arm.stm



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