

June 2000

ARM Facilities Newsletter

ANL/ER/NL-00-06



ARM Participation in SuomiNet

The ARM SGP Program recently joined a national research project named SuomiNet, named after famed weather satellite pioneer Verner Suomi (pronounced "sue me"). The project involves universities and research institutions in the continental U. S., plus a few sites representing arctic, island, tropical, and ocean climates. The more than 100 registered SuomiNet sites include 15 SGP extended facility locations. The project is scheduled to last five years, and the first installations of equipment at the SGP sites could occur by early fall 2000.

SuomiNet is designed to be a university-based, real-time, national global positioning system (GPS) network for atmospheric research and education. The use of GPS to

measure atmospheric moisture was discussed in the February 1999 issue of this newsletter. The 24 GPS satellites that orbit Earth continuously transmit 1.6- and 1.2-GHz signals. Ground-based receivers detect these signals and derive atmospheric moisture content on the basis of the delay in the signals received. GPS technology has many applications beyond meteorology. In addition to its location detection capabilities used for navigation, GPS can make ground radiation measurements for comparison with satellite data. Other GPS applications include atmospheric chemistry, astronomy, ionospheric signatures of geophysical



ARM Facilities Newsletter is published by Argonne National Laboratory, a multiprogram laboratory operated by The University of Chicago under contract W-31-109-Eng-38 with the U.S. Department of Energy.

Technical Contact: Douglas L. Sisterson

Editor: Donna J. Holdridge

events, regional climatology, coastal meteorology, and hydrology.

Each SGP extended facility site used for the project will have a GPS receiving station installed. Computers and data communication equipment will provide a means for data distribution and management. The GPS receivers can be controlled and coordinated remotely via the Internet. This feature will allow scientists to selectively sample atmospheric events like boundary layer turbulence, ionospheric effects associated with meteor showers, or upper stratospheric geomagnetic storms including sprites, jets, and elves.

SuomiNet data from all participating sites will be available in real time (as the data are collected), providing thousands of accurate upper- and lower-atmospheric measurements worldwide each day. Such data are relevant to ongoing research projects like the U. S. Weather Research Program, the Global Energy and Water Cycle Experiment, and the National Space Weather Program. The data will be used to help advance research in the areas of mesoscale modeling and data assimilation, severe weather forecasting, precipitation, cloud dynamics, regional climate modeling, and hydrology, which are all essential to the goals of the ARM Program.

SuomiNet will also benefit education directly by putting state-of-the-art GPS equipment, data, and processing methods in the hands of university students and faculty. Students will be

able to gain insights into fundamental elements of GPS and its capabilities and limitations, as well as improved experimental design and methods, data analysis, and mathematical modeling techniques. SuomiNet is moving science forward by combining a vast network of accurate, real-time data with the delivery capabilities of the Internet. The combination provides a unique, innovative means of furthering education and research. The ARM Program is pleased to be a part of this resourceful and beneficial project.



Figure 1. GPS antenna installed at Platville, Colorado.