

Material for Cliff's Presentation to Member's Representatives

July 1978

I. MISSION AND GOALS OF THE FOF

The mission of the Field Observing Facility is to provide surface-based measurements for the atmospheric sciences in support of experimental meteorological programs throughout the United States and occasionally around the world. In meeting its mission requirements, FOF engages in the following major activities.

(1) Operation of advanced remote- and immersion-sensing systems to support the research of atmospheric scientists in universities and NCAR.

(2) Development of new measurement systems, in cooperation with the Research Systems Facility, to meet the needs of atmospheric science.

(3) Development of operational and analytical techniques for optimum use of its facilities, and transfer of these techniques to the atmospheric sciences community. These techniques include instrument deployment, data collection methodologies, software development for data processing and methods for displaying data.

Although FOF's charter is broad, our emphasis in recent years has been directed at support to mesoscale and boundary-layer meteorology in accordance with the growing national scientific interests in convective storms, winter cyclonic storms, boundary layer processes, and air pollution as it is coupled to boundary layer turbulence, transport, and diffusion.

II. FOF CAPABILITIES

A. Two 5 cm Doppler Radars

1. Uses - For measurements of winds, turbulence, and precipitation structure in convective storms, stratiform rain and snow. Also may be used to measure air motion in chaff clouds and occasionally in clear air under favorable conditions.

2. Features

- Digital Processors
- Real-Time Color Display
- Computer Compatible Magnetic Tape Recording
- Replay and Display
- Software for Processing Data

B. Portable Automated Mesonetwork

1. Uses - For surface measurements of winds, temperature, humidity, pressure, rainfall rate and other variables.

2. Features

- 30 microprocessor controlled, battery powered remote data gathering stations.
- Telemetry of data to central base station
- 50-80km range from base station (terrain dependent)
- Radio repeater
- Real-time displays
- 22 hours storage on disc
- Permanent storage on computer compatible tape
- Replay and display
- Software for processing data

C. Lidar

1. Uses - For studies of tropospheric and stratospheric aerosol loading and rates of decay.

2. Features

- 5 Joule ruby laser
- 50 ns pulse
- Digital recording
- Software for processing data

D. Two Boundary Profile Systems

1. Uses - For measuring profiles of temperature, humidity, and winds in the boundary layer up to 700 m.
2. Features
 - Tethered balloon
 - Telemetered data transmission
 - Cassette tape recording
 - Software for processing data

E. Four Rawinsonde Systems, 2 GMD's, 2 Weathermeasures

1. Uses - For measuring profiles of winds, temperature and humidity in the troposphere and lower stratosphere.
2. Features
 - Automatic tracking

F. Mechanical Chart Recording Weather Stations

1. Uses - For surface measurements of winds, temperature, humidity, pressure.
2. Features
 - Paper chart records

G. Wind Tunnel

1. Uses - For calibration and testing of anemometers
2. Features
 - Speed control to 28 m/s
 - Some wind function control - square waves and ramps

H. Environmental Chamber

1. Uses - For calibration and testing of instruments
2. Features
 - Computer control of temperature, pressure and humidity
 - Computer printouts of chamber parameters

All FOF facilities, except the wind tunnel and chamber, are transportable for use anywhere in the country.

III. FIELD PROGRAM SUPPORT IN FY 1977

A. Srivastava, University of Chicago

One Doppler radar was used on the south shore of Lake Michigan and with the CHILL radar formed a dual Doppler pair for studies of winter snow storms.

B. Stephens and Ray, Florida State University and NSSL

One Doppler radar and the PAM system were used as part of the 1977 NSSL spring network for study of severe tornado producing storms.

C. Lhermitte, University of Miami

One Doppler radar was used with two of Lhermitte's to form a triple Doppler array for study of lightning producing convective storms as part of TRIP.

D. Cotton, Colorado State University

One Doppler radar, PAM, rawinsonde and boundary profile support was provided for study of convective storm development and propagation over South Park, Colorado.

E. Hobbs, University of Washington

One Doppler radar was provided for study of winter cyclonic storms.

F. Fernald, Denver Research Institute

Periodic lidar observations of stratospheric aerosols

G. In addition FOF lent a variety of mechanical chart recording stations

rain gages, theodolites, cameras, etc. to about 20 university investigators on a first-come, first-served basis.

In FY 1977 virtually all of FOF's support was to university scientists.

IV. FIELD PROGRAM SUPPORT IN FY 1978

A. Hobbs - Similar to 1977

B. Grant, Colorado State University

PAM system for winter time study of mountain air flow.

C. Marwitz, University of Wyoming

One Doppler radar for study of winter time storms on west slope of Sierras.

Formed triple Doppler network with two NOAA radars.

D. Businger, University of Washington

PAM System at BAO for study of terrain effects on the boundary layer.

E. Fujita and Srivastava, University of Chicago

Two Doppler radars, PAM, rawinsonde for study of severe thunderstorm downbursts.

F. Lhermitte, University of Miami

Similar to FY 1977 support.

H. Hildebrand, Illinois State Water Survey

One Doppler radar and PAM will be used with BAO tower, NOAA Dopplers, NCAR aircraft and other instruments to study the convective boundary layer.

I. Squires, NCAR

Operate rawinsonde and CP-2 radar for CSD field experiment. Test video tape recorder on CP-2 Doppler data.

In FY 1978 most of FOF's support was to universities. The Sierra and BAO experiments might be considered joint NCAR-University-other agency experiments but the principal scientist in each case is a university person. The CSD support was to NCAR.

Distribution:

Universities - 60%

Joint - 25%

NCAR - 15%

V. DEMAND FOR SERVICES (FY 1977 and 1978 PANEL MEETINGS)

- In FY 1977 no requests were refused although many dates were compromised. The WPL radars were used in SPACE for CSU with one NCAR radar. It is fortunate that this was possible since both TRIP and SPACE would have suffered if FOF had tried to meet both commitments fully.
- At the October 1977 meeting of the FOF advisory panel there were six requests for radar support with three of the requests asking for two radars. Thus there were nine radar-experiment requests. Four radar-experiment requests were refused. Those that received support had their schedules compromised and it was necessary to use WPL radars in the Sierra and BAO experiments. There were seven requests for PAM, three were refused and schedules were compromised. We should have refused four of the requests.
- At the April 1978 meeting of the panel, there were six radar-experiment requests. One was refused, winter MONEX was questionable, and the CYCLES and SESAME required schedule compromises. We should have refused both the winter and summer MONEX requests. There were four requests for PAM with one refusal and schedule compromises were necessary. There were also requests for nine rawinsonde-experiments. Seven were granted but schedules were shortened.
- In summary, in the past two years, there were 21 (6 in FY 1977) radar-experiment requests, 15 were granted, but we should have refused at least one more. There were also 13 (2 in FY 1977) PAM requests and 9 were granted, but we should have granted no more than 8.