

# Mt. Washington Icing Sensors Project (MWISP) Tests Technologies for Remote Sensing of Icing Conditions



*Radars used for MWISP field test.*

The Mt. Washington Icing Sensors Project (MWISP) was an intensive multiagency field test of remote-sensing technologies and methods for in-flight icing detection. This field test was the first comprehensive examination of multiple remote-sensing technologies, and it included ground and airborne in situ measurements for comparison. The data gathered will allow the assessment of icing remote-sensing technologies leading toward the development of ground-based and airborne systems. These systems will provide flight crews with the information required for avoiding or exiting hazardous icing conditions.

MWISP took place on and around Mt. Washington, New Hampshire, during April 1999. The combination of persistent clouds with high liquid-water content and the opportunity for continuous in situ measurement provided by the Summit Observatory led to the selection of Mt. Washington. Field test participants included the NASA Glenn Research Center at Lewis Field, the Federal Aviation Administration (FAA), the National Oceanic and Atmospheric Administration's (NOAA) Environmental Technology Laboratory (ETL), the U.S. Army Cold Regions Research and Engineering Laboratory, the National Center for Atmospheric Research, the Canadian Defense Research Establishment Valcartier, universities, and private firms.

Technologies examined include

- Multiband radar differential attenuation techniques to detect liquid water—the NOAA ETL and University of Massachusetts X-, Ka-, and W-band radars were used for this activity.

- A multiband radar neural network technique to detect liquid water and classify droplet size—the NOAA ETL and University of Massachusetts X-, Ka-, and W-band radars were used for this activity.
- A multiple field of view lidar to detect liquid water and measure droplet size distributions—the Canadian Defense Research Establishment Valcartier lidar was used for this activity.
- Ground-based (up-looking) radiometric measurement of cloud liquid water and temperature—the NOAA ETL and Radiometrics, Corp., radiometers were used for this activity.
- Airborne (side-looking) radiometric measurement of cloud liquid water and temperature—the NOAA ETL Polarimetric Scanning Radiometer (PSR) was used for this activity.

In addition to the remote-sensing technologies examined, in situ measurements were made at the summit, aboard Glenn's Twin Otter Icing Research Aircraft, and on specially modified radiosondes (weather balloons).

The large quantity of data gathered at MWISP is currently being analyzed. A technology "down select" will follow the analysis, which in turn will lead to ground-based and airborne systems development and prototype testing in the user environment.

**Find out more about Glenn's icing research <http://icebox-esn.grc.nasa.gov/>.**

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