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NCAR Involved in First Test of Enhanced LLWAS System in Denver

Here's the latest installment with regard to NCAR's involvement in the microburst/windshear research at Stapleton. (See NCAR Updates No. 2 and 6 on TDWR and CINDE respectively for more complete coverage on the projects, NCAR facilities and staff involved)

NCAR's Atmospheric Technology Division is closely involved in the first operational demonstration of the FAA's newly enhanced Low-Level Windshear Alert System, called LLWAS, which is currently under way at Stapleton International Airport in Denver.

The LLWAS is the only ground-based windshear detection system currently operating at about 110 major airports in the U.S. The system utilizes surface wind speed and direction sensors to measure the presence of windshear over the airport.

Begun August 3, the test of the enhanced LLWAS system to improve airport detection capabilities for hazardous windshears associated with microbursts will continue until September 4.

If the test is successful, the enhanced LLWAS system modification will be installed at the other 109 U.S. airports equipped with the windshear warning system.

The Stapleton test includes a modification of equipment and computer software in the ground-based LLWAS windshear warning system, developed by NCAR's Research Applications Program scientists who made major contributions to this test by:

- Examining the operation of the original LLWAS system during the 1982 Joint Airport Weather Studies (JAWS) Project, which was a major study of microbursts. NCAR established that the LLWAS was ineffective in detecting microbursts in many cases because the instruments were spaced too far apart to detect the dangerous phenomenon.

- Developing a strategy for an improved network design of the LLWAS by proposing that the number of wind-measuring stations be increased from six to eleven or twelve, thus providing for a more effective detection of microbursts.

- Establishing a new concept in the LLWAS windshear alert air-traffic-controller display that provides controllers and pilots with a considerably more useful message.

All of these changes have been incorporated into the current LLWAS demonstration, which is part of the much larger CINDE and TDWR efforts sponsored by the FAA, NOAA, and NSF.

A product of that research has resulted in a more sophisticated way of processing data for pilots that alerts them to the likelihood of a microburst endangering aircraft on approach or takeoff at Stapleton in time for them to take alternative action.

During the test, the system will be evaluated by meteorologists assigned to the Denver FAA Air Traffic Control Tower, by air traffic controllers in the tower, and by pilots flying in and out of the airport.

The older LLWAS gives the actual wind direction and speed at each of six sites at Stapleton. The enhanced system utilizes 12 sensors and is able to specifically detect microbursts, in addition to identifying somewhat more simple windshears. The message for each windshear is runway specific, and provides a runway oriented estimated wind speed gain or loss for each aircraft. Examples:

1. A microburst event located on the runway within the Enhanced LLWAS, given to an arriving aircraft:

   "UNITED 226, MICROBURST ALERT, THRESHOLD WIND TWO FOUR ZERO AT FIVE, TWO ZERO KNOT LOSS, ON THE RUNWAY."

2. A wind shear alert given to a departing aircraft and located one mile from the departure end of the runway:

   "DELTA 210 WIND SHEAR ALERT, CENTERFIELD WIND TWO FOUR ZERO AT FIVE, ONE FIVE KNOT GAIN, ONE MILE DEPARTURE."

Additional information on the LLWAS operational demonstration can be obtained from the following NCAR/RAP scientists: John McCarthy, Wayne Sand, or Wes Wilson

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