

Future Devices to 'See' Weather

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BOULDER — Instruments that can "see" the weather and instruct computers to devise three-dimensional pictures of weather patterns may someday be used to warn citizens of severe storms and prevent airplane crashes.

An integral part of the development of such advanced weather-description systems will be a 985-foot instrumented tower now under construction by the National Oceanic and Atmospheric Administration (NOAA) in rural Weld County, Colo.

DR. C. GORDON LITTLE, director of the wave propagation laboratory at NOAA's Environmental Research Laboratories here, said the new instruments could revolutionize the way meteorologists gather data on which they base weather forecasts.

Today, most local weather conditions are monitored by ground stations recording temperature, humidity and barometric pressure. At regular intervals, balloons are sent aloft with instrument packages which sample the atmosphere. Satellite pictures map large weather systems.

This is adequate for general weather information.

However, the new systems now being developed at Little's laboratories could have spotted the thunderstorms that caused the Big Thompson flood disaster and accurately estimated the amount of rainfall in them.

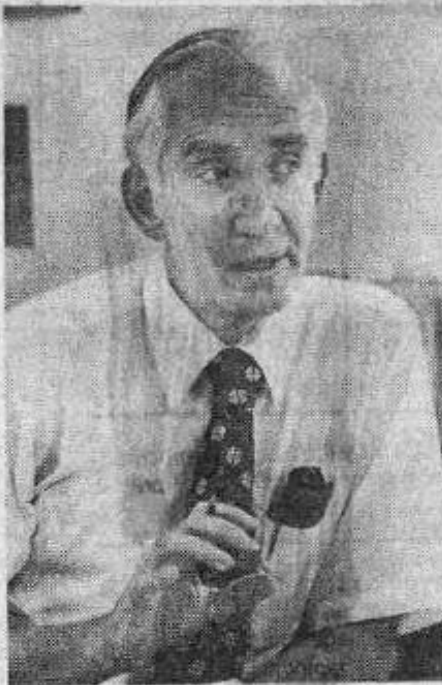
The instruments can spot "windshears" which have been responsible for at least two plane crashes—one in Denver.

LITTLE SAID the instruments even could be used to determine whether storms will rain out baseball games or spoil a round of golf.

He envisions the day when the data could be assembled and telecast to the public.

It might double the cost of providing weather information from about \$200 million annually to \$400 million if the service were provided in the nation's 100 largest cities, Little estimated, but the public may decide the extra cost is worth it.

In the meantime, the instruments are being used at Dulles International Airport near Washington, D.C., to locate wind-



DR. C. GORDON LITTLE

He says tower can locate storms.

shears which can force an airliner to the ground at takeoff.

Windshears are like air pockets which cause airliners to "bump" in flight, but they are located near the ground where the "bump" can cause a plane to crash into the ground.

The instruments use radar, lasers and sound waves to measure temperature, wind speed and humidity at various points in the atmosphere.

Some of the instruments must bounce a signal off a cloud — a collection of moisture droplets — to record data.

BUT, OTHER SYSTEMS can take readings in clear air.

Little said the windshear detector at Dulles uses a combination of wave-propagation devices. Some work only in the rain and others must have clear air to operate.

Recently, he said, a windshear was detected during intermittent rain showers, and the devices performed flawlessly — keeping the windshear located as the weather varied between clear air and rain.

The huge tower in Weld County will be operated jointly by NOAA and the National Center for Atmospheric Research,

whose scientific capabilities have made Boulder the world's most renowned center for atmospheric research.

The purpose of the tower will be to precisely monitor the weather at intervals along its height. Little said the air around the tower "will be the best observed cubic kilometer of the atmosphere in the world."

THE TOWER WILL be used to test experimental weather-monitoring equipment against known weather conditions and accurately calibrate operating instruments, Little explained.

The tower may also become the base from which Denver residents will be provided data on the weather using the new, advanced weather sensing devices.

Little said National Weather Service officials are considering plans for such an experimental station for the metropolitan area, but that would be years away.

The Boulder scientist estimated that it would take five years to initiate the prototype testing and evaluation program and another five years before the system could be operating.

But, he indicated, constructing the tower could be a first step toward providing people with better information about the weather. "We couldn't do any of this efficiently without the tower," he said.