Erie's huge tower overlooks much of the state

By Rob Selleck

In a stubble field three miles east of Erie there's a 1,000-foot tower that's just wide enough to support a two-man elevator between its three interlocked columns of steel.

Two fairly thin people can ride that elevator to the top of the 100-story high tower and find one of the most spectacular views any structure in the state can offer.

On clear, sunny days you look down at mountains beyond the Front Range. A glance to the south reveals even the lower floors on the Denver skyline. Over your shoulder the plains stretch endlessly toward Kansas.

On foggy days you can rise above the clouds and see a gray sea lapping at the foothills above Boulder. The base of the tower disappears into the mist, and perception flip flops.

On blustery days you can sway with the solid-steel structure as wind whistles at varying volume through the lattice of cross supports. Just keep reminding yourself the tower is anchored in 30-foot deep pilons and designed to withstand 160 mph winds even when sheathed in two inches of ice.

On cold, winter nights you can leave it all below and bask in the warmth of a thermal inversion while watching the twinkling city lights from Denver to Fort Collins.

The tower offers more than a view. It offers the opportunity for continuous, first-hand observation of a 1,000-foot column of Boulder County atmosphere. Operated by the Wave Propagation Laboratory of the National Oceanic and Atmospheric Administration (NOAA) in Boulder, the Boulder Atmospheric Observatory has no equal in the field of meteorological study.

"There is no facility in the world that has this type of instrumentation," John Gaynor said, explaining the weather measuring devices placed at eight, fixed levels on the tower.

Gaynor, a research meteorologist with NOAA for the past 15 years, and manager of the tower for the past five, said the instruments on the tower continuously monitor wind speed, temperature, humidity and pressure. Some of the information is recorded as often as 10 times per second.

There is so much information, in fact, that even after it is put into averages, much of it is dumped from the massive bank of computers stored in two tractor-trailers parked at the base of the tower. "It's an overwhelming amount of data," Gaynor said, "even when averaged down to the one tape a day we save."

After eight years of operation, a formidable amount of information has been collected on this particular column of air.

And someday, as a result of all the collecting, weather forecasting methods will make an incredible jump forward in accuracy, Gaynor said. the next 10 to 15 years. We won't see the blown forecasts we have so much of now. It's exciting, very exciting."

Gaynor is excited about the possibility of someday replacing weather balloon technology with remote-sensing weather detection. That translates to the difference between basing forecasts on data collected by balloons launched 200 miles apart every 12 hours — and data collected 24 hours per day by the microsecond using ground-based radar, lidar and sodar (radio wave, light wave and sound wave).

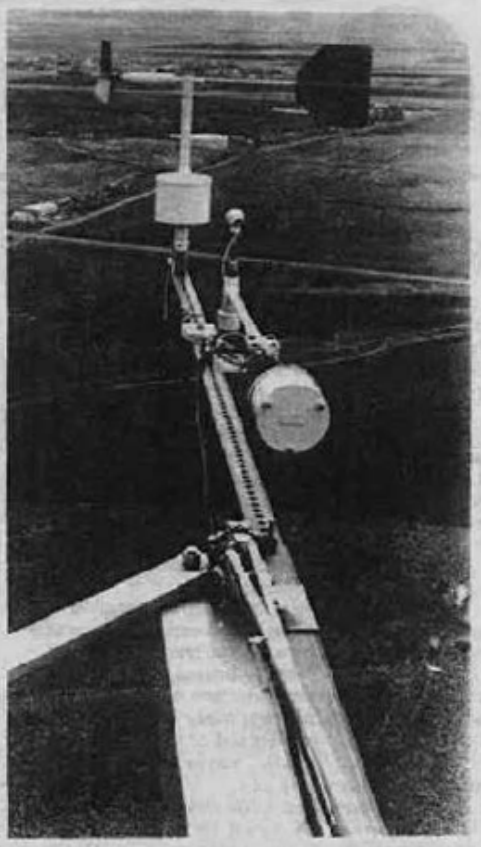
As an example, Gaynor singled out the big storm that never materialized last week. Two feet of snow was forecast. Travelers were urged to arrive at Stapleton Airport Monday night for Tuesday morning flights; some flights were cancelled; advisories were issued to stockmen throughout the state; and commuters were warned to get an early start or perhaps arrange to stay home Monday morning. Then Tuesday came with no snow.

Gaynor said he and others at the wave propagation lab visually noticed the storm wasn't materializing Monday so they checked wind data gathered by their radar-type devices at three points in the state: Stapleton Airport, and the towns of Flemming and Platteville. With the ability to constantly monitor the changes in wind in the triangular area, the lab was able to see the storm was not developing. Monday night they knew what the rest of us would slowly figure out Tuesday. Unfortunately, the experimental data is not yet being incorporated into conventional forecasting.

However, the wind-measuring devices are sophisticated enough that they are commercially manufactured, and used by private industry for small-scale weather monitoring. And 30 of the devices are being deployed in the Midwest in an investigation of thunderstorm complexes. "These are very large storms that can cover up to half a state, and involve tornadoes and hail. It's not understood how they develop," Gaynor said.

The tower has played an integral part in developing remote sensors that probe the atmosphere with beams of light, pulses of sound and waves of radio frequencies. Using state-of-the-art, conventional weather monitoring devices on the tower as guides, NOAA meteorologists have been developing remote sensing instruments that will someday accurately measure atmospheric conditions at any point from ground level up into the ionosphere.

The tower has allowed the wave propagation lab to study the scattering effect the atmosphere has on ground-based sensors. The lab compares averages based on conventional measurements taken from specific points in the atmosphere (on the tower) with measurements taken by the remote sensors. Then a type of calibration is available to add meaning to the information supplied by the remote



Gaynor acknowledges there is much work to be done. "There still are questions on how you compare these types of data — remote sensors are so new. There are no procedures to calibrate, as there are with standard devices. It's a very difficult problem. It won't be easy to solve."

But the remote sensing instruments already developed are sophisticated enough, and the data collected is great enough, that NOAA plans to stop the Wave Propagation Laboratory's funding of the tower in two years. Then, unless another agency or agencies step in, the tower will shut down.

The Wave Propagation Laboratory will develop a mobile tower so research can continue with the added benefit of not being confined to a particular column of atmosphere.

Chances are that if funding from other agencies doesn't allow the tower to remain as a meteorological tool, it will become a communications tower.

Throughout the tower's history, NOAA has turned down requests to lease space on the tower for communications purposes. The tower is designed to allow the height to increase another 500 feet, making it even more attractive as a potential antenna.

So in two years the tower will probably become what most motorists on I-25 think it is now — just another antenna, flashing its aircraft warning lights in the distance, day and night, rain or shine. □