RUGGED IIoT SAVES LIVES AT "THE HOME OF THE WORLD'S WORST WEATHER"

Mount Washington Observatory

Imagine your worst winter day. Bone-chilling cold, howling, bitter winds, blinding snow and sleet, and your truck is encased in ice. What do you do? You tough it out, scrape the ice off the windshield and get to work.

The FreeWave radio network deployed at one of the world's most important weather research facilities has to endure and perform in extremely brutal climates nearly every day of the year, 24/7/365. Lives depend on its successful transmission of weather data. And for over a decade, FreeWave radios have gotten the job done at the Mount Washington Observatory.

Location

The private, non-profit Mount Washington Observatory (MWO) in New Hampshire is one of the most important state-of-the-art climate research facilities in the world.

With a weather recording history dating back to 1932, the MWO's mission is to research the Earth's climate. Weather observations are reported to the National Weather Service and National Oceanic and Atmospheric Administration for use in nationwide and global forecasting models.

Additionally, the New Hampshire State Park (NHSP), US Forest Service Snow Rangers, and New Hampshire Fish and Game all rely on the MWO's current weather data to determine the safety and viability of launching search operations.

In short, the MWO saves lives and provides critical climate data, and FreeWave delivers it – no matter what the weather conditions may be.

Located on the highest peak in the Northeast United States (elevation 6,288 ft.), the MWO operates mission-critical weather stations in notoriously brutal and erratic weather conditions that are amongst the worst in the world. The long-standing slogan of the MWO is "The Home of the World's Worst Weather" and summit conditions certainly prove this.

During the summer, researchers encounter 50-100 mph winds with penetrating fog. Winter conditions include sub-arctic temperatures, 140+ mph winds, freezing fog, and heavy glaze icing. The weather can change rapidly, going from clear and warm to fogged-in and freezing within minutes. Additionally, ice accretion rates of up to 12"/hour are often observed. Winter winds can change from light and

variable to hurricane-force, and beyond, without notice, with blinding snow eliminating all visibility. In fact, at one time Mt. Washington held the world record for recorded wind speed of 231 mph.

These unique conditions make the Observatory an ideal location for research and product testing. If a product is stamped “Mt Washington Tested,” know that it has experienced the harshest conditions imaginable on this continent.

It is because of these year-round brutal conditions that the MWO turns to FreeWave for mission-critical and extremely rugged wireless.

THE NETWORK

On its mountaintop weather station, MWO deploys a radio network of 900 MHz FGR and FGR2 Series radios (both serial and Ethernet) connecting a network of 28 sensors and devices on five different remote weather stations. These stations and sensors measure temperature, humidity, wind speed/direction, and ground temperature. Continuous links are vital to provide real-time weather feeds.

The master radio is located 4 miles away on the summit of 4,063 ft. Wildcat Mountain, with 5 client stations situated at 1,000 ft. intervals along the Mt. Washington Auto Road, a privately owned 7.6 mile gravel and tar road that winds its way to the summit at 6,288 ft. These combined stations comprise MWO’s Auto Road Vertical Profile (ARVP). The Auto Road is closed to the public in winter, but the staff of the MWO and the NHSP routinely travel its treacherous path to and from the summit in full-sized snowcats, breaking through snowdrifts of 10 and 20 feet, carving a notch into its side in the vicinity of the actual road.

Because this type of winter travel is so treacherous, current weather data along the road is crucial for the safety of the crew, and both the MWO and the NHSP rely on FreeWave radios to maintain the constant communications links between weather stations and data servers.

The FreeWave radio network has been in operation since 2004.

FREEWAVE: LOW-POWER and TOUGH

All 6 weather stations are solar-powered in locations that only get sunlight approximately 40% of the year, so the MWO needs radios that consume minimal power while providing constant 24/7/365 connectivity on the Mount Washington Regional Mesonet. In meteorology, a mesonet is a network of automated weather and environmental monitoring stations designed to observe meteorological phenomena.

RESULTS

- According to the MWOs IT Manager, Peter Gagne, "For almost 13 years these Freewave…radios have been on duty continuously, and I personally can attest to their durability and reliability in conditions that, frankly, radios shouldn't survive. These radios routinely are exposed to bitter cold and winds that far exceed the radios specifications, and have always passed the test. It is because of this outstanding record of performance, as well as the superior customer support we receive, that we have decided to stay with Freewave, despite the multitude of competitors, in the upgrade of our ARVP sites this year of 2017."
- From the field-proven FGR2-PE Series to the edge-intelligent ZumLink 900 Series, FreeWave is rugged, mission-critical IIoT and intelligent wireless. If FreeWave can deliver in the "World's Worst Weather," we can deliver anywhere.
- Additional information about the groundbreaking climate research done at Mt. Washington Observatory can be found at www.mountwashington.org.

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