



PROJECT: CLIMATE AND SNOW CONDITIONS AT A SKI RESORT  
CLIENT: BEAVER MOUNTAIN SKI RESORT  
LOCATION: LOGAN CANYON, LOGAN, UTAH  
YEAR: 2005

### **Application Notes:**

Intermountain Environmental was contracted to assist with the design and installation of a Weather Station with Snow Depth monitoring that would replace an older weather station that had been un-reliable due to poor telemetry conditions from the site.

Beaver Mountain is located about 30 miles northeast of Logan, Utah along Highway 89. An older Campbell Scientific weather station had been installed by the local avalanche forecast office, but because of the lack of budget, no one was specifically assigned to maintain the site. The site had been only minimally useful to the ski resort.

Every morning during the ski season resort personnel reports the latest snow conditions to the main office in Logan. Without an automated weather station at the resort, they would have to wait for someone to drive to the resort, go to the top of the mountain, and check a snow measurement stick. They wanted a system that would allow them to always know the snow conditions from their office in Logan. Not only would this make it easy to make the daily snow reports, but it would also be something that they could use on their web site to provide skiers with real-time snow and weather conditions.

Beaver Mountain is a small family-owned resort and didn't have a large budget for this project, nor did they have personnel at the resort that would be able to operate or maintain a system that required a technical background.



Weather Station being installed on 20 ft.  
Triangular Instrument Tower



### **Installation and System Design:**

After looking at several different options, it was decided that the best solution would be to use a WeatherHawk Weather Station. The WeatherHawk is a complete weather station that is mounted on a "flying wing" style platform. The issue with the WeatherHawk in its standard configuration was that it did not accept external sensors. It had built in sensors for air temperature, relative humidity, wind speed and direction, precipitation, and solar radiation, but no wiring panel or external port where additional sensors could be connected. A standard WeatherHawk couldn't measure the most important parameter "Snow Depth"

Intermountain Environmental, Inc. solved this problem by customizing the WeatherHawk platform. The precipitation sensor and the solar radiation sensor were removed, and internal wiring was rerouted to new external plug-in type connectors that were mounted to the bottom the “flying wing”. This allowed two snow depth sensors to be connected to the WeatherHawk. One snow depth sensor, a Campbell Scientific SR50 Ultrasonic Distance Sensor, is used for measuring the total snow accumulation throughout the season. The other snow depth sensor, a SD100 Ultrasonic Distance Sensor, is mounted to a snow measurement board to measure daily new snow accumulation.

An external antenna port was also added to the WeatherHawk so that a 9 dB YAGI 800 MHz antenna could be mounted to the top of the 20 ft. weather station tower. Intermountain Environmental, Inc. also completely modified the programming of the WeatherHawk so that it would measure and record the sensors that were attached and make this information available for transmission to the base station, located 2000 ft. down the mountain from the location of the weather station.



The Base station consisted of a PC connected to a DSL Router and an NL100 Network Link. The base station has a 12 VDC power supply that is charged by an AC wall charger.

The base communicates with the remote weather station through an RF400 with a 9 dB YAGI 900 MHz antenna that is mounted to a pole on the roof of the equipment building at the resort.

The base station at Beaver Mountain polls data from the remote weather station every 30 minutes. The information is then available through the Internet to various organizations such as the Avalanche Forecast Office or the National Weather Service.



Intermountain Environmental, Inc. set up a server at our office that connects to the base station PC at Beaver Mountain and polls the latest data from a specified file location. This data is then used to update a web page that Beaver Mountain displays on their website.

Beaver Mountain has an ongoing contract with Intermountain Environmental, Inc. to maintain the station each year and to ensure that the data is being displayed correctly on their web site.

The system is designed such, that they can add additional monitoring stations throughout the resort and collect the data in the same manner.



This link will take you to the Beaver Mountain Ski Resort web site. It is only active during ski season, feel free to check it out.

For Information on this project or these products please contact:

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