



Panocea Labs - Ellsworth, Maine

Increasing UHF Range

The transmitting power of the radio is certainly one very important factor impacting the range or distance from the base unit that your rover will be able to receive corrections, but the physical placement of the UHF transmitter can actually play an even more significant role.

While this discussion isn't intended to be comprehensive, it should be of some benefit in helping to illustrate the reasons for considering where to place the transmitter. In tests completed, a 1-watt radio outperformed a 4-watt radio in terms of range.

Using the HPT401BT, a 1-watt, or 1000mW radio, plus a 2.4 dB antenna gain, the total power output is 32.4 dB. The transmitter was located 22' above grade (see photo on right) on a nearby knoll. The rover was at 5' above grade.

The HPT404BT, a 4-watt, or 4000mW radio plus a 2.5 dB antenna gain gives us a total of 38.5 dB power output. In this instance, the transmitter was atop 2-meter GPS pole in our dooryard and the rover was at 5' above grade.

The map on the left shows 10' contours and their two overlapping coverage areas. (LiDAR has been provided through the courtesy of the United State Geological Survey and the Maine Office of GIS). Using just these values to calculate viewsheds and



Free Space Path Loss (without Fresnel Zone added criteria or other obstruction specific vector data), Global Mapper v15.2 produced these coverages.

Another point worth highlighting from this exercise irrespective of total power output and UHF range: shadows. In both coverage examples, the topography creates what

can be visualized as shadows if the radio transmitters were instead strong beams of light; otherwise known as dead zones. So in this example, the transmitter with the shorter mast had coverage in parts of the river valley otherwise obscured from the much taller mast.