GPS Newsletter – Sensor

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Common Radio Problems - Intermittent Radio Link (cont)

Interference or jamming can also be detected if you have a radio scanner. If you always work in areas of high radio activity (such as in or around a large city or near airports) it may be worth investing in a scanner. You can then find out which frequencies are free for you to use.

Is the radio link intermittent on all frequencies? This may be bad luck with all frequencies also being used by other radio users. It may also be that somebody is using a radio which uses a very wide frequency band, thus jamming a wide range of frequencies.

Switch the ref to be the rover and the rover to be the ref and try all the frequencies. This may indicate if there is a problem with one radio being only able to transmit or receive intermittently. The radios would then need further investigation.

What does the message "Ref data lost" mean? This message appears if the rover does not receive data from the ref within 5secs of the last message. However, this message does not necessarily mean that there is a particular problem with the radio link.

You would also see this message if the ref has been turned off or has had a power failure (the ref cannot transmit any data). You would also see this message if the ref is no longer tracking satellites (the ref has no data to transmit).

Very Limited Radio Range

It may be that the rover receives RT data perfectly within a few hundred meters of the ref, but cannot receive any data at longer distances. Again, this may be due to jamming. Check this with procedures described above.

It could also be that the ref radio is defective and can only transmit with reduced power. Check this by switching the ref and rover radios. Also check the radio antenna by swapping the ref and rover.

Check that the equipment is set up correctly. Are the ref and rover antennas attached? Are the cables attached?

Increasing Radio Range

It is possible to increase the range that a radio link will work between the ref and the rover using boosters, repeaters and / or directional antenna. Some or all of this equipment may not be used in certain countries and is not discussed here.

However, the radio range can still be optimised using only "standard equipment" by considering the following.

The location of the reference station. Try to position the reference station so that it is as high as possible, for example on a hill or on a building.

If necessary, "survey in" the ref into a new position onto a hilltop. This one high ref station position may cover the whole of your area of work rather than having to continually move and use several ref stations positions on the lower ground.

The height of the reference and rover radio antenna. Put the antennas as high as possible.

For the reference, use a second tripod and the telescopic rod. A simple test at Heerbrugg showed that putting the antenna 1.5m higher (using the telescopic pole) increased the radio range by 1.5km!

For the rover, fully extend the pole in the backpack or attach the radio antenna to the 15cm arm and put the antenna directly under the GPS antenna.

Do not use excessive amounts of cable between the radio and the antenna at the ref. We recommend that you do not use more than 4.4m of cable (the 2.8m antenna cable and a 1.6m extension) between the radio and radio antenna.

Work within line of sight of the reference. Buildings, hills, trees and other objects can "shadow" the radio and greatly reduce the operating distance of the radios. Of course it is not always possible to work in line of sight of the reference antenna, but try to limit the number and size of obstructions between the ref and rover.

Plan your survey. Before starting the survey, try to plan ahead and decide optimal ref station positions. Visit the site and/or use maps to look for high hills or buildings where ref stations could be placed.

As with any survey, spending an hour or two at the start of the job to decide the best method of operation can save many hours of work during the survey itself.

Remember

- Investigate radio problems with the rover close to the ref and in a logical manner.
- Check even the most basic reasons for the problem.
- Plan your RTK survey and always place the ref in an optimal site for maximum radio coverage.

Leica Geosystems