THE American Surveyor
A Foot In The Past... An Eye To The Future
Vol. 7, Issue 8

ARCTIC CIRCLE

New Coordinate System
NGS plans for the future

Gear Review
Nikon Nivo C—Run 'n Gun

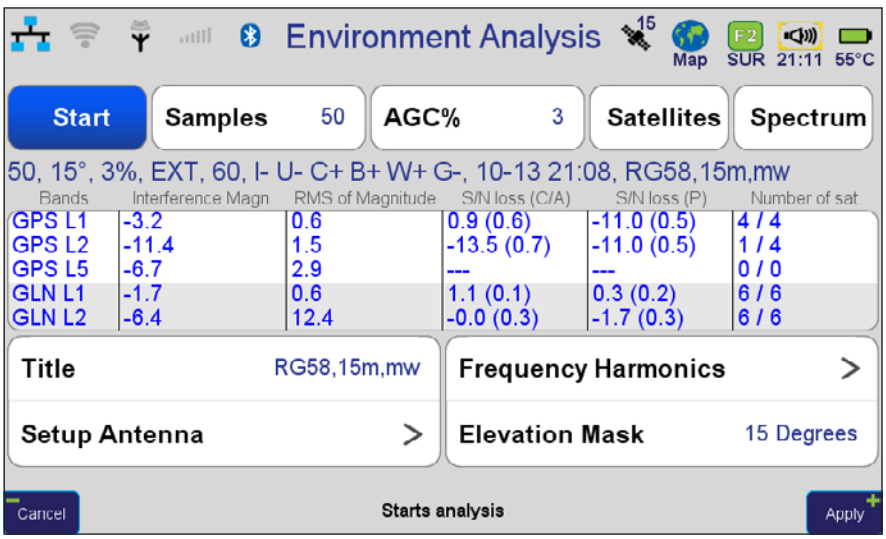
New ALTA Standards
A Heads Up for Feb 2011

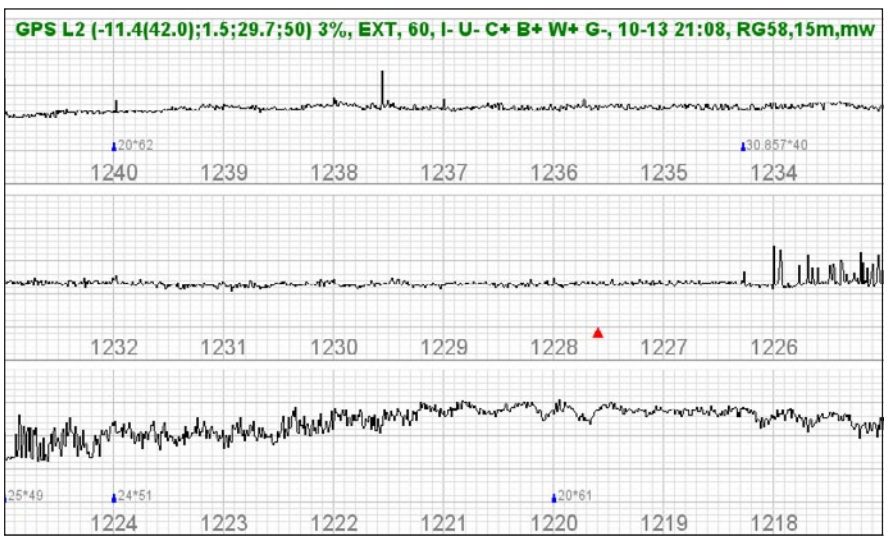
Environment Analysis from JAVAD GNSS

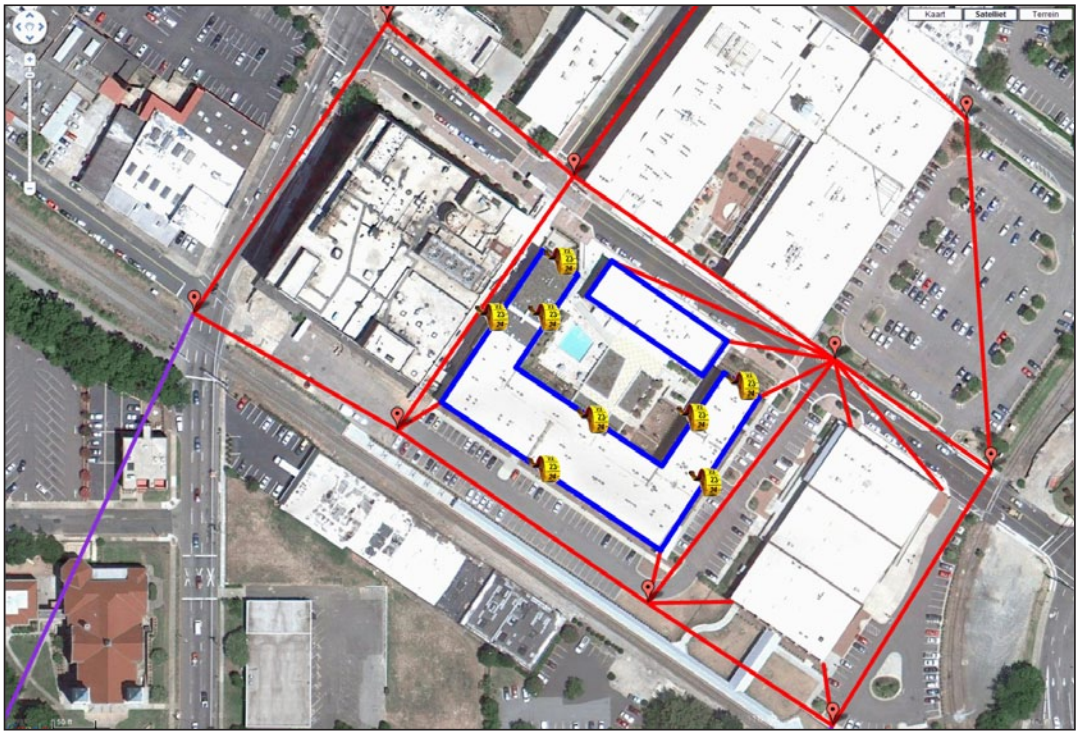
Ever wonder why your RTK sometimes takes two minutes to go from float to fixed rather than five seconds? To address the fact that sometimes GNSS doesn't work on one or more bands, and to provide a tool that explains why, JAVAD GNSS announced its latest (patent pending) enhancement for the Triumph VS at Intergeo in Germany in October. The company has incorporated a spectrum analyzer into the VS that does more than what a $30,000 lab instrument does to show GNSS interferences: it identifies the existing conditions in which the user is working. Javad, who has a knack for explaining complex subjects in simple terms, explained it thusly: "Would a pilot take off without knowing the weather conditions?" he asked. "The answer is no, so why should a surveyor go to a jobsite, set up, then wonder what is wrong if the unit does not function as expected?"

All higher-end GNSS receivers analyze the signals, and some identify interference and attempt to mitigate it at some level. Javad feels that the VS mitigation methods are heartier than the standard signal-analysis-filtering-mitigation, but this is the first time this information has been made available to the user. Best suited for fixed harmonic interference, for example from radio, television stations and from mobile sources such as a trucker jammer, the capability will be useful for those who suspect interference (perhaps the same folks who suspect everything when they cannot connect because they can't accept that cell phones do not work everywhere, that they cannot work under canopy, etc.).

Environment Analysis has two screens: one that shows numerical interference values, and another that shows the shape and exact frequencies of the interference, just as one would see on a laboratory oscilloscope. The former will be more useful to the average user. So before the user stops to scratch his head and wonder what is wrong if a unit appears to not be working, or before he calls the vendor to complain, this simple yet highly technical behind-the-scenes tool will tell not only why it may not be working, but will also pinpoint the GNSS signal that is being affected. See the JAVAD GNSS wingfold ad in this issue for a more technical explanation of how Environment Analysis works and also a powerful fix for interference as an option on the VS—Inband Interference Rejection.







The small yellow icons represent hand-taped measurements. By adding these values to total station measurements, MOVE3 uses the redundancy to tighten mapping accuracy.

MOVE3 Moves to the U.S. Survey Market

Given redundant and imperfect measurements, Network Least Squares finds the most probable position of points. It produces estimates of point accuracy in the form of "error ellipses" or confidence regions, typically at the 95% or 99% level. Network Least Squares is a tool that allows you to calculate, analyze and defend both the positions you publish and the measurements you made to determine them. It is now the standard, approved means of adjusting all types of field survey data for best results, such as angles, distances, height differences and GNSS baseline vectors.

MOVE3, developed by Grontmij of The Netherlands, is one of the most advanced products available today for using Network Least Squares. Designed for surveyors and civil engineers, its algorithms and particular methods are used by major survey equipment and software manufacturers as their "least squares engine." It is taught at Purdue and other university survey programs. MOVE3 can handle the smallest closed traverse to the largest network of field measurements, combining mixed data sources from total station to GPS to level loops and even including taped measurement.

Raw survey data includes Total Station Angles and Distances, GPS Vectors from Base to Rover, Level data, and Taped Measurements. Because 90-degree angles can be assumed, taped measurements around buildings (supplementing total station measurements to visible corners from a single setup) can be used effectively to map developed sites with multiple structures, saving time.

MOVE3 has a graphic engine in which individual observations, stations (points) and associated accuracies may be edited directly from the graphic environment or withheld for computation (a common debugging technique). It can project the points and associated vectors and measurements on top of Google Maps or Virtual Earth.

Computations are accomplished by one simple step. However, options include Free Network (unconstrained), Pseudo Constrained, Weighted Constrained and Absolute Constrained which allows review or adjustment of the "weighting factors" assigned to measurements. Instead of guessing at weighting, you can see its impacts. Your 5-second total station may in fact deserve a 3-second angular weighting (or 10-second!).

MOVE3 imports standard Carlson RW5 files, Trimble JXL files and LandXML raw data files, in addition to TXT files in prescribed formats. Level data can be received from Leica, Topcon, Sokkia and Zeiss instruments. Point data is extremely flexible. The outputs from MOVE3 are also useful for site surveying that follows after initial control calculations. Outputs include precise site scale factors (ground to grid, grid to ground), azimuth offsets, refraction coefficients and baseline transformation parameters.

A dedicated team is at work, continually advancing MOVE3's feature sets. In the U.S., contact Carlson Software for pricing and technical support.