

Leica Geosystems **TruStory**

Quality Assurance for British Columbia

Active Control System with Leica GNSS QC



Base Mapping & Geomatic Services has been ISO9001:2000 certified since 2004. One of the requirements of being ISO certified is that processes must be in place to ensure quality assurance and availability of GPS data. Leica GNSS QC will provide the means to achieve this goal.

Leica GNSS QC has been installed at Base Mapping & Geomatic Service's (BMGS) office. BMGS is presently evaluating this software, but it is evident it will provide a powerful tool for the management and quality assurance of BCACS data. The advantages Leica GNSS QC will bring to BMGS's services now and in the near future are discussed in this paper.

The BCACS (British Columbia Active Control System) is a network of 18 continuously operating Active Control Points (ACPs). The BCACS comprises a combination of municipal and BMGS owned GPS receivers from diverse vintage, manufacturers and models. The network is managed by

BMGS and used by a variety of clients, from municipal agencies to industrial clientele. As a government service provider and a certified ISO9001:2000 member, we are obligated to provide our clients with complete, relevant, quality data products for the geomatics and technical community. British Columbia covers a large area of extremely rugged terrain with many inaccessible areas. Most British Columbians live in the heavily urbanized south-west corner of the Province. However, most of the ACPs operate in remote parts of the province, providing support for forestry, mining, oil and gas exploration and development, and a host of other applications.

Most of the sites are connected via IP. However, due to the remoteness of many of the sites, reliable communications are a significant issue when downloading data. Occasional problems are encountered with RINEX data transfer from the ACPs.

■ **Challenge**

The BCACS comprises 19 reference stations using 4 models of sensors from 2 manufacturers. An automated system is required to analyze the logged data for completeness and quality.

■ **Customer**

Base Mapping & Geomatic Services
Integrated Land Management Bureau
Province of British Columbia

■ **Date**

Installation January 2006

■ **Project Summary**

Instruments

Leica RS500
Leica GRX1200
Trimble 4000
Trimble NetRS
Leica GNSS QC Software
Leica GPS Spider Software

Office

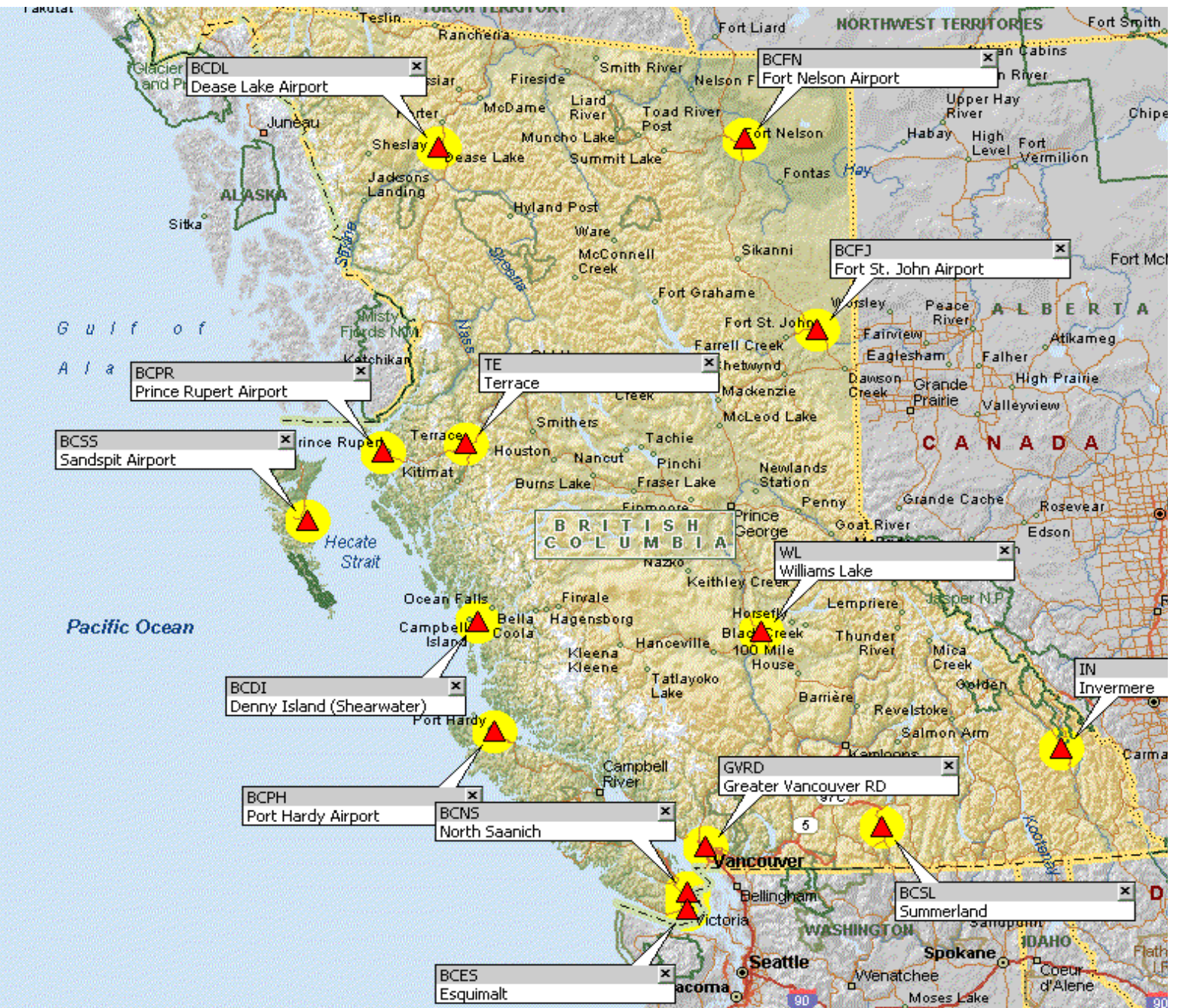
Base Mapping & Geomatic
Services Branch
Integrated Land
Management Bureau
2nd Floor - 395 Waterfront Crescent
Victoria, BC V8T 5K7
Attention: Vern Vogt

■ **Benefits:**

- Monitor the BCACS and give users real time access to the system's status.
- Evaluate data integrity and availability.
- Quality control analysis on logged data.
- Receiver performance testing.
- Aid in backing up of archived data by indicating any missing files within an epoch.
- Automated QC functions minimize demands on staff time to ensure data quality and completeness.

- when it has to be **right**

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BCACS ACP Locations

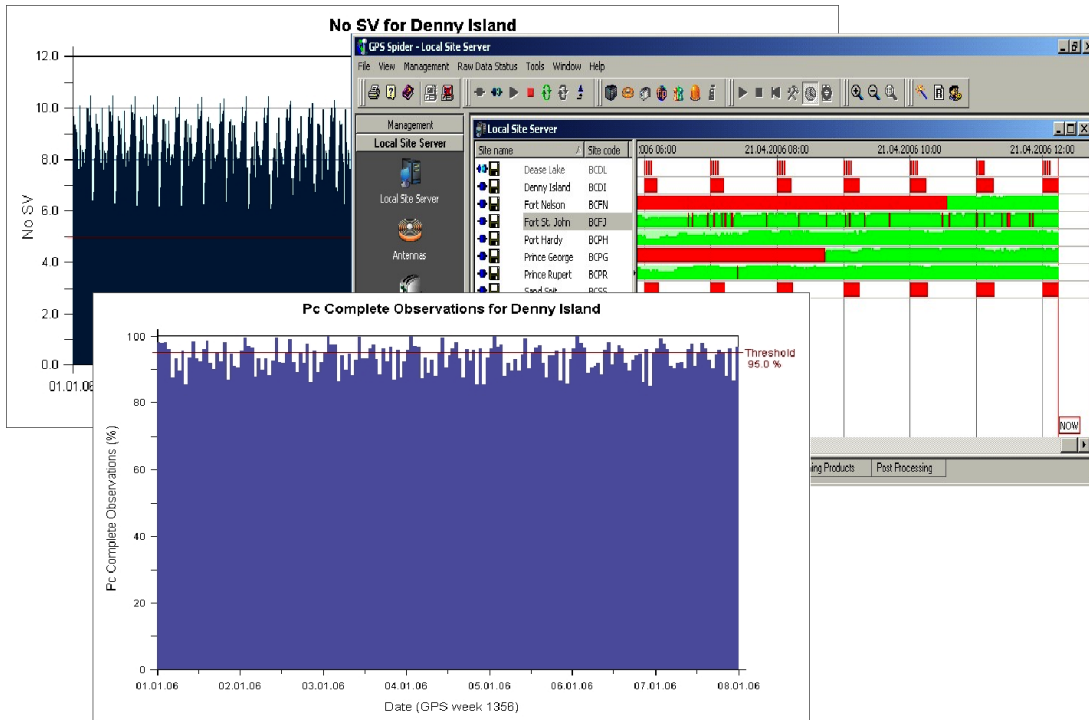
Leica GNSS QC is a key software tool that will monitor the ACP stations and the data coming from them.

The Leica GPS Spider/ GNSS QC combination will help BMGS perform the following: manage remote sites and download data from them, monitor the RINEX data from the sites, readily identify any missing hourly files, look for

missing epochs within the RINEX files, log sites that are not operational, and perform quality control analysis on the data.

The 19 ACPs currently operating generate up to 456 files daily. This volume of data makes manual analysis for quality control purposes impossible. Leica GNSS QC provides a complete set of standard quality control operations

and processes; it also displays the results of the analysis in various graphical formats for at-a-glance analysis of results, which is a key benefit of this software for BMGS. Graphical output includes SNR graphs, multipath, GDOP and other graphs showing the results of analysis of the data. As well, it will permit BMGS to display this data on a website as an advisory page



to our clients, informing them of data availability and quality for any site in near real time. These graphs illustrate the connection status to Leica GPS Spider for all of the sensors in the network for the previous 24-hour period and the number of complete observations and observed satellites for the previous two weeks from Leica GNSS QC. The latter graphs indicate at a glance whether there is a missing data or problems with the station. Leica GNSS QC is flexible software with the capability of processing data in the standard RINEX format, supporting our partners' and BMGS's legacy receivers. It can perform detailed coordinate analysis and post processing for monitoring each site and displaying any deviation from our published ACS coordinates. On examination, it can alert us to a possible site problem that needs to be resolved and we can flag any data coming from that site. Previous software generated text files that required careful

examination to derive any useful information about the quality of the data. Leica GNSS QC will make this process much less time consuming and less prone to errors, improving the quality of data we provide to our clients.

BMGS is currently planning for the modernization of the BCACS network. We intend to involve the municipalities in more active roles managing the ACPs within their jurisdiction. With this increase in the number of people handling the data, it will be even more prone to human errors. Leica GNSS QC will be invaluable for monitoring the data being by the municipally managed sites and checking for data quality and integrity.

BMGS's future vision also involves densification of our BCACS network employing RTK surveys, post processing, and in preparation for the modernization of our vertical datum. With the extra ACS sites, more data will be managed by Leica GPS Spider that will be actively checked by capable real-time quality control software like Leica GNSS QC.

By Tariq Al-Barwani and Vern Vogt, P.Eng.

With close to 200 years of pioneering solutions to measure the world, Leica Geosystems products and services are trusted by professionals worldwide to help them capture, analyze, and present spatial information. Leica Geosystems is best known for its broad array of products that capture accurately, model quickly, analyze easily, and visualize and present spatial information.

Those who use Leica Geosystems products every day trust them for their dependability, the value they deliver, and the superior customer support. Based in Heerbrugg, Switzerland, Leica Geosystems is a global company with tens of thousands of customers supported by more than 2,400 employees in 22 countries and hundreds of partners located in more than 120 countries around the world. Leica Geosystems is part of the Hexagon Group, Sweden.

When it has to be right.