



Editorial

>> Marc Cheves, LS and
Gavin Schrock, LS

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A FOOT IN THE PAST... AN EYE TO THE FUTURE

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PUBLISHER Allen E. Cheves
allen.cheves@chevesmedia.com

EDITOR Marc S. Cheves, LS
marc.cheves@chevesmedia.com

ASSOCIATE EDITOR Joel Leininger, LS
ASSISTANT EDITOR Jacalyn Cheves
ASSOCIATE PUBLISHER Jason Metsa

CONTRIBUTING WRITERS

Dale Beeks	Jeff Lock
Joseph Bell, LS	Dan Martin
Joe Betit, LS	John Matonich, LS
Shawn Billings, LS	Jerry Penry, LS
J. Anthony Cavell, LS	Al Pepling, LS
C. Barton Crattie, LS	Walt Robillard, Esq., LS
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Dr. Richard L. Elgin, LS, PE	Gavin Schrock, LS
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Gary Kent, LS	John Wilusz, LS, PE
Wendy Lathrop, LS	Robert Young, LS
Thomas Liuzzo, LS	Rj Zimmer, LS

The staff and contributing writers may be reached via the online Message Center at amerisurv.com

GRAPHIC DESIGN LTD Creative, LLC
WEBMASTER Joel Cheves
ACCOUNT EXECUTIVE Richard Bremer
CIRCULATION Mirta Ryker

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Trimble Dimensions 2009

Defying the economy, Trimble's fourth annual user conference hosted more than 2,400 registered attendees from 67 countries. In his opening keynote, Trimble CEO Steve Berglund presented refreshingly candid remarks by saying that 15 months ago (at the last conference), participants were encouraged to embrace change, only the recent changes were not what anyone had in mind. Continuing with the black humor, Berglund spoke about pursuing vision while running for your life. Before, it was all about opportunity, now it's all about assessing risk.

On a lighter note, Berglund reminded the audience that technology-driven change is inevitable, but it presents an opportunity of a lifetime to those who can see the visible future. Contrasting before and now, Berglund spoke about vision in reasonable times: 1) the need to reject the status quo; 2) constraints were more internal and external; 3) conflicts existed with current boundaries; 4) change was not possible with current capabilities; 5) excitement was created by a rallying point; and 6) change flirted with failure but with a high probability of success.

Now, 1) six months ago looks good; 2) externals are crushing; 3) boundaries can't be found; 4) retaining capabilities is difficult; 5) employees are worried about their jobs; and 6) failure most likely means extinction. Berglund posed the question: Will you respond hunkering down and deferring, or modifying and attacking? He assured the audience that its slice of the pie can grow if the correct decisions are made.

After spending \$1 billion since 2000 to acquire 35 companies, the recent unpleasantness has caused Trimble's stock to plummet, and indeed, Berglund said the company thought long and hard about whether to spend the enormous sums to host this year's conference. The resounding decision was yes, and it looks to me like they made the correct move.

As in the past, I have asked Gavin Schrock for his thoughts about the conference. As you will see, the emphasis was on gathering data, dealing with data, and moving data:

Dimensions '09 Summary

In the 18 months since the last Dimensions conference (this due to a shift from a fall to a spring time frame) a lot has happened to our industry, and even more to our economic climate. Despite the hard times, attendance actually increased, and as I found out in looking at the levels of interest in particular industry segment sessions; the economic downturn serves as a harbinger and driver for things to come.

Simply looking at the composition of the schedule of sessions is telling: 120+ for construction, 115+ for surveying, 25 infrastructure (real-time networks), 15 mapping/GIS, 25 mobile mapping, and 15 mobile resource management (think vehicle/equipment tracking) and a dozen specifically about utilities. This conference is not simply about "all-things-Trimble" (as it would be impractical to try to bundle in the segments for agriculture, OEM GPS, timing, military, etc.) but mainly construction, survey, GIS, and related productivity tools.

The make-up of the construction sessions (and notably those for which the limited spaces filled quickly) was certainly heavy on the machine control but also quite predominantly on productivity tools, data management, and asset management. Some attendees speculated openly about possible posturing for proposed stimuli-through-infrastructure-spending, but that even if that were not to happen (or at least not at the levels some are anticipating) the current economic downturn is enough of a driver on its own for customers to "spend smarter".

The survey tracks as well were heavy in the productivity tools. There was a loud buzz around the recently launched Access Software (remote connectivity, job



management, and data management tools). Live demos of field-office interactions using the same data controller connectivity many users have established for their use of RTN were certainly impressive, even more so was the remote support service. Live support sessions can be hosted right on the data controller in the field. These developments had been anticipated as further improvements along the lines of the “connected site” theme of the previous conference.

The driver for another prominent segment of the survey tracks could also be tied to current economic realities; that of preserving existing infrastructure and adopting a repair rather than replace strategy. A full 30 of the 100+ survey track sessions were directly or indirectly related to deformation and integrity monitoring. The tools have matured, and so have the practitioners; examples in case study sessions highlighted not only the amazing results, but also sober treatment of the limitations and practicalities of various tools.

Fascinating Session

If I had to pick a “coolest” session candidate it would have to be the absolutely fascinating summary by Fugro Survey AS on the multi-faceted program developed to monitor the largest potential landslide in Norway. The story of a hand-sized crack at the top of a fjord slope discovered by a local farmer as a boy that has since grown by many meters in width has triggered the Norwegian authorities to pull out all stops, and try many methods to be able to give as much advanced notice as possible to avert certain disaster. This slope in the scenic Aknes-Tafjord

region, fjords frequented cruise ships, would upon failure create a 40m tsunami destroying dozens of towns.

By studying data from previous landslides, the criteria for the proposed multiple systems was to be able to detect in real-time, velocities beyond the annual 3-10cm currently tracked to trigger an alarm and notification system. It is expected that the pending collapse will be detectable by increased velocities a week in advance allowing orderly evacuations, but even in the worst case scenario a completely unexpected collapse would spare the lives of many who could reach nearby shelters within minutes.

This is a situation where the conventional seismographic methods would be too late, providing only after-the-fact, only computed and not actual displacement information. The decision was for multiple and redundant systems, not only to ensure the best possible solutions, but also to evaluate as many as possible; no single system being viewed as “primary”. Even though nearly all access was by helicopter, an array of permanent concrete bunkers was built on the stable areas, with diesel generators and all weather instrument enclosures. One has a large bay window behind which a robotic total station can run periodic series on targets set on the slope below. GNSS sensors (with GLONASS being essential in this steep fjord) run in real-time on both the slope and stable areas. A radar site built across the fjord provides millimeter precision ranging on simple targets set on the slope. All of these systems augment conventional borehole strain gauges and extensometers (armatures measuring the expansion of the crack at the top of the slope). The latter

devices bringing a chuckle to the American audience in that the Norwegians have dubbed these as “Crackmeters”.

Several mine survey examples also exposed weaknesses in “single-solution” and conventional monitoring initiatives. A runner-up in the cool presentation category was that of the South African copper and diamond mine monitoring activities of Optron Geomatics. The stakes are high not only in improved operations where a single manageable degree of slope increase can save multi-millions annually in excavation costs, but also in the perils of proximity to nearby developments and billion dollar processing plants. In the copper mine example a huge crack up slope of a recent slide is clearly visible via Google Earth. The open pit is over a mile wide, causing atmospheric effects limiting optical robotic options (other presentations showed limitations of optical due to ice and other weather factors).

One hazard facing the copper mine project in rural NW South Africa is quite unique (and here I thought brambles were problematic); GPS sensors had to be built on raised enclosed platforms as the local elephants that roam freely and frequently around the site become a bit too curious about the installations.

There were related sessions including high precision rail monitoring, dam deformation, historic structure preservation, and many more, but the message of maturing solutions and economic realities was the same. GPS/GNSS is now a shining star in the toolbox for monitoring projects. Attempts in decades past with such solutions as near-real-time single frequency that may have fallen short are now eclipsed

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by real-time dual-frequency solutions that provide nearly unbelievable results.

On the RTN front, a wonderful panel session on development of guidelines for "gold standard" RTN design and operations brought a great variety of RTN operators and developers together with representatives from the National Geodetic Survey that is in the process of developing some guidelines of the same. These were frank discussions which were ultimately educational for RTN and NGS folks alike.

Then there was a report on the 2008 study commissioned by the Ordnance Survey of the UK, executed by the University of Newcastle and funded by said organizations and the two commercial providers of real-time networks in the UK. The study sought to develop guidelines for network RTK use and involved a very comprehensive test of both networks (which use data licensed for commercial RTN from the stations owned by the Ordnance Survey, or OSNet) and tested under varied conditions. This was not intended as a head-to-head test of otherwise competing solutions (as both are capable of providing both master-auxiliary, or "MAC" and VRS style solutions), and to that end the presenters (and hosts) did not reveal which data set came from which solution. The good news from this wonderful report was that RTN can consistently provide 1cm horizontal and 3cm vertical results. The study also revealed substantial effects of ocean tides; information that developers have been quick to act on. One can make their own conclusions after studying the report (you can download from www.tsa-uk.org.uk) but it certainly serves to prove that the sometimes outlandish claims of supremacy by the manufacturers can be statistically muffled, and also that the value of RTN is substantial and measurable (pardon the pun).

But how much of a role is being played by surveyors in these emerging markets? It appears that when it comes to these monitoring projects, they have at least included surveyors in some capacity; a number of the measurement-based solutions have traditionally been employed by surveyors. It would behoove surveyors to get a bit more involved in the budding GNSS monitoring segment (rather than stubbornly relying on optical systems alone) and to learn more about related monitoring tools. It would not be good to let perhaps another discipline slip through our fingers....

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