Editorial

Let the Future Envy Us

It is no secret that ongoing success and enthusiasm about our profession depends heavily upon mentoring, OJT, and self-study. Like many of you, I have been attending seminars and conferences since the late 1970s, and have always considered my surveying education to be continuous. In each conference I attend, I expect, therefore, to at least learn about whatever the titles of the individual seminars tout. A pleasant surprise at the recent **Trimble Dimensions 2005 User Conference** held in Las Vegas in October 2005, however, were the keynote speakers whose messages were uplifting and energizing.

We heard from **Steve Berglund**, Trimble President & CEO, as well as a raft of other speakers, not all of which are involved in surveying. All pointed the way to the future, both for Trimble and the entire industry as well.

Berglund emphasized that Trimble is not a products company, but rather a solutions company. The company had $750 million in sales last year, and since 1999, has experienced a growth of approximately 20 percent. Engineering and Construction accounts for two-thirds of the revenue, and 50 percent of that is in the United States. Encouragingly, 12-14 percent of revenues is plowed back into research and development. Berglund outlined how Trimble sees the market: 1) engineering and construction is lagging in the application of information technology; 2) recent advances in technology will play out as a radical transformation of our industry over the next 5-10 years; and 3) one technology is not enough. Rather, multiple technologies, applied as a suite, will be necessary. The three-pronged Trimble approach will include three technologies: positioning, wireless and software. Trimble has hardware and software development taking place all over the globe. In the future, two questions will be asked: "Where are my assets?" and "Where are my people?" Berglund used the term ubiquitous to describe more convenient and cost-effective precision 3D positioning at the flip of a switch; high-density 3D surface data and imagery; wireless connectivity, including real-time data with unconstrained bandwidth; info sensors that will increasingly grow smaller; and real-time info networks that will provide seamless information flow.

Dr. Scott Pace, Associate Administrator for Program Analysis & Evaluation at **NASA** HQ, gave the next keynote and led the audience on a quick trip through time as he described how, from 1405-33, China made marvelous leaps in technology and exploration. However, when China stopped exploring for 100 years, Portugal took over. Pace summed these events up by saying that the choice is between "magnificent but brief" or "small but sustained." Whereas China launched enormous fleets of ships, Magellan had only one ship. Today, Magellan's explorations are remembered more so than China's. Pace related this to the timeline for space-based positioning and discussed the Transit system which lasted from 1962-96, and the Navy's Timation system which began in 1972 and morphed into Air Force Project 621B which became today's GPS. Interestingly, he described the EU's Galileo system as the equivalent of WinXP, whereas GPS has already moved on to LINUX. Even so, the US is cooperating with the EU (as well as Japan, Russia and India) in the development of future systems. Speaking of Galileo, Pace emphasized that the system needs must be driven by the users. He also described a future in which NASA is looking at placing a GPS satellite at the L1 point for use by spacecraft. The L1 Point is that point between the earth and the moon where the gravity of each body cancels each other. A six-satellite GPS constellation for the moon is currently being considered, and Pace

THE American Surveyor
A Foot In The Past... An Eye To The Future

www.TheAmericanSurveyor.com

Volume 3, No. 1 January/February 2006

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

CONTRIBUTING WRITERS

Dan Beardslee, LS
Silvio A. Bedini
Joseph Bell, LS
Joe Betit, LS
J. Anthony Cavell, LS
Cathy B. Costarides, LS
Paul Cuomo, LS
James J. Demma, Esq., LS
Dr. Richard L. Elgin, LS, PE
Fred Henstridge, LS
Chuck Karayan, LS
Gary Kent, LS
Wendy Lathrop, LS
Thomas Liuzzo, LS
Jeff Lock
Dan Martin
John Matonich, LS
Thomas G. Merrill, LS
Jerry Penry, LS
Al Pepling, LS
Mark X. Plog, LS
Walt Robillard, Esq., LS
Fred Roeder, LS
Gavin Schrock, LS
Angus W. Stocking, LS
Patrick Toscano, LS
Rj Zimmer, LS

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

GRAPHIC DESIGN LTD Creative, LLC
WEBMASTER Joel Cheves
ACCOUNT EXECUTIVE Richard Bremer
rich.bremer@chevesmedia.com

The American Surveyor (ISSN 1548-2669) is published January/February, March/April, May, June, July/August, September, October, November and December by Cheves Media LLC. Editorial mailing address: 905 W. 7th St., #331, Frederick, MD 21701. Tel: (301) 620-0784.

Subscriptions prices in the U.S.: $29.95 for 1 year. Canada: 1 year $56.00 US; international subscriptions $72.00 per year (Airmail), U.S. funds prepaid. Back issues (subject to sufficient stock) are available for $4.95 + S/H.

New subscription inquiries and all other address changes should be sent to *The American Surveyor,* P.O. Box 4162, Frederick, MD 21705-4162. Fax: 301-695-1538. Subscribe online @ *www.TheAmericanSurveyor.com*

Made in the United States of America

CHEVES MEDIA

Proud Member of:

asprs

gita GEOSPATIAL INFORMATION & TECHNOLOGY ASSOCIATION

GIA Geomatics Industry Association of America

also described a recent experiment aboard the Space Shuttle in which an onboard GPS receiver was successfully used as an FTP site. Pace concluded his remarks by relating a story about Yuri Gargarin, the first man in space. After seeing everything that came after, Gargarin was asked if he was sorry to have been involved so early in the space effort. He replied, "No. Let the future envy us for the pioneering work we did."

The next speaker, **Erik Lindbergh**, grandson of Charles Lindbergh, presented an uplifting message mentioning not only his grandfather's achievements, but his own solo Atlantic flight in honor of the 75th anniversary retracement of his grandfather's epic flight. The younger Lindbergh, a master furniture maker, wood sculptor and athlete, was afflicted with rheumatoid arthritis at age 21 and suffered for fifteen years until a biotech drug opened new horizons. He is a board member of the X Prize Foundation, which was recently awarded for the successful private launch into space. The $10 million Ansari X Prize was fashioned after the Orteig Prize, which Charles Lindbergh won for his flight across the Atlantic. For his successful flight, Erik relied on planning and expert consultation. Key to his success was redundancy and back-up systems, and intense training and simulation. While Charles relied on the stars for his trip, Erik relied on GPS, Iridium phones and Orbcomm data uplinks. He quoted Daniel H. Burnham: "*Make no little plans; they have no magic to stir men's blood . . . Make big plans, aim high in hope and work,*" and exhorted the audience to give "juice" to the kids because our generation got it!

Attendees also heard from a panel representing **Autodesk**, **Bentley**, and **ESRI**. Moderated by **Mark Forrest** and **Peter Large** of Trimble's Engineering and Construction Group, the panel echoed Berglund's previous comments about construction lagging behind. While "scale" (as in bigger machines) was once relied upon to accomplish earth-moving tasks, new technologies and approaches are now needed. Convergence is accelerating – wireless is moving the office to the field, and soon, we'll have a connected site. The streamlining of information flow is enabling a re-engineering of the construction flow. The new paradigm is shared digital project information. This eliminates errors, reduces duplicate work (for example, converting paper plans to digital plans) and speeds up the entire process.

Panel member **Chris Bradshaw** from Autodesk began with a little story: to the surveyor, the number 43560 represents 1 acre; to the GIS professional, the number 43560 represents the Zip code for Sylvana, Ohio. Given these differing perspectives, Bradshaw launched into a global view on the construction industry. Infrastructure customers manage large, complex systems, and he discussed the enormous infrastructure projects being built in China and India and how these needs are placing a global drain on resources and brainpower. In discussing the current situation in America, Bradshaw outlined several hurdles: 1) inadequate funding for infrastructure; 2) competitive pressures from other countries; 3) less people to do the work due to our aging workforce; 4) attempts to push information to the field; and 5) inadequate office information. Technological challenges include dealing with design changes and coordination between the designers and the builders. "Old ways" are becoming tedious; they involve a lot of surveying and staking. "New ways" will involve 3D models and machine control. Caterpillar, for example, no longer sells dirt-moving equipment without GPS. The eventuality of all this is what Bradshaw calls "direct from design."

> **"...give 'juice' to the kids because our generation got it!"**

Paul DiGiacobbe, speaking for Bentley, pointed out another problem with our current process: interval-based, cross section-based design and construction really doesn't work because it handles changes between the cross sections poorly. And although design is being handled digitally, the result is 2D plans. The plan view doesn't show underground interferences such as utility pipes. DiGiacobbe made a call for a switch to a reliance on a 100 percent 3D model. Currently, he said, 3D is being used for viewing the model, but not enough for design. It's more than just surfaces, it's a need for being able to view everything above and below ground. DiGiacobbe also discussed the difficulties in obtaining pay quantities, and used as an example a street intersection where several different grades are intersecting in transition zones. Bentley feels that a 100 percent 3D model would solve this. DiGiacobbe also mentioned the difficulties we have in dealing with the hundreds of files created for one single project. Bentley is working to bring this into one file.

Clint Brown, Director of Software Products at ESRI, discussed interoperability and improving workflow in the field, and that highly accurate GPS provides a framework for GIS. He talked about how location or position is a key to looking at relationships and interpreting digital information, and how, with the rapid growth in wireless communications and web applications, GPS is enabling real-time GIS.

On Day Two, **Mark Pflederer**, a VP from **Caterpillar**, discussed Caterpillar's long history with electronics and said they have a thousand engineers who have been working for more than 30 years on software and controllers. He said Caterpillar leads the industry in GPS patents. The fruit of all this is a 30-50 percent gain in productivity. Caterpillar invested nearly a billion dollars last year in R&D. Pflederer displayed a bell curve showing the innovators, early adopters, early majority, late majority and laggards, and said that maintenance alerts now come to the equipment owners wirelessly, as does position information about where the equipment is located. Something else they have achieved is in-cab alerts for operators, notifying them as the presence of underground utility hazards. In an endorsement of technology and intelligent transportation, Pfleder**r** finished his presentation by stating, "The Interstate Highway System would be safer if people weren't behind the wheel."

The final keynote speaker was **Ken Alder**, author of *The Measure of All Things.* Alder gave a fascinating presentation about the origins of precise measurement and its impact on commerce. If you haven't read his book, I highly recommend it. (You can also access the Jan/Feb 2005 archives on our website to read Janhein Loedeman's thought-provoking review of Alder's book as it relates to surveying and life).

For more information and insight on the Trimble conference, see Gavin Schrock's article in this issue.

Wishing each of you a healthy and prosperous 2006!