

BUILD YOUR CONNECTED SITE

Trimble Dimensions 2006

The annual Trimble Dimensions show was held from 6th to 8th November 2006 in the Convention Center at the Mirage Hotel, Las Vegas, USA. With the theme "Build Your Connected Site"™, the event was as much about civil engineering and construction as surveying. Two thousand participants attended this event, which followed the usual format of keynotes, technical sessions and a trade-show. According to Bryn Fosburgh, vice-president, Trimble Engineering & Construction Group, there was an approximately 60% increase in attendance this year compared to last, with 47 countries represented. Technical sessions fell into thirteen education tracks, including four covering survey, five construction, and three a combination of subjects, one in Spanish. Trimble employees from around the world, and some representatives from other companies, presented sessions. Unlike the usual case histories, these focused more on the fundamentals and nuances of equipment and concepts.

Milestones

During the opening session milestones were flashed onto a huge screen: Trimble started in 1978 when the first GPS satellite was launched; 1986 saw the first GPS receiver for surveyors, and now there are eighty Trimble VRS networks throughout the world, deploying three thousand reference stations. Originally known for GPS technology, Trimble has made a big splash in recent years. The company develops total stations, GPS receivers, 3D laser scanners, handheld data collectors and related systems, software, and networks, this largely by acquired companies. In early November 2006 XYZ Solutions was acquired; the firm provides 3D-software for managing spatial aspects of a construction project. In late November 2006 Trimble acquired Spacient Technologies, Long Beach, CA, provider of enterprise field service-management and mobile mapping solutions for municipalities and utilities.

Speaking of history, Robert Farrar of Keystone Precision Instruments described how the first EDM instrument was developed in 1947 and the first commercial unit came out in 1953. Known as a geodimeter, it had a range of 31 miles and weighed 221 pounds. The first total station was introduced in 1971. The first reflectorless EDM came out in 1977, with 200-metre range. The first electronic angle sensor came out in 1981. The first servo-driven total station came out in 1987 and the first robotic system in 1990.

Keynotes

Steve Berglund, president and CEO, talked about the "Connected Site"™ and how this was the convergence of three core technologies: cellular, GPS, and software. "The boundaries between land surveying, aerial surveying and GIS have been blurred," he said, going on to indicate that the application of positioning and IT played a pivotal role in improving accuracy and productivity in all phases of the construction process. The next speaker, Dava Sobel, a former New York Times science reporter and author of three books on navigation, gave a presentation that tied the past with the future. Showing an inflatable globe, she related how Christopher Columbus had got lost because he didn't know where he was going. The UK had passed a law in the 1700s offering a prize to anyone who could sail to the West Indies and back without getting lost; this required solving the difficult problem of longitude determination. Galileo had tried to measure the speed of light by having assistants stand on high points in Tuscany, Italy, but the distances were too short.

Tuesday's keynote speaker, Dan Burrus, founder and CEO of Burrus Research Associates, offered insights into the present and future opportunities made possible by rapid advances in technology. "You can predict the future," he mused. "It's fall now. I predict winter's coming next: I'm right." Contrary to popular belief, he said, people like change. "The change you don't like is the one you don't see coming." Surveying was still in the late twentieth century and we were still clinging to old ways. "It's human nature," he went on. "We spend most of our time crisis managing and putting out fires. I want you to be in charge of your future."

Exhibition

On the trade-show floor Trimble went out of its way to make sure this was not just about itself by including many "partner"™ firms: the floor was evenly distributed between Trimble and partners. The 35 exhibitors included several magazines. Three universities showed off their surveying and geomatics programmes. Present too were five Trimble companies (Tripod Data Systems, Apache Technologies, Pacific Crest, Quantm, and Applanix) and three construction-equipment companies (Volvo, Bobcat, and John Deere Construction & Forestry Company). There were companies and organisations typically seen at other surveying conferences (ESRI, Spar Point Research, Autodesk, ACSM, OmniSTAR, Ohmex Instruments) and one German company (kubit) for good measure. By survey trade-show standards this was a small fair, but it had an intimate flavour as it afforded ample opportunity for one-to-one conversation with company reps in a relaxed setting.

Laser Technology

Ken Dooley of Trimble Process, Power & Plant Solutions told his audience how laser scanning was used for design validation. In typical plants rework used to run at 3-5%, but laser scanning had reduced this to less than 1%. Some scanners were based on time-of-flight, others on phase change, and typical jobs used a combination of both. Phase-based scanners were used in tighter spaces. Laser scanning should be followed by traditional survey using a total station. When planning for laser scanning the requirements should be considered of the various disciplines involved, such as mechanical, structural and piping. LASERGen software combines point-cloud and CAD data, allowing viewing of models within a CAD environment. In the future, we would, he said, be able to integrate total station, GPS and laser-scanning data. Laser scanning provided 3-5mm accuracy.

The speaker from TopoSys in Germany described how Lidar equipment onboard an aircraft uses a gyroscope for sensing orientation and GPS to measure sensor position. A system generated 100,000 pulses per second and cost \$1million. Using a last echo allowed scanning

through vegetation on the ground. Lidar could be used with a camera on the same flight, for complete data. Lidar measured heights, and one application employs it to scan coastlines to monitor beach erosion. It was explained that a laser-beam diverged gradually on its way to the ground, so that it is typically a metre wide at ground level. The instrument uses a mirror swinging back and forth to scatter the beams from side to side and cover a path (swathe) up to one kilometre wide.

GNSS

Participants learned that many more satellites would become available when the Galileo satellite network becomes operational in five to six years. QZSS is a Japanese GNSS, and the Chinese are planning one too. Glonass has sixteen satellites currently in orbit, ten of which are operational; this is not enough for accurate positioning, but it may be combined with GPS. In 2007 it will have nineteen satellites. The audience was told how to use Glonass to supplement GPS when encountering obstructions such as buildings in urban areas. For accuracy, satellites were needed at high and low elevations. In five years no one will have to set up their own base station, all will be able to use an RTK network like the Trimble VRS. There are six augmentation systems, such as WAAS and EGNOS, in Europe.

Closing Session

Monday night featured a cocktail reception with live music. Tuesday night brought the Gala Dinner, “A Dinner in Three Dimensions”™, including a performance by Mechanical Action, a troop of acrobatic and ballet performers choreographed specially for the conference as a genuine Las Vegas experience. In the closing general session Dr Jill Tarter, director of the Center for SETI (search for extraterrestrial intelligence) Research at the SETI Institute, spoke on the institute’s attempts to find habitable worlds by looking for evidence of any inhabitant’s technology using the Allen Telescope Array. This consists of 350 six-metre antennas placed precisely within a 700-m diameter. Trimble equipment was being used to pinpoint antenna locations.

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