

ROLE OF POSITIONING IN IMPROVING WORK PROCESSES

Trimble European Headquarters

Founded in 1978 in Sunnyvale, California, US, Trimble provides positioning solutions that enable professionals in many areas to improve their work processes. As well as utilising positioning technologies such as GPS, laser and optics, solutions include software content and wireless technologies to tightly couple the field and back office. The company has a worldwide presence, with more than 3,400 employees in over eighteen countries. Trimble's European headquarters are in Raunheim, Germany.

This article results from a visit to Trimble's European headquarters and kicks off a new monthly column in which one of our editors will report and reflect on a visit to a geomatics firm. The new feature is called "A Visit to..." and we will initiate contacts with companies. But you can ask us in too, and any reader interested in extending such an invitation should contact the editor-in-chief.

Monday 18th June 2007 and the sun is shining. Without having to recourse to any electronic navigation device, I succeed in arriving not having got lost and well on time at Trimble's European main office in Raunheim. Since GPS technology is part of Trimble's core business, I feel somewhat uncomfortable leaving the car in the realisation that I have managed my 600km drive guided just by paper maps. But, old-fashioned or not, maps still work very well for me. Susanne Preiser, Trimble project & PR manager for Europe, cordially receives me, commenting that Raunheim was specifically selected as location for the European main office because of its position close to Frankfurt airport, Germany's main international airport. There are direct flights from here to many major cities.

Craftsmanship

The first stop on our Raunheim tour is the service workshop, the domain of Werner Ickes, Service & Repair Workshop manager. 'Survey instruments are precision tools consisting of optical, mechanical and electronic parts,' Werner explains, and his team repairs, provides maintenance and upgrades equipment, as well as supporting the Trimble service provider network. 'Instruments may come to Raunheim from Europe, the Middle East, or even Africa'. There are worktables laden with instruments, some uncovered or completely dismantled. One technician is busy with a variety of tools laid out around a partially disassembled instrument. The concentrated expression on his face reveals that good craftsmanship resides not in tools but in brains. 'Sometimes it might take a whole day to renovate one instrument, or even longer, depending on its internal complexity,' says Werner. 'However, out in the field the instruments are very user-friendly and their technical complexity is invisible to the user.'

Upgrading

As with many precision instruments, continual wear and tear may result in reduced accuracy. Trimble products typically endure repeated shocks and vibration during transport and are exposed to rapid fluctuations in temperature or humidity. Precision instruments therefore require periodic calibration, an activity also performed in Raunheim. The sound functioning of an instrument is not thanks only to its inherent characteristics. It also depends on the level of knowledge and skills of the user. So there are helpdesk and training facilities where customers and dealers can brush up on their knowledge and skills. Four levels of service training are distinguished, and dealers who have passed the highest level are authorised to repair and upgrade instruments themselves. Werner's Raunheim team consists of eleven people, not all on site; some are at other locations or even on other continents. 'We are not working on an island,' Werner emphasises. 'We regularly communicate with colleagues around the world and share what we have learned, which is what makes working with Trimble so exciting for many of us. Approximately 3,400 people work for Trimble around the globe and around the clock, 24/7. Almost half Trimble employees are outside the US.'

Profile

Trimble engineers work all over the world on cutting-edge positioning applications that no one could have imagined just a few years ago. The company presently offers more than five hundred products and is developing position-centric solutions; its technology can be found in, among other things, consumer and commercial vehicles, construction equipment, farm machinery, computers, and personal digital assistants (PDAs). Applications include dispatching and managing fleets, surveying and building roads, monitoring and mapping earthquake damage, recording and synchronising international financial transactions, and improving the efficiency of wireless communications networks. Trimble revenues for 2006 totalled approximately US\$940 million and the company spends approximately 11% of its annual revenues on R&D; about 28% of its employees are in engineering. One fine example of the commitment to R&D is the VX Spatial Station.

VX Spatial Station

A colleague had told me of the great success of the world premiere of the Trimble VX Spatial Station held in Westminster, Colorado in early 2007, so one of my reasons for visiting Raunheim was to get acquainted with this system. 'Since the mid-nineties we have witnessed marvellous growth in the geoinformation industry,' says Christian Breuer of the European Survey Division. 'Georeferenced imaging applications are now playing a key role in mainstream business and consumer applications.' He has mounted a Trimble VX Spatial Station

on a tripod in the meeting room. 'It looks like a total station, true, but only from the outside. The instrument combines the optical capabilities of the Trimble S6 Total Station with 3D scanning and imaging capabilities, and since it is not a total station and not a 3D scanner we have given this class of instrument an entirely new name: VX Spatial Station.' Nevertheless, because of its scanning capabilities, rate up to fifteen points per second (typically five points per second), the instrument was included in GIM's August 2007 Product Survey on Terrestrial Laser Scanners; innovative solutions are all very well for users, but they regularly confront magazines with categorisation difficulties.

Merging Professions

Using integrated imaging technology the robotic operator at the rod can see what the instrument sees, controlling it remotely even for DR measurements without returning to the instrument. The colour chip in the camera has a resolution of 2048x1536 pixels and the images are stored in JPEG format. Five frames per second can be created in Video streaming modes. The images can be transmitted to and viewed on a handheld controller, which may be mounted on the rover. The points to be measured are selected by tapping the touch-screen. Points captured are superimposed on scene images, enabling direct control and monitoring of the survey. According to Christian Breuer, 'The deliverables that can be created back in the office reflect the flexibility in the field. By combining point data with georeferenced images of the site and point-clouds of detailed features the clients can be shown exactly what has been measured on a project in a very visual and easy-to-understand way. The camera provides additional information which, in combination with measured points, can be used to recreate highly detailed geometries. These can be processed in the office and provide additional information of high geometric accuracy.' Indeed, this instrument has the potential to significantly change the surveying profession, and even to merge the professions of surveyor and photogrammetrist.

Global Footprint

Around half of Trimble's 2006 sales were in North America, 25% in Europe, 12% in the Asian Pacific and the remainder in the rest of the world. Over the last five years revenue has doubled from nearly half a billion in 2002 to nearly one billion US\$ (940 Million) in 2006. Revenue for the second quarter of 2007, ending in June, was \$328 million, up approximately 34% from that of \$245 million for the same period of 2006. And talking statistics, let's quote some more figures. The company is organised into four business segments: Engineering and Construction (E&C), Field Solutions, Mobile Solutions, and Advanced Devices. Supplying multiple technologies including GPS, optics, scanning, lasers, communications, and software, E&C is responsible for slightly over two thirds of revenue. In the second quarter of 2007 E&C topped \$198.9 million, up approximately 18% over revenue of \$168.0 million for the second quarter of 2006. Revenue is mainly derived from the provision of location-based solutions that enhance productivity for engineering and construction professionals. About 15% of total revenues stem from the Field Solutions market comprising Agriculture, Mapping and GIS. Precision farming, which provides GPS-guidance solutions for operations such as tillage, planting, cultivation and irrigation, is a strongly growing portfolio. In the third quarter of 2007 it is expected overall revenue will grow to between \$294 million and \$299 million, 25% to 27% compared to the third quarter of 2006. The strong focus on R&D has resulted in seven hundred international patents mainly associated with GPS technology and applications such as optical and laser technology. Trimble has been a publicly traded company since 1990 (NASDAQ: TRMB) and R&D is so important that all profit is reinvested; historically the company has never paid dividends on its common shares and does not intend in the foreseeable future to do so.

Growth Strategy

The company's strategy for growth centres on developing value-added solutions for existing customers whilst marketing these to new customers and geographic regions. This growth strategy sometimes results in partnerships with or acquisition of companies with capabilities that potentially offer faster marketing and development of solutions than might be accomplished solely through internal development. Since 1999 this has led to joint ventures with Caterpillar and Nikon, and to acquisition of 21 companies. For example, in 2006 the Engineering and Construction division acquired companies in the US, Europe and Australia, including XYZs of GPS Inc in the US, which develops software for real-time GNSS reference-station integrity monitoring and dynamic positioning. Also acquired was Quantm International, Inc, Australia, which provides route optimisation solutions for planning highways, railways, pipelines and canals, and INPHO GmbH of Stuttgart, Germany, which provides photogrammetric solutions.

Final Remarks

On the drive back, after a fine dinner enjoyed in a village near Raunheim, it starts raining, a very different end to a day that began with sunshine. I grab my paper map to navigate home and start thinking about how technology has been impacting upon and changing our everyday lives, from the creation of paper maps millennia ago to navigating our vehicles using GPS devices today. Positioning has become ubiquitous and Trimble links positioning with productivity, which enables significant improvement in work processes for professionals in engineering and construction, surveying, agriculture, fleet and asset-management, public safety, mapping and field services.