The Future for Leica's Terrestrial Laser Scanning Business

Interview with Ken Mooyman

Ken Mooyman, a Canadian by birth (of Dutch extraction), was educated as a surveyor at Algonquin College in Ottawa, Ontario. During the early 1980s, he managed a GPS services business and a project management consulting practice. Later he worked for Trimble Navigation as the company's Director of Sales for Canada and the Western U.S.A. He then left Trimble and, for a short period in 1999, he worked as Sales Director for the Vicinity Corporation. However he quickly returned to the surveying instrumentation field, joining Cyra Technologies (based in the San Francisco area) as Vice-President of Sales. Shortly aftewards, the Cyra terrestrial laser scanning business was bought by Leica Geosystems. In 2001, Mr. Mooyman became Vice-President for European sales and support for Cyra's scanner products, based in Rijswijk in the Netherlands. He then returned to the San Francisco area business headquarters in 2003 as Senior Vice-President in charge of world-wide sales and support for what had by then became the High-Definition Surveying (HDS) Division of Leica Geosystems. Under his leadership and drive, the Division's revenues have grown spectacularly over the last two years. In recognition of Ken's background and his successes with Cyra and Leica Geosystems, Ken Mooyman has just been appointed as head of Leica Geosystems' ground-based laser scanning business.

by Gordon Petrie

Ken Mooyman, head of Leica Geosystems ground-based laser scanning business - with examples of the company's HDS laser scanners in the background.

GP - Now that Leica Geosystems has been taken over by Hexagon AB, and given Hexagon's existing strengths in the metrology field, one might expect new product development to go towards very short-distance laser scanners that could be used indoors for metrology applications - for example, reverse engineering, prototyping and the measurement and recording of small objects. Will entry into this area be a long-term aim for Leica Geosystems and a strategic objective of Hexagon AB?

KM - One of the strategic objectives at Hexagon is to remain the leader both in the micro and macro measurement space. As the existing leader, we will continue to monitor the needs of our customers in all our markets and develop the required solutions. I think the trend will continue and even accelerate to move towards laser scanning as a mainstream tool in both these micro and macro markets. The benefits of accurate, high definition as-built (as-is) information are not only valuable to an engineer designing a bridge retrofit, but also to an engineer who is reverse engineering an automobile part. Laser scanning in all markets for Hexagon, including those within Leica Geosystems, will continue to be a long term aim.

GP - The former HDS Division of Leica Geosystems concentrated its efforts on the manufacture, sales and support of laser scanners that operated over medium distances between 1m and 25m (with the HDS4500 instrument) and up to 300m (with the HDS2500 and HDS3000 instruments). Does the newly formed Geosystems Division have an interest in extending its product range into the area of still longer range scanners - measuring distances up to 1,500m, like the ILRIS-3D instrument produced by Optech?

KM - There are really two aspects to this question. The first aspect is a historical one. Our founder was actually a civil/structural engineer who ran a large engineering and construction management company. In that business, he experienced at first-hand the need for much better as-built (as-is) information, especially for plants and related structures, than that which was typically available using traditional as-built methods. He recognized that better as-built information allowed better retrofit design, which could significantly reduce construction costs and risks for retrofit projects. He also saw that this was a large, industry-wide problem. So this led to the development of high-accuracy scanning systems with a maximum range of about 300m. This turned out to be a sweet spot in the market in terms of the wide variety of applications that users could benefit from the technology and it has been one of the main reasons behind Leica Geosystems' commercial success thus far.

The second aspect is a “looking forward” perspective. If you look at the fundamental characteristics of terrestrial scanning systems for much longer ranges, you will find a few inherent shortcomings that limit the types of applications for which the technology is really well-suited. One shortcoming is accuracy. At long range, the magnitude of the distance and angle errors combine with a much large spot size and wider point-to-point spacing such that high accuracy is just not achievable at very long ranges. Therefore, you see such systems being relegated to low-accuracy applications such as mining and terrain models. These are useful applications of the technology, but the cost of this technology today may be too expensive. If we can bring the right value to customers, we will certainly do it.

The fact that all laser scanners are line-of-sight instruments imposes another practical constraint as you go out further. There are often obstructions between the scanner and the surface of interest and things tend to get worse as you get further from the scanner. Even if a scanner could capture data at 500m range, you may not have a clean line-of-sight to the surface of interest. So, in practice, users have to move a scanner around a site, only getting 50m, 100m or perhaps 200m practical line-of-sight range. Yet another problem at longer ranges is the scanner’s angle of incidence to horizontal surfaces. If the angle of incidence is too low, you cannot get a return and if you do, it is just not very accurate. The bottom line is that when you look at longer range, wide-area applications, many users would begin consider a combined solution of a Leica aerial scanner, such as the ALS50, and a terrestrial scanner such as the Leica HDS3000. This solution provides customers with the ability to map large areas and to augment points of interest with higher accuracy points.

***GP* - Before the take-over by Hexagon, Leica Geosystems had already moved its production of the ALS50 airborne laser scanner from Massachusetts to its main manufacturing plant in Heerbrugg, Switzerland. Now there is "talk" within the surveying industry that the production of the HDS3000 ground-based laser scanner will be transferred from the factory in California to Heerbrugg. Would you please like to comment on this "talk"? I am sure that the answer will be of much interest to your existing customers!**

KM - Actually, I don’t think most customers care too much about where products are manufactured, as long as they are produced with excellent quality and at fair cost. I think customers care more about local service and support, especially with a technology like laser scanning, in which support can be so critical to their success. So let me address what this move means from both of these perspectives.

First of all, the “talk” you were hearing is correct and I am very excited about this move. With this move, we will be able to fully leverage Leica Geosystems’ high-end, state-of-the-art manufacturing facility in Switzerland. The Switzerland team is exceptional at quality, cost-efficiency, and long-term product serviceability. This is something that can be a challenge for a smaller manufacturing facility and especially one that is located in the San Francisco Bay area, which has very high manufacturing labor costs.

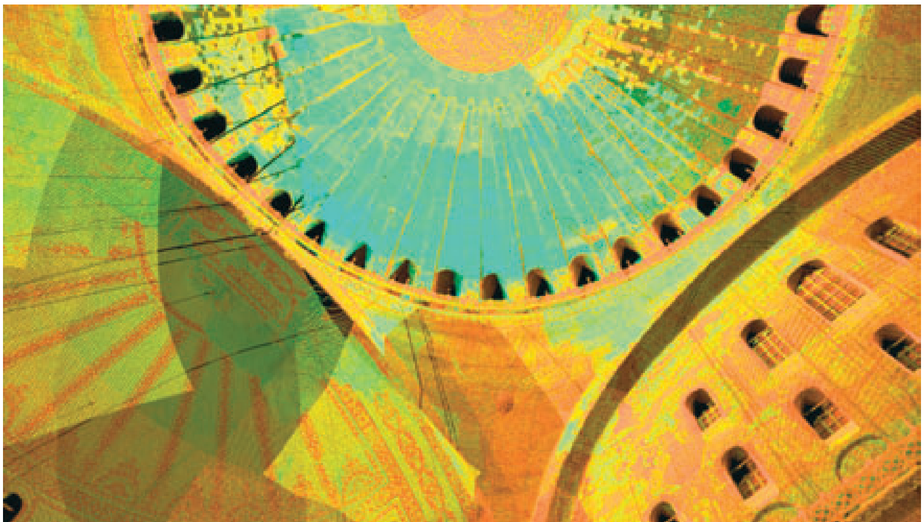
Although we are moving the main manufacturing line to Switzerland, we are keeping a state-of-the-art testing, calibration, and repair facility in our San Ramon offices. So, customers in the Americas will still be able to get prompt service and support. Our European customers now also have access to a state-of-the-art European-based service, calibration, and repair facility. Asian customers will have access to both of these facilities.
A final benefit of the manufacturing move for our customers is that without the distractions of periodically supporting manufacturing issues, we can better focus our San Ramon talents on product development (R&D), marketing, service and support.

This will lead to better and faster innovations for our customers. In summary, the move allows the California team to focus on product innovation and service/support and the Swiss team to do what our customers have come to rely on - produce high quality Leica Geosystems products and provide first class service and support.

***GP* - In aerial photogrammetry, there is much interest in data fusion, especially combining airborne laser scanned data with the image data produced by digital frame cameras and pushbroom scanners. Is there a similar strong interest in data fusion among land and engineering surveyors? If so, do you foresee further developments on the instrumentation side with calibrated photogrammetric imagers such as digital panoramic cameras being integrated into ground-based laser scanners? Presumably this would require very close co-operation between your own unit and the photogrammetric side of your company's Geospatial Imaging Division, both regarding software as well as hardware.**

KM - There are currently numerous examples of “data fusion” in the market. One example - combining digital photographs and clouds of points - has already become common practice in laser scanning. This is done either using cameras that are integrated directly into the scanner itself or using images from external digital cameras that are not attached to the scanner. There has been a lot of activity in the industry over the last year in this area, including our own Cyclone 5.4 release.

There are many different sensors to capture imagery or spatial information such as total stations, GPS, digital aerial cameras, and terrestrial laser scanners. The key is how to combine this information efficiently to provide intelligent data to users. Today, existing customers routinely use their total stations and GPS instruments to complement the data captured by laser scanning. I think the real key in the future is not with the sensors but with the software that can intelligently reference, measure, analyze and present this fused data. Software applications like Cyclone should not care about the type of sensor used to capture the information. The challenge from a vendor standpoint will be to continue to keep pace with the sources of new spatial and image information and make it easy for users to take full advantage of this information in their office software and in their networked and web environments.



An image of the interior of the central dome of the famous Hagia Sophia church in Istanbul, Turkey that has been generated by a Leica Geosystems HDS laser scanner.

As part of Hexagon, we are fortunate to add yet another dimension to the aspects of data fusion. As you know, Hexagon is expert in "micro" measurement technology. There are also data fusion needs and opportunities between the micro and macro worlds. In Hexagon, sharing R&D and other competencies is a key company value. We work closely within Hexagon to share development for both hardware and software efforts to bring more complete solutions to customers. Our customers can be assured of this.

GP - Turning next to your market leadership in ground-based laser scanners, what do you feel are the main factors that have produced this success? And where does your main competition come from - does it vary (i) from one regional market (North America, Europe, Asia, Australia) to another; (ii) within different industries (surveying and non-surveying applications); and (iii) according to the level of knowledge and sophistication of your existing users and your potential customers?

KM - Well, it is no accident that we have such a strong leadership position in the industry. There are really several key factors.
(i) One is having been an industry pioneer - we were able to get off to a fast start right out of the gate. Together with early adopters, we created the growth of this market. Today scanning is already accepted as the preferred solution in a number of market segments.
(ii) A second factor is that I think we have made some sound strategic decisions. We offer state-of-the-art software and hardware. The micro-chip laser offers the cleanest dataset and that helped to improve accuracy. We have the exclusive right to the two patents on the use of micro-chip lasers. The power of the Leica Cyclone software is well known. Customers expect our commitment to develop these technologies further. They trust Leica Geosystems to have the stamina and the resources to further advance this technology for their benefit. I think the market has highly valued this in Leica Geosystems.
(iii) I think a third factor behind Leica Geosystems' success is that we have hit the mark in terms of the breadth and the capabilities of our hardware and software products. Laser scanners and associated software are still fairly costly to acquire, so customers really want them to be as versatile as possible in terms of the number of applications that they effectively address. The capabilities and actual performance of both our hardware and software have met this need and this has been a big plus.
(iv) If you ask around, you'll find that customer support is the fourth factor. Especially with a new technology, support can be just as critical as the products themselves as far as helping to make users successful. And, in the end, this has really been the biggest factor of all: the success of so many of our customers. It is their success that fundamentally drives adoption of the technology and has continued to bring the majority of new customers to Leica Geosystems.

The main "competitor" in the laser scanning industry is not another manufacturer but the way customers are currently doing their as-built activities. This barrier does vary from region to region. In areas of generally higher labor costs, such as much of Europe, North America and certain parts of Asia/Pacific, laser scanning's productivity advantages are more appealing. In regions with low labor costs, we focus on industries like oil & gas, where the value in laser scanning is not so much the productivity to capture the as-built info but more in the downstream benefit of lower construction costs, lower construction risks and shorter down-times of the facility. Reducing the period of time an oil rig is down for a revamp project is just as valuable in Malaysia as it is in the North Sea or the Gulf of Mexico.

From a geographic standpoint, things are somewhat more competitive in Europe than other areas, as this is where most of the other hardware vendors happen to be headquartered. These vendors tend to focus their marketing and sales efforts close to home and customers are a bit less worried about support if the vendor's headquarters are next door. In terms of vertical markets, I think we have a strong leadership position in each one except for the mining market, although we have some good successes here as well. Open pit mining is one market where the very long range systems have a good fit, as accuracy requirements are low, line-of-sight may not be a problem, and, if you are scanning vertical walls in an open pit, you don't have an angle-of-incidence problem.

The last portion of your question – about the level of sophistication of prospective customers - is an interesting one. We are fortunate in that we do well across the board, but I think that we probably tend to get an even higher share of the more sophisticated users who have done their homework. For example, there are as yet no standards for specifying laser scanners. Some vendors are much more aggressive than others with their specs and what they include or exclude from their specs. Leica Geosystems has tended to be very conservative with specs, often choosing to let the actual performance of our products significantly exceed our specs. So, newcomers are well advised to evaluate vendors' specs carefully. More sophisticated prospects will do the extra homework to make sure that they get what they want. They will talk with other users and actually test products before buying. They also tend to be more successful when they do buy, which leads to more referral-based business for their vendors. Because of this, we put a lot of effort into educating the market about the technology to help customers make well informed decisions.

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