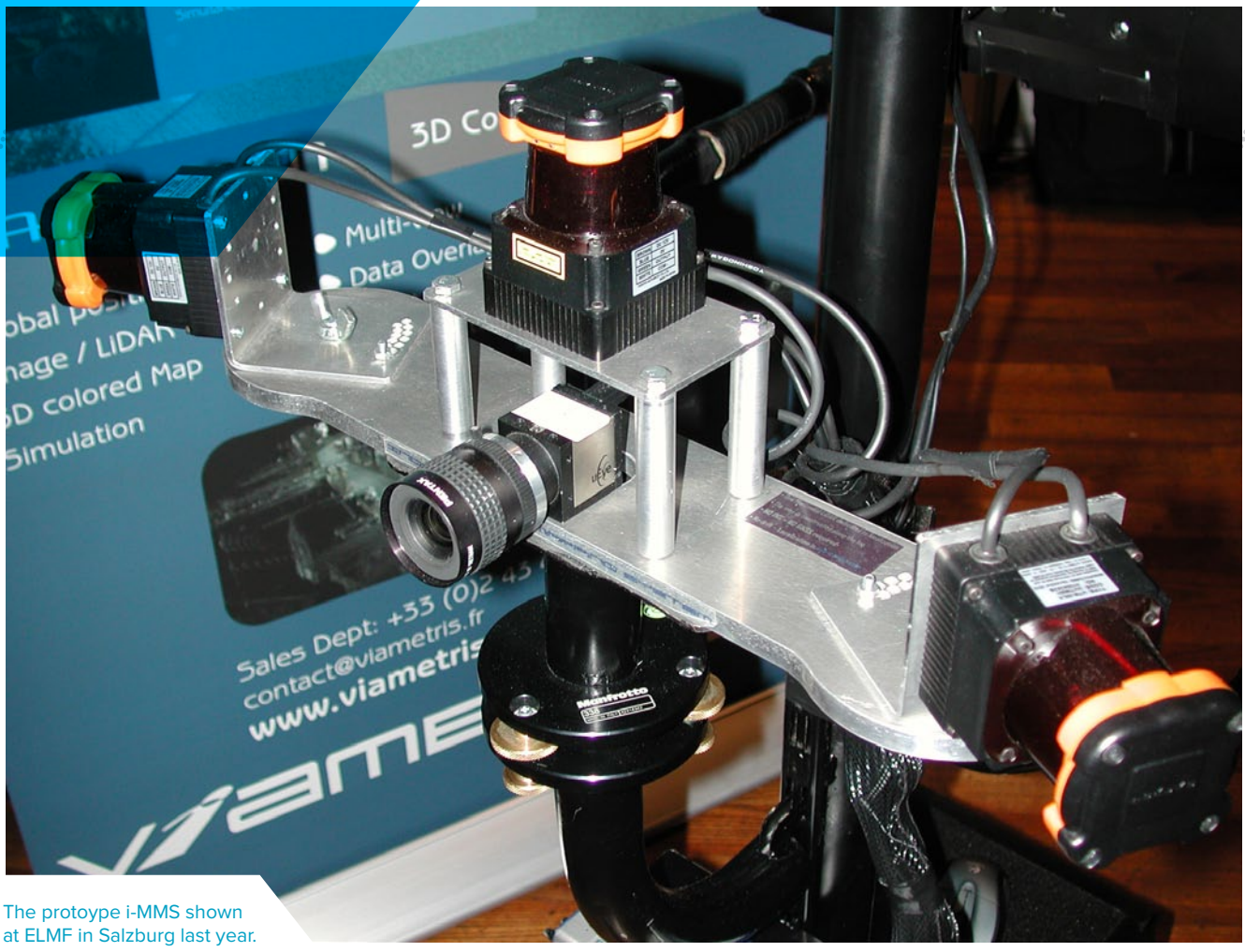


The protoype i-MMS shown at ELMF in Salzburg last year.

Viametris—What's in a Name?

Small venues are like small communities: conveniently arranged, good-natured, and for the most part the opposite of being hectic. Such conditions are ideal to perhaps spot something unusual or interesting from the general stuff. This happened to me at the European LiDAR Mapping Forum (ELMF) in Austria's Salzburg, last November. On my first tour around the exhibition floor along an aisle stood a conspicuous looking device, combining a computer-screen, a camera for industrial purposes and some extrusions that turned out to be small laser-scanners. These elements were built onto a wheel-able device that somewhat resembled a 'Zimmer frame' or 'walker'—a walking-aid for elderly people. Obviously it was a prototype of some kind related to mobile mapping, but what?

A young man with friendly eyes behind a pair of round glasses kindly invited me with a melodious French accent: "Can I help you?" This was my first encounter with Dr. Laurent Smadja of Viametris who explained about the company's prototype i-MMS, an acronym for Indoor Mobile Mapping System.

A renewed acquaintance with Viametris occurred last June at Optech's European User Conference in Nice, France. (See for the Optech UC recap elsewhere in this issue of LiDAR News.) Viametris was one of the very few companies presenting their products at this small yet very interesting technological two-day event. Since last November, i-MMS has definitely gotten a more fashionable look, though this wasn't the final prototype either, Eddie Cappleman,

BY IR. JAN **LOEDEMAN**

Touch-screen for operating the i-MMS

Viametris' Sales Manager explained. The 'real thing' will be presented at the 2012 Intergeo in Hannover, Germany, October 9-12.

At Optech UC's closing dinner Jerôme Ninot, Viametris' founder and CEO, told me about the company's young history and his plans for the near future. Our vivid discussion ended with his invitation to visit the company on my way home to Holland when returning from Spain, (my next destination following Nice).

Viametris premises

Finding Viametris' premises in Laval in the west of France was definitely less easy than spotting the i-MMS at the ELMF in Salzburg. I had an address in my GPS, of course, but for several reasons it took me nearly an hour by car to finally discover that in reality, from my hotel to the company's true address actually is a five minute walk.

Next surprise: my car trip to Viametris ended in front of a white industrial hall with no external sign of Viametris. When entering the empty hall, the building looked inhabited. Then through a door in one of the 'office boxes' in the hall's left corner Eddie Cappleman appeared to welcome me. Jokingly, I asked him whether Viametris had chosen this new accommodation for the production of the i-MMS. Not entirely so, he replied. Viametris' parent company is Induct, which is specializing in electric robotic vehicles. In this hall Induct will accommodate a production line for their autonomous transport MODULGO.

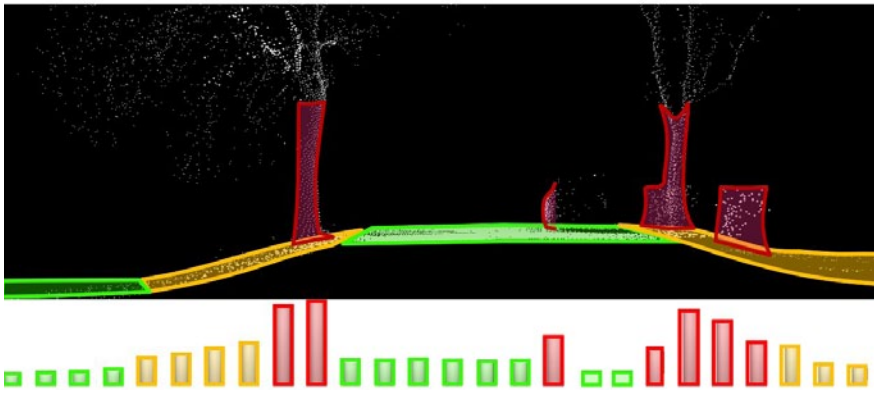
As robotized shuttles require autonomous navigation, they need to be equipped with devices that can sense and interpret geometric characteristics of their surrounding physical environment. This explains the link between Induct and Viametris.

Latest i-MMS prototype operated by Eddie Cappleman

Who makes Viametris?

Dr. Jerome Ninot is the company's CEO. He founded Viametris in 2007 when still busy with his PhD research. His thesis was published May last year, titled in English translation: "Automatic reconnaissance and analysis of images for computing the road environment." In 2010, Jerome applied for a patent called: "*Method for reading information related to vertical traffic signs, related device, and use thereof.*" Both titles refer to the functionality of Viametris' main software product 'MAGELAAN', an acronym that stands for "MApping GEodesic data Localization and Automatic ANalysis." This software suite enables near-autonomous extraction of road geometries and traffic signs from point

Viametris' booth on ELMF Salzburg 2011 with Eddie Cappleman (left) and CEO Jerome Ninot. In front the first i-MMS prototype.



Object Segmentation and colour grouping of objects. Once the road and objects have been correctly separated, a Region Growing algorithm, based on Euclidean distances, is applied. This fast and simple approach provides good results.

clouds acquired by means of mobile mapping systems (MMS).

Dr. Laurent Smadja, Viametris' Head of Research, is qualified in related research topics. In 2003 he published his thesis, titled in English translation: "Generating dense 3D environments by means of cylindrical panoramic images." His specialty is stereo-vision. Before joining Viametris in 2008, Laurent was involved in the development of an image-based audience measurement tool based on human face-detection and tracking. With Viametris he has developed algorithms for image segmentation and automatic analysis of road geometries. His algorithms are currently implemented in Magelaan, the company's software suite enabling near-autonomous extraction of road geometries and traffic signs from point clouds acquired by means of mobile mapping systems (MMS).

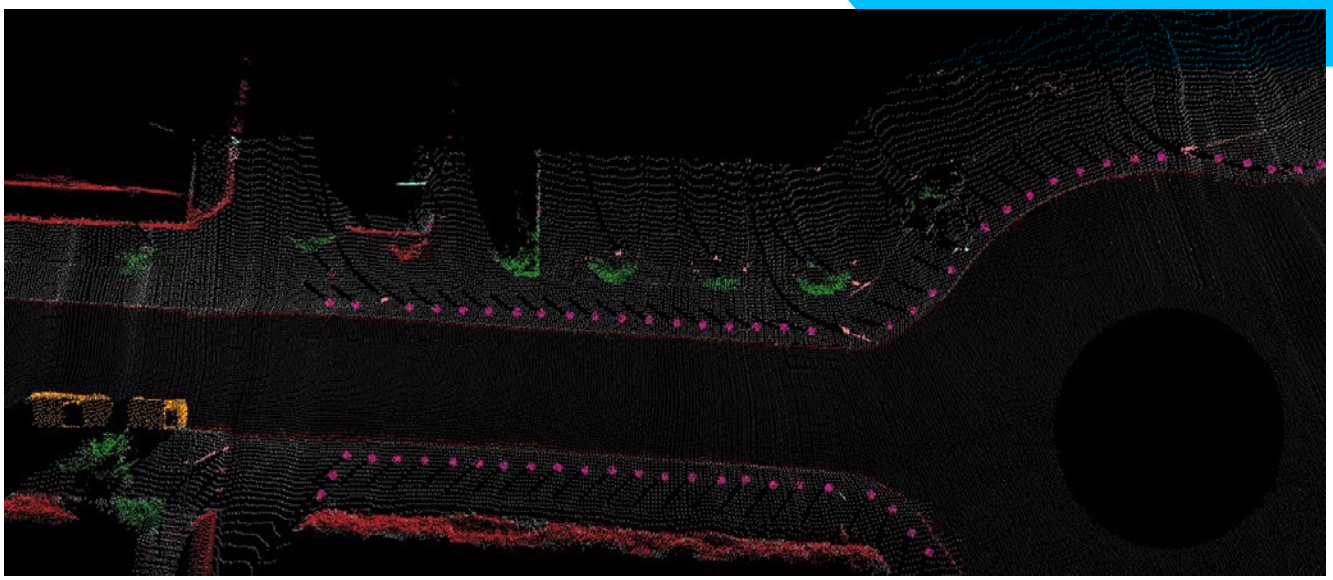
Though Jerome and Laurent act as the company's 'front office', together with marketing & sales manager Eddie Cappleman, they definitely are not the only ones who constitute Viametris as a company. Currently the company employs 5 staff in total.

> "BIM has the potential to be the mother system of all building developments."

Viametris' products

Two products are spearheading Viametris' product portfolio: the aforementioned i-MMS and MAGELAAN. Since my first encounter with the i-MMS last year, the prototype has significantly developed towards a full-blown product. Currently, the i-MMS looks to be well-positioned due to the fact the market is relatively new and hasn't realized its potential. However, the market for Magelaan is quite the opposite. The market is hungry, eager for auto extraction from geospatial data. Hard to say from the outside what the pros and cons of this product are without having conducted a thorough product evaluation, but for sure its functionality is tuned towards autonomous feature extraction.

The i-MMS and Magelaan are not the only products Viametris has developed. To provide local GIS service but mainly to qualify Magelaan, the company developed its very own custom designed terrestrial MMS. Currently however there are no plans to enter the market with such a system. Due to its strong relation with parent company Induct, Viametris is involved in occasional projects deploying the company's specific range of expertise in autonomous vehicle navigation. For that same reason, Viametris has developed a "fast algorithm for constructing optimal navigation" (FALCON) as required for autonomously navigating a vehicle over a road network.



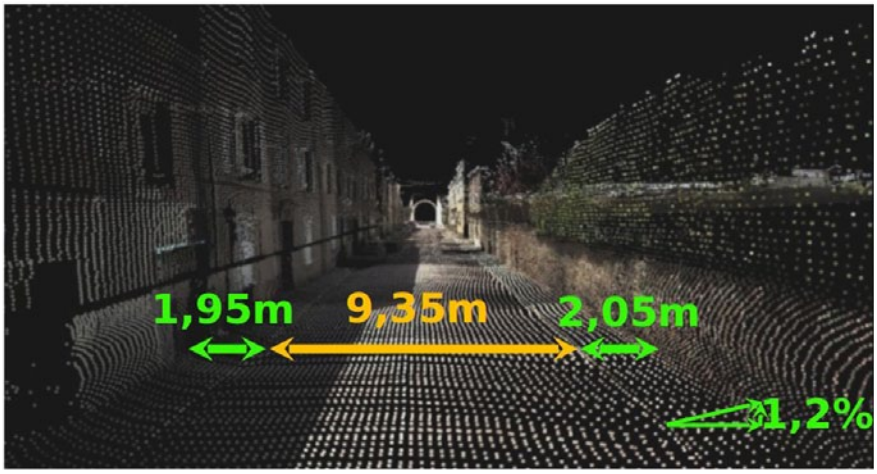
Road view is arranged into groups via segmentation of objects. This permits identification and standardization of these objects. The next step being a automated process.

What's under the hood of the i-MMS and Magelaan?

Techniques applied in i-MMS and Magelaan are known by their acronyms SLAM respectively RANSAC. Some aspects of these underlying techniques are worth mentioning here, though necessarily in a superficial fashion.

SLAM stands for "simultaneous localization and mapping." The following quote from Wikipedia clearly stresses the relevance of SLAM with respect to Viametris' i-MMS (cit.): "a technique used by robots and autonomous vehicles to build up a map within an unknown environment (without a priori knowledge), or to update a map within a known environment (with a priori knowledge from a given map), while at the same time keeping track of their current location." So far so good. The hardest nut to crack, however, is not in the definition of the problem but in its solution. If the map is collected via SLAM, why not show it? So that's what Viametris has done with the i-MMS.

RANSAC, the underlying technique used in Viametris' Magelaan, is an even harder 'nut' to be cracked. This acronym stands for "random sample consensus", which in itself is the opposite of a clarifying expression. Here too Wikipedia comes to the rescue again, though in a somewhat elaborate fashion: "It is an iterative method to estimate parameters of a mathematical model from a set of observed data which contains outliers..." A basic assumption is that the data consists of "inliers", i.e., data whose distribution can be explained by some set of model parameters, and "outliers" which are data that do not fit the model. [...] RANSAC also assumes that, given a (usually small) set of inliers, there exists a procedure which can estimate the parameters of a model that optimally



MAGELAAN is also a standalone GIS system, including standard measurement characteristics.

explains or fits this data." This explanation tells us that RANSAC offers a tool for tracing "known"—i.e. mathematically specified—geometric structures and objects in a LiDAR point cloud. This is what Magelaan has been designed for with respect to the extraction of road curbs, traffic signs, and the like.

Viametris 5 years from now?

Currently point clouds are already too big to be handled by visual interpretation. Viametris is one of many research groups and companies chasing the Holy Grail in LiDAR development: autonomous feature extraction from point clouds. Due to rapid technological developments in LiDAR hardware and computer processing power, point clouds will rapidly expand both in seize and density. By consequence, a lot of clever work needs to be done to make autonomous feature extraction practicable for various applications.

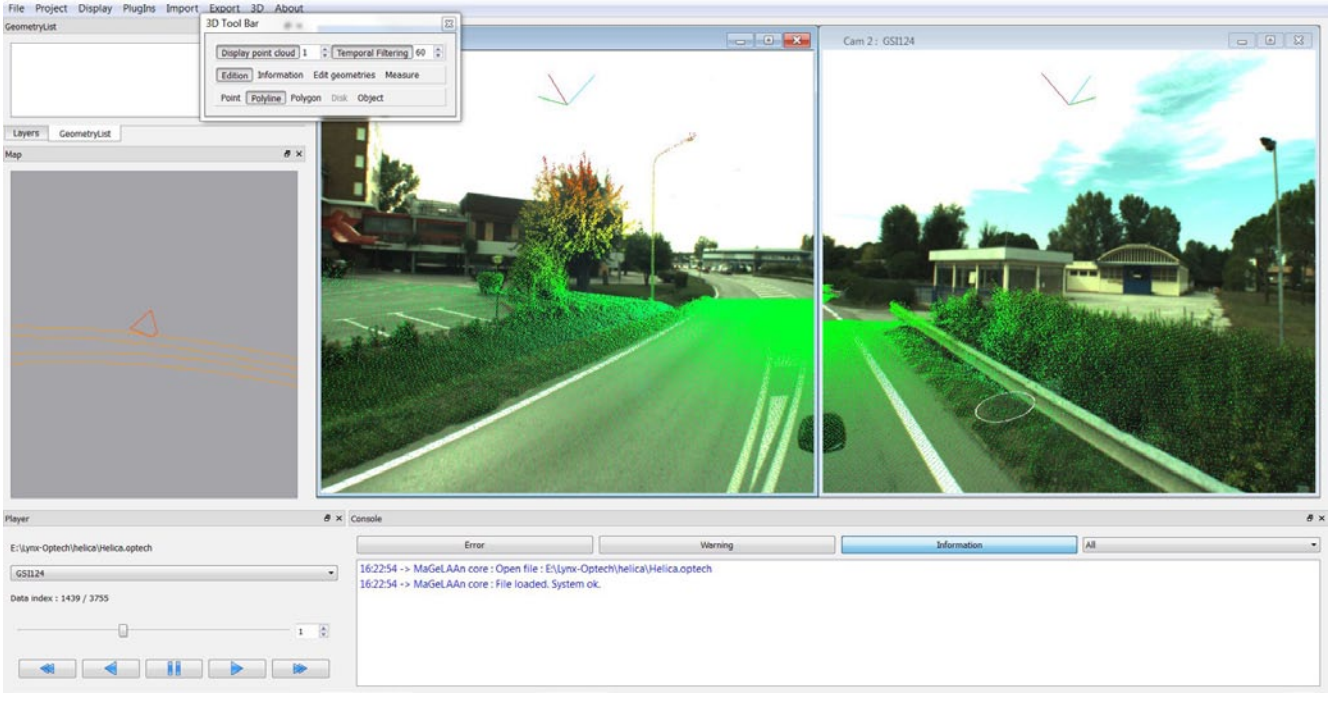
Viametris' RANSAC technology as implemented in its Magelaan software suite definitely has a future. Less easy to foresee is in which direction comfortable niche markets will develop. Urban mobility based on small autonomous electric vehicles is an intelligent guess, I suppose.

Building Information Management (BIM) offers a booming market for 3D as-builts. It also has the potential to be the mother system of all building developments. Consequently, the market for indoor mobile mapping systems is potentially huge. Indeed, the i-MMS has a place in this as a measuring tool allowing real data to be compared in the various stages of BIM

Finally, a company is as good as its "wetware" is, i.e. the quality of its staff. Viametris proves to be a creative and flexible company. It's strongly oriented towards R&D and product development.

About a decade ago the CEO of a world-wide leading company in surveying technology told me about the change he envisaged for his company in order to survive the digital era. His vision was to transform his company "from a battleship into a fleet of small attack-boats." Viametris, with its small and young but highly qualified staff, meets the requirements for such an attack boat. The emerging question is: In which fleet to participate?

Ir. Jan Loedeman is an agricultural engineer by education and recently retired from a long career in teaching surveying, photogrammetry and GIS at Wageningen University in the Netherlands. He is also a former editor of *GIM Magazine*.



Visualization of two view points simultaneously, with super-imposed point cloud.