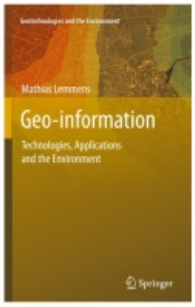
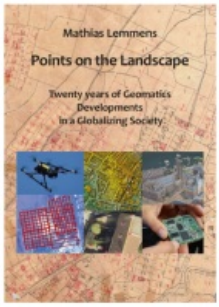
FAREWELL INTERVIEW WITH SENIOR EDITOR MATHIAS LEMMENS

Shedding Valuable Light on the Geomatics Industry





Read this farewell interview with Mathias Lemmens, who is stepping down from *GIM International* after 23 years as senior editor and industry figurehead.

After 23 years, senior editor and industry figurehead Mathias Lemmens is stepping down from his position on the *GIM International* editorial board. He has played such a significant role in the evolution, quality and reputation of this publication that we cannot allow this moment to pass unnoticed. In this extensive farewell interview, Lemmens looks not only back but also forwards as he takes us on a journey through his career in the field of geomatics. A 'must read' for everyone involved in the surveying profession!

You started your career at* GIM International *with a clear focus: to publish high-quality articles on cutting-edge technological developments, new application areas and societal developments that could influence the surveying profession's future. Looking back on the past couple of decades, did you succeed?

It was not so much a career, but rather a sideline to my main activities: research, teaching and consultancy. I'd been a voluntary editor of a national geomatics journal since 1990. When I was approached to become editor of *GIM International* in 1997, I hesitated at first. Just as today, the magazine was sponsored by the industry. How would that balance with my academic independence? Would it lead to a conflict of interests and infringe my ethical standards? But I also recognized its potential for disseminating new technologies to a worldwide audience. Having guaranteed my independence, I agreed. Since then I have written hundreds of columns, articles and interviews with leading scientists and industry decision-makers. Often provocative and thought-provoking, my writings have covered not only technology and technological trends in geomatics, but also and above all the fate of our planet and the people living on it – societal issues, education, Earth's vulnerability (climate change, natural disasters, etc.) and the relationship between poverty and our monetary system and the organization of aid. My major ethical principle was to refrain from promoting individual interests from the realms of industry or science. The eagerness of practitioners and scientists alike to be published in *GIM International* and the use of articles from it in academic education prove how well the magazine has been appreciated. So my answer is definitely yes, I have succeeded!

Your clear and understandable interpretations of the impact of wider developments on the geomatics profession have consistently provided a foundation for learning and debate. What drove you to always take such a broad view?

My broad view stems from my concern about the inequality of wealth in the world. Why are some countries rich and others poor? Why is there such an extreme divide between rich households and poor ones within a particular country? And how can geomatics help to lessen those extreme? I collected many ideas in Part 1 of my book *Points on the Landscape* under the heading 'Wealth and the Art of Map Maintenance'. The first chapter covers land, debt and poverty. Poverty expresses itself through a lack of food, proper sanitation or potable water, but finds its roots in power imbalance and thus money. Land administration systems, a major branch of geomatics, cannot be established without recognizing that our monetary system leads to corruption. The only way to fight corruption is to change the way money is created and implemented in society. It is a misconception that reducing poverty is just a matter of giving money; you can't fight fire with fire. Improving the fate of the billion or so poor people on this planet should be a supported bottom-up process, not a top-down one.

'Geo-information â€“ Technologies, Applications and the Environment' and 'Points on the Landscape'.

Tell us about your passion for writing.

As a youngster I discovered that I had some talent for it, but not enough to make a living out of it, so for my career I decided to focus on my second passion: the Earth and how it is mapped. My editorships enabled me to combine those two passions.

You have always regarded* GIM International *as a platform for the exchange of ideas. How did you encourage knowledge sharing in the magazine?

One way I encouraged the exchange of ideas was in the *Invited Reply* series, in which I approached experts to comment on ideas presented by one or more authors in previous features. I also organized several series of articles – such as on geomatics education, land administration and other topics – and summarized the findings in concluding articles. As disasters became an increasingly relevant application area for geomatics, I introduced a monthly column called *GIMasters and Disasters* in 2007, which ran for several years. And to help our readers keep pace with the rapid implementation of technological advancements in geomatics instruments, my former colleague, Henk Key, and I introduced a long-running monthly column called *Technology in Focus*. Such initiatives take lots of time and require a deep understanding of the potential of geomatics and its role in society, of course.

In January 2000, you wrote in a column that "…beyond 2000, the geomatics industry will be primarily focused upon consumer-orientated services, end-to-end solutions and fast adaptation to user needs". Is this statement still applicable today?

The geomatics industry consists of three layers. The bedrock is made up of the manufacturers of GNSS receivers, total stations, photogrammetric cameras, laser scanners, image processing software, GIS software and so on. These are the primary sponsors of *GIM International* and their messages are directed towards the second layer, which consists of geodata acquisition firms that use instruments and software to serve a wide variety of customers – who form the third layer – such as national cadastres, mapping agencies, municipalities and water boards. In my column, I foresaw that the first layer would take a shortcut to provide end-to-end services to the third layer through dedicated solutions for applications such as construction, firefighting, agriculture and city planning. Today, they are known as 'verticals'. This shortcut has been enabled by cheaper, more intelligent and more productive technologies combined with an understanding of the relevant workflows so that customers in the third layer can perform specialized tasks themselves. The growth of this customer base is ongoing, and I still firmly stand by the words I wrote in another early column: "The future of geomatics is bright".

The geospatial industry has seen its fair share of hypes over the years. Some turned out to be real game changers, some have added a useful solution to the surveyor's toolbox and some have simply vanished. In your view, which of them have made an essential contribution to the industry and what was just a soap bubble?

There are business hypes and research hypes. One research hype back in the 1980s/90s was the use of artificial intelligence (AI) for object recognition. Many researchers working on it – including me – believed that it would soon be possible to feed images captured from the air or space into a computer to produce maps without any human intervention at all, but we were disappointed. The basic flaw in thinking was that computers can mimic the human brain. But now, due to the gigantic volumes of geodata produced today, AI has resurfaced as the Holy Grail for automatic object recognition. In today's academic papers, researchers complain that the complexity of Earth-related scenes, such as the presence of shadows and occlusions, cause 'challenges'. These are the same problems we faced three decades ago, so I am sceptical about the potential of machine learning and deep learning, notwithstanding the huge increase in computer power, storage capacities, and speed of data transport. As for business hypes, one around the turn of the millennium was location-based services (LBS). It didn't actually vanish, but did become invisible, hidden as it is in navigation apps and affected by privacy regulations. And a hype which turned out to be a great success is of course unmanned airborne systems (UASs). Equipped with cameras and/or Lidar and supported by dedicated software, such as dense image matching (DIM), they have become a mainstream surveying tool and have contributed to a huge extension of application domains. By the way, DIM has made a big contribution to the revitalization of photogrammetry as a major source of point clouds after Lidar initially caused its relevance to fade around 2010.

In 2005 you became a self-employed geomatics consultant. Why did you decide to move in that direction after two decades in academia?

Actually, it was not the first time. In my graduation year I co-founded an engineering firm – Geodelta – together with fellow student Robert Kroon. It was my Plan B, because the economic crisis in the early 1980s had caused high unemployment and because the PhD research proposal I planned to work on didn't secure funding. After some time I got a second chance to do PhD research and sold my shares. Today, the firm is owned by a fellow former editor, Martin Kodde. I really enjoyed working in education right from the start. The aim of a university should not be to make a profit, but to fulfil its societal tasks (see below).

Societal Tasks of Universities

1. Creation of new knowledge through research to help society to maintain wealth, welfare and civilization and to prevent poverty and starvation
2. Transfer of knowledge to youngsters, practitioners and society as a whole through lectures and publications in professional journals
3. Structuring of knowledge through textbooks
4. Conservation of knowledge through libraries and – increasingly today – open-access repositories.

"Geomatics graduates can expect their career to get off to a flying start. Where they stand ten or twenty years later depends on their intelligence, commitment to continuous learning, zeal and also a bit of luck."

I am primarily committed to the second and third tasks. As my career unfolded, research got hoisted into the zenith and university managers gained ever-more power. Rather than being respected as proud professionals committed to high standards, teaching staff became part of the 'production machine'. After a burnout, I decided to become self-employed but I continued supporting geomatics students through a small teaching appointment. It turned out to be one of my best decisions ever. Around three years before I retired, I was asked to become Director of the MSc in Geomatics – recognition of my dedication to education at last, albeit a little late!

The surveying profession is a supplier of geospatial data to many users in many disciplines for many purposes, yet there seems

to be a lack of awareness of this. How can education contribute?

Geomatics combines various different technologies to produce geodata and convert it into geoinformation, often as 2D or 3D maps. The applications are virtually infinite. At the end of a project, the surveyor heads back to the office armed with data, leaving barely a physical trace of all the hard work that has taken place, and airborne or satellite-based data collection is even more 'invisible'. Is that a problem? I don't think so. There are many other professions people are unaware of. When talking about geomatics, I explain that it's a combination of the words geography and informatics in which the data are GPS coordinates, digital maps, images and laser measurements. I emphasize that geomatics forms the basis for Google Maps, Street View, satellite navigation and other well-known services. High schools can contribute to greater awareness by teaching about maps in geography lessons, doing geomatics exercises in mathematics, and – in history – discussing the role of surveyors in food supply in ancient Egypt or the role of maps in exploring the world in the 15th and 16th centuries. For example, how many people know that Mount Everest is named after a surveyor?

What are the career prospects for young people in geomatics?

There is a shortage of geomatics professionals to meet the ever-growing need for geoinformation. In 2018, I conducted a survey among Dutch employers which revealed that geomatics graduates are in high demand due to their extensive geodata knowledge combined with ICT skills. Therefore, geomatics graduates can expect their career to get off to a flying start. Where they stand ten or 20 years later depends on their intelligence, commitment to continuous learning, zeal and also a bit of luck.

Climate change – and the associated carbon crisis – is one of the biggest challenges the world is facing today. How can the geomatics profession help society to address this? Are you optimistic or pessimistic?

Satellites record multispectral images with one or more near-infrared (NIR) bands. Topographic airborne Lidar also exploits the NIR band. Both technologies are used for determining biomass, monitoring its fluctuation over time, and mapping vegetation parcels. Climate change causes sea-level rise and heavy rainfall, increasing the risk of flooding and destruction by mudslides. Geomatics technologies are used on a regular basis to monitor the condition of dikes and dunes. Water boards in the Netherlands were among the first to recognize the potential of airborne Lidar. The country's dense DEM originates from its centuries-long battle against water. I am optimistic about the future and believe that humans will continue to dominate the planet for another million years, although not in such huge numbers as today. In line with Darwin's 'survival of the fittest' theory, we should accept that life evolves over time and that we cannot fully control nature.

You worked in academia for many years. How has the way of educating students evolved over the decades?

Not that much has changed over the years, to be honest. A lecturer still stands in front of a class of students. The ubiquitous spread of the internet sparked predictions of a distance learning revolution some 25 years ago. The message was that lecturing is just like giving a presentation, resulting in the delusion that academics should follow a drama course to improve their skills. Blackboards were deemed old-fashioned and removed from lecture rooms. Guess what – they are back again, and many students still make notes using pencil and paper! There have been some benefits of digitalization, of course, such as computer projections replacing overhead sheets and the ability to post lecture notes or messages in digital learning environments. But the way young brains absorb knowledge and adopt skills hasn't changed much throughout history. Learning is also a social activity. Students empower each other. The transfer of knowledge is based on talent and motivation; technology is just an aid. If distance learning were a real alternative, it would have been in place already. After all, the invention of the printing press and introduction of regular postal services could have enabled it centuries ago. In that context, today's online videos are just another tool.

Coming back to your farewell as senior editor of* GIM International, *how can the publication continue to address readers' needs?

The internet inundates us with an abundance of articles, images and videos. But as more information becomes available, the trustworthiness of the source becomes increasingly important. Independent content is essential and high quality standards are rewarded in the long run. The fact that *GIM International* has been flourishing for over three decades is proof of this! There is a continued need for articles that illustrate the potential of promising technological developments not based on claims, but through use cases in which the technologies have been applied successfully. Don't talk, show! Regular articles on state-of-the-art geomatics technologies will provide valuable ongoing support to professionals, especially when combined with product surveys from the high-end segment. New technologies are rapidly implemented in instruments and it remains important to help practitioners understand how they work so that they can judge the suitability of such instruments for their existing or planned workflows.

How are you spending your well-earned free time now that you have retired from your decades-long career at TU Delft and also from* GIM International*?

I recently finished a monograph which I had been working on for four years. The book, entitled *An Introduction to Pointcloudmetry – Point clouds from laser scanning and photogrammetry*, will be issued by Whittles Publishing (ISBN: 978-1-84995-479-2) next year. I regard it as my legacy and hope it inspires students and practitioners. I have also written a chapter – on airborne and ground-based laser scanning – for the forthcoming publication called *The Routledge Handbook of Geospatial Technologies and Society*. Now, I am switching to other pursuits. I have written a novel, in Dutch, that is set on a university campus, which was published at the end of October. As a long-distance cyclist I also have plenty of exciting travel plans, but unfortunately they are currently being thwarted by the coronavirus measures. I hope to be able to set out on new adventures very soon!

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Biography
Mathias Lemmens (1953) started his career as a draughtsman and reckoner at Kadaster (the Dutch cadastre). He received his MSc in Geodesy from Delft University of Technology (TU Delft) in 1983 and was appointed as assistant professor there in 1987, specialized in geodata acquisition technologies and geodata quality. He completed his PhD thesis on photogrammetry and computer vision in 1996. In 2005 he started as a self-employed geomatics consultant while retaining a small teaching appointment at TU Delft, where he recently retired from the position of Director MSc Geomatics. Lemmens is author of over 500 publications, including scientific and professional papers, books, chapters and lecture notes, and has supervised over 50 MSc and four PhD students. As team leader and GIS advisor he has led major EU and World Bank projects in Estonia, Nigeria and Kenya. His popular book *Geoinformation – Technologies, Applications*

and The Environment, published by Springer in 2011, provides a unique and in-depth survey of geomatics. In November 2019, to mark his retirement from TU Delft, he published *Points on the Landscape – Twenty Years of Geomatics Developments in a Globalizing Society*, a compilation of 150 selected columns published since 2000. He is also author of the monograph *An introduction to Pointcloudmetry – Point clouds from laser scanning and photogrammetry*, to be issued by Whittles Publishing in 2021. Lemmens is married with three children and one grandson. In his spare time, his biggest passion is travelling through Europe and Asia on a bicycle loaded with survival kit. He has written two books about his long-distance cycling adventures (in Dutch).

You can contact Mathias Lemmens by e-mail.

https://www.gim-international.com/content/article/shedding-valuable-light-on-the-geomatics-industry