

## Interview



### Surveyors Need to Change Their Attitude

*Interview with the Rector of ITC: Prof. Martien Molenaar\**

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As from 1st January 2002, ITC will adopt the updated designation 'International Institute for Geo-Information Science and Earth Observation'. The developments leading to this change were introduced by Professor Martien Molenaar in his inaugural speech as new Rector of the ITC in December 2000. Under his responsibility, this famous institute in The Netherlands is undergoing transformation and restructuring. The new rector, whose predecessor was Professor Karl Harmsen, is still very much involved in his profession and the world geomatics community. His appointment provided reason for an interview with GIM International.

*You're well familiar with ITC and you have been rector since January this year. Please tell us what you see as the most significant differences between the way in which education and research is carried out at general universities and the way it is done at the ITC?*

There is a difference in mission between ITC and normal universities. Essential to the mission of normal universities is the education of young people to prepare them for a

career in society. ITC educates mainly professionals who already have a career with organisations predominantly located in less developed countries. The aim of such an education is institutional strengthening and capacity building. So although we educate individuals, we actually co-operate with the organisations from which our students come. In educating these individuals, we help the organisations to improve and modernise their work processes and to adapt to the needs of today's information society. This all means that our students at ITC have an average age of 33 years, which is over ten years older than at normal universities. Our students can receive Professional Masters, Master of Science and PhD degrees. Our programmes are all focused on the same theme: Geo-Information Science and Earth Observation. Normal universities provide a wide variety of themes. A substantial proportion of our research is directly devoted to consultative work and the strengthening of our position as an institute for international knowledge exchange in this respect. Although we do carry out fundamental research, the balance between fundamental and problem-oriented research is apparently different from that in normal universities.

*How does development in research support education at ITC?*

Education, research and advisory services are all at the same level and they support each other. We carry out a lot of applied research to support organisations, primarily in developing countries, which want to implement new procedures and systems. Our applied research is fed from more strategic fundamental research, carried out primarily under our Ph.D. programme developed over the last twelve years. In the meantime, our fundamental research programme has resulted in fifty Ph.D. candidates permanently carrying out research in-house. The annual intake is in excess of ten PhD candidates. Yearly, about ten of our researchers receive their Ph.D. degree. ITC has not itself the ability to issue Ph.D. degrees. To do so, we have good co-operation with other universities who are represented on our board. Those wishing to participate in our Ph.D. programme should have attained an appropriate academic level. Our professors and other academic staff have very significant scientific stature, so that they are able to provide a high quality environment and support for



Prof.dr. Martien Molenaar, new rector of ITC.

PhD research. Most of our professors also have an assignment at one of our partner universities, providing them with the status to act in academic promotion of our PhD candidates.

*During the fifty years of ITC's existence, thousands of students from all over the world have followed courses and many have graduated from here. Can you give an impression of the impact of this knowledge transfer on countries of origin of these students and on the organisations which employ them?*

This is a very difficult question. How should such impact be measured? We keep in contact with our alumni and their organisations. Many organisations, including universities, have a substantial number of staff with an ITC education background. This has certainly had an impact on the performance of these organisations and upon the perception of the role played by the individual organisation in society. It has helped organisations to adopt and adapt new techniques to improve performance. A number of

vices. About 50 per cent of our students come from organisations with which we have long-term contact. The aim is to provide them with knowledge and skills but we also support their sponsoring organisations with advisory services to help to improve their performance and to modernise their role in a modern information society. One example of such a co-operation is the long-term arrangement with the Egyptian Survey Authority. Their employees are trained by ITC, but we also organise seminars for mid- and top-level management to aid them in dealing with a modern, information-oriented organisation.

*Rapid developments in earth observation technologies, GPS and standardisation efforts in relation to Open Gis will all have an impact upon the dissemination of geo-information in many developing countries. What will these moves bring us?*

Many countries have mapping organisations within which the production processes for topographical mapping date from colonial times. Such organisations have a hard time



The interview with Prof. Molenaar took place in the ITC building, Enschede, on 9th July 2001.

universities have developed curricula on the basis of ITC experience. We also have joint programmes with some of these universities. Furthermore, we have set up schools within several professional organisations.

*After having completed the ITC programme, people return to their home countries refreshed with new knowledge, but knowledge should come to rest on good ground....*

... Indeed, education alone is not enough. Therefore our education programmes are supported by advisory ser-

to keep pace, in terms of production rates, with the fast development of their country. Traditional approaches are too slow. I think that along with new mapping techniques we should develop new concepts for core data production and provision which avoid the slow processes of traditional map production. If we do not dwell too much on interpretation but instead correlate data geometrically sufficiently correctly with GPS, then we can work on the provision of a good core dataset capable of being linked to other types of information, like vegetation and soil data. In training and conceptual development there should come

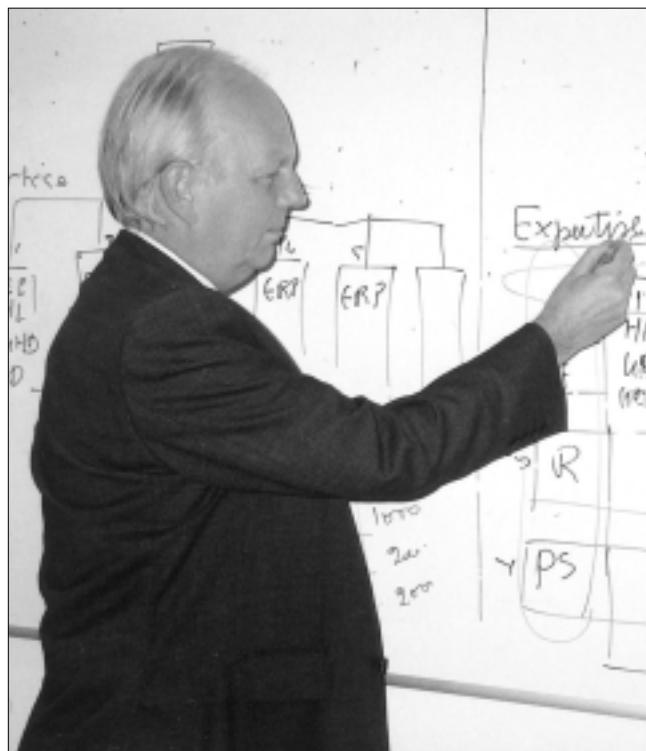
a move away from the traditional map concept still so often found in the definition of products.

*How do you mean... in what sense?*

For many purposes, the mapping of objects on the earth's surface alone is no longer sufficient. An example is the monitoring of soil erosion or of vegetation. Here we are not so much interested in discrete terrain states as in processes. In the past, we were specifically focused on making snapshots of a terrain state at a particular time. However, to solve today's earth-related problems one needs to identify and to model processes. The huge amount of data now becoming available, mainly stemming from sensors on satellite platforms, should help us to understand earth processes. But these mapping processes are completely different from mapping a particular state of the earth surface. From the process perspective, a house should not be considered as an object with a boundary, and so on, but as a unit which responds to events or processes occurring in its immediate, or even its far distant, neighborhood. As a result, the thematic component of geo-information is becoming much more important than it was considered to be in the traditional perspective of surveyors and cartographers. Indeed, traditionally surveyors look at the world as being very static and stable. Since it is important to consider the world within the concept of processes, surveyors need to change their attitude. The paradigm shift from static to process in conceptual terms influences our profession and how we have to educate surveyors.

*It seems remarkable to hear these words from the mouth of a geodesist...*

...After my education in geodesy at Delft I was for ten years employed at ITC, where I was professionally mainly involved in the field of photogrammetry. It was a challenge to me then to change to Wageningen Agricultural University. I was not acquainted with that environment but I saw it as a challenge. With the change of working environment, I also experienced a change in perception of the world. As a geodesist one is educated to see the world as something which can be measured in a geometric sense. The agricultural scientists at Wageningen look at the world from a different perspective. They see the world as a complex system of linked processes which should be approached from a semantic perspective. A geodesist is educated to understand technique. He looks at the world with his technical tool box in his hand. His main focus is to apply his technological skills. An agricultural scientist is trained to understand the world, to identify problems and to see which tools and technology should be chosen and applied to solve these problems. The one cannot do with-



*It is important to consider the world from the conceptual point of view of processes. Therefore, surveyors need to change their attitude. It also affects the way surveyors have to be educated.*

out the other. The problem-solver cannot do without the tools of the technologist. But somebody who is busy developing techniques and tools without understanding the real world problems for which they could be used to find solutions will ultimately lose his role in society.

*Should surveying and mapping schools change the way they educate their students in order to adjust to the changing role of mapping?*

It's a two-way communication. The geodesist has to understand what problems earth-scientists and others try to solve because the tools available for problem-solving may have a great impact on the actual formulation of the problem; to use the words of Chris Gold, if you have a hammer every problem looks like a nail. On the other hand, earth-scientists should have a notion of the possibilities and limitations of mapping technology and thus their relevance for the problems they actually want or need to solve. One has to evaluate history and judge whether today's approaches are still relevant in the context of the new needs of society and the problems with which it is confronted. The educational programmes of the past were mainly focused on solving the many computational problems in land surveying because these were substantial. Solving computational problems requires much understanding of mathematics and statistics. As a result, these

subjects became a substantial part of any surveying curriculum and, in addition, one had to learn much about the gravitational field because of the role of the geoid in mapping. To understand all these subjects to the level at which they might be properly applied in professional life took a substantial part of the time available in university curricula. However, carrying out heavy computations is no longer the daily work of the surveyor. Many complex data transformations are now embedded in software easily run on a PC. The change from pen-and-paper computations to software tools over the last twenty years has placed the geodesist in a completely new area. He needs an understanding of fields of application in order to be able to provide a value-added service. The risk of overly technical-oriented education is that there is overemphasis on the development of tools and too little sensitivity for the context in which these tools have to play a role.

*Less technology, better understanding of application fields: this is how we understand your message. What is your opinion about the need to provide students with management skills?*

What one needs after completion of the study is an open mind. Look at people who are successful in society and then look at what they studied. Were they trained in marketing and economy? When you're eighteen, you should take a curriculum which is interesting and fascinates you. The academic attitude acquired is much more important than what is actually learned. One should look beyond the problem areas learned at school. One should look at the opportunities offered in life and then one can go ahead. Having gained an understanding of the main structure of society, one can deal with it. Today there are so many opportunities.

*You were one of the leading persons in ISPRS. Organisations like the ISPRS, including for example FIG, have been in existence for a century or even longer. In the course of their existence society and technology have changed quite a lot. How do you see the future role of the ISPRS in today's dynamic society?*

Honestly, I do not know what the role of ISPRS should or will be in the future. What I see today is that the ISPRS



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community is not anymore the fixed community it was in the past. New groups are rapidly joining ISPRS but they are also rapidly disappearing.

In the past, somebody with a photogrammetric education was a photogrammetrist his whole life long. Today, the situation is completely different. Somebody may join in ISPRS events a couple of times whilst an active member, for example during the writing of a Ph.D. thesis on one of the problem areas concerning ISPRS. He or she does so because they may benefit from the exchange of ideas and sharing of views. However, after completion of their research, this same person may become active in a completely different profession. Change of professional perspective is today very easily effected. Of course, this development results in great mobility within the community. As a result, there is no longer any fixed audience on which one may count. Society Council and working group chairmen increasingly have to make substantial efforts to keep people interested and to attract newcomers by organising high quality events. The changing role of the society is also expressed in the congress exhibition. One doesn't see much photogrammetry anymore. The major interests concern image processing, GPS, and GIS. This is a completely different society compared with, say, twenty, or even ten years ago. Although I don't know what the future will bring us, I know for sure that ISPRS and other comparable organisations, like FIG, have to adapt to changing needs all the time. They also need to anticipate developments, however rapid, or else they will lose their reason for existence.

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