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2003 number 3

introduction

When this edition of *ITC News* lands in your mailbox, it will make a heftier indent than usual. Much is happening in and around ITC, so it's no wonder that sometimes boundaries - and page numbering - must be extended to keep you up to date with the latest news. Spatial and temporal dimensions play a key role in publishing too!

Doors opening and closing feature in many a proverb, so we'll just leave it at that. Suffice it to say that September was a pivotal month, with both graduation ceremonies and the Opening of the Academic Year 2003-2004 writ large on the calendar. During the official opening ceremony (pages 2-7), Professor Menno-Jan Kraak's stimulating keynote address gave the newly arrived students a taste of things to come. And among the special guests welcomed on that occasion was Professor Shunji Murai, fellow of ITC and professor emeritus of the University of Tokyo. Those fortunate enough to be at the Institute on 29 September were able to attend the guest lecture given by Professor Murai: his subject the three-line scanner for large-scale mapping. Still, those engaged elsewhere that day - and this will apply to the vast majority of our readers - have not been forgotten. Turn to pages 11-17, and you'll discover that *ITC News* is carrying a fully-fledged scientific paper this time around.

Opening and closing, all very well and good, but what happens in between? "A goodly amount", to put it plainly. For one thing, you can read all about the experiences of the course participants during the rapid field survey that concludes the introductory module of the NRM programme (page 29). No doubt too, Iris van Duren's entertaining account of MSc fieldwork and research in a Chinese wetland (page 28) will resurrect many personal memories. On the other side of the fence, the extracurricular activity Run4Fun presents challenges of a completely different nature (page 18). This article appears a little later than originally intended - those spatial constraints once again - but not too late to inspire ITC's present student contingent to dig out their running shoes and start training for next year's events. It would certainly brush away a few cobwebs.

Reading habits vary. Some people read literature straight through from beginning to end, others are perfectly happy to pick and mix. And quantity does not necessarily mean quality, but in the case of *ITC News 2003-3* we sincerely hope it does. The verdict is yours!

Janneke Kalf, Acting Managing Editor

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Opening Academic Year 2003-2004

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Again this year the Grote Kerk in the old market square of Enschede was the scene of the opening of ITC's new academic year.

Those enjoying the fine afternoon on the pavement terraces dotted around the cobbled square watched the comings and goings with interest - a pleasant meeting of town and gown. Uplifting music played by Mr Gijs van Schoonhoven on the church organ greeted visitors as they entered the building and took their seats.

In his opening speech Rector Martien Molenaar welcomed the ambassadors of Ghana and Indonesia, the members of ITC's Supervisory Board, and Professor Shunji Murai and Professor Klaas Jan Beek, honorary fellows of ITC. Furthermore, he extended a special welcome to the new course participants, who had come to ITC to learn more about geo-information science and earth observation. Speaking on behalf of the Student Association Board, Mr John Ballesteros, acting president, wished his newly arrived fellow students a pleasant stay in Enschede and every success in their studies and research. He also reminded them that the SAB would be at their service during their stay.

A musical interlude followed. The duo "Brandhout" (Mr Tijmen Vroegop and Mr Joris van den Berg on clarinet) played two pieces, *Duo for Two Clarinets, opus 6* by

Crussell and the first part of *Three Grand Duets* by Cavallini. While enjoying the music, the audience also had the opportunity to appreciate the impressive church interior, with its magnificent stained glass windows and handsome chandeliers.

In his keynote address, Professor Menno-Jan Kraak, professor of geoinformatics, cartography and visualisation at ITC, took his listeners on a tour of worlds beyond the map - the world of imagination, the world of technology, and the world in which maps can play new roles. And he urged the students to ask questions, be critical and strike out on new paths.

Winner of the Klaas Jan Beek Award this year was Mr Chockalingam Jeganathan from India. With the presentation of this award, the opening ceremony drew to a close, to be followed by a lively reception across the square in the Twentse Schouwburg (Enschede's theatre). Although only a short walk away, many paused first in the square, talking in groups and taking photographs. Naturally enough, the new course participants from Ghana and Indonesia were keen to pose with their ambassadors - it certainly was a very special occasion.

The new course participants at the old market square, talking in groups and taking photographs

of this new technology. Some 30 years ago the Canadian government was the first to introduce GIS methods for land and forest inventories but since then the development of geo-information has gone through several stages:
• developing software for special applications
• the drive of technology
• information management
• organisational and management aspects
• institutional and policy issues (local, national and international geospatial data infrastructures)
• governance, spatial processes and geo-information provision.

Professor Molenaar briefly guided his audience through each stage, emphasising that "we should always keep in mind that the real problem is the management of geospatial complexes and processes, be they man-made, man-induced, natural or combinations of these. We think here of urbanisation processes, the management of natural resources, water management, the management and exploitation of earth resources, the monitoring of global change, etc."

Opening Speech:

Rector Martien Molenaar

In his opening address Professor Molenaar posed the question: "How short is history?" We live in a world where the role of technology is taken for granted: we communicate by e-mail, search the Web for information, enjoy the easy convenience of cell phones, and have the choice of innumerable television channels. Yet we tend to forget that some ten years ago such services were not generally available.

"Geo-information provision today is completely based on computer science and ICT, which in its present form has a history of about 60 years. The history of remote sensing is even younger. It is just 30 years ago that satellite remote sensing became available for civil purposes. And now we are used to receiving regular updates of the worldwide weather forecast illustrated by satellite images. Whenever there is a disaster, we see satellite images of the damage on television within a few hours."

But Professor Molenaar warned that we should not underestimate the amount of effort required to make good professional use

Nor has ITC stood still. The academic field of ITC shows a fast and continuous development and this is reflected both in the Institute's organisation and in the ongoing processes of degree harmonisation, accreditation and decentralisation. Furthermore, the Dutch government has introduced some far-reaching changes in various policies and regulations, not all of which have been well received. "Political decision makers do not always appreciate the fact that international cooperation requires long-term investment in institutional and personal relations." Moreover, some of the new procedures have been plagued by teething troubles and it is to be hoped these will soon be cured.

Welcoming some 230 young professionals from all over the world, and encouraging them to take full of advantage of the opportunity to learn about other cultures and to exchange ideas during their stay - "this informal part of your education will prove to be at least as important for your personal development as the education through our programmes" - Professor Molenaar declared

Rector Martien Molenaar

Mr John Ballesteros

the academic year 2003-2004 open.

Student Association Board

Mr John Ballesteros, acting president of the SAB, added his personal welcome to the new students. He said that ITC was a unique place, where professionals from more than 80 nationalities gathered every year and could share or exchange cultural values, expertise and opinons. He recognised that they had left behind friends, family and loved ones to come here and pursue their studies and that sometimes this might prove hard to bear. But he also had words of encouragement: "Don't worry, soon you will start making new friends … and the cultural shock will pass too. And of course you will get a new kind of family, the ITC family, which you will miss when you go back home." Past experience has shown that, although achievements at ITC are not easily come by, students can rely on the capable supervision and willing cooperation of the staff and he assured them that "if you remain focused on your tasks and effectively manage your time, success will be bound to come".

Keynote Address:
Prof. Dr Menno-Jan Kraak
"Beyond the Map"
Professor Menno-Jan Kraak studied geography at Utrecht University, where he specialised in cartography. Following his studies he became an associate professor at the Geodesy Department of Delft University. In 1996 he joined ITC, where he chairs the Department of Geo-Information Processing. Professor Kraak has gained a worldwide reputation through his many publications in journals and contributions to congresses. His books are used by students and professionals the world over and have been translated into many languages.

Prof. Dr Menno-Jan Kraak

In his keynote address, Professor Kraak introduced his audience to worlds beyond the map. Perhaps the most appealing was the world of imagination. Maps can create an image in the mind of the reader, and the image will depend on the text, colours and symbols used - and maybe also on the colours and symbols not used. "But you probably all realise and know from past experience that maps give you different views. We can look at the same reality and still get different impressions." A topographic map will try to describe an area as accurately as possible; satellite imagery may be an option but interpretation and the information retrieved would be different. Combining a topographic map and satellite map of the area could provide information on the heights of the region. And draping this height map over a digital terrain model would present a different view again of the

same piece of landscape.

A second world beyond the map is related to the technology applied. "How is it created? How did we collect our data? Where did we gather the remote sensing information? How did we structure the information in our databases? How are we able to display the areas of interest in the right format and the right colour? This is the world beyond the map you will be confronted with during your stay at ITC."

At this point Professor Kraak gave a brief description ("a few samples that are not necessarily representative of the whole programme") of what awaited the new students at ITC. Those who had enrolled for the Geoinformatics programme would deal with the technology and methodology of the geodata spatial handling process. They would learn how to collect data, what kind of technology was available, which satellite was the most suitable for what, how to organise and store data, and how to query the database in order to produce a map of useful shape and design. Those following the Geo-information Management programme would deal with questions related to organising and managing large volumes of data. Here geodata infrastructure plays an important role and the problems involved are extremely complex. For instance, the problems may relate to planning whole neighbourhoods, with information being required (and integrated) from all kinds of sources.

When planning a new neighbourhood, maps (possibly 3D maps) can be used to map different alternatives, or animations can be used to trace urban development in the past or play out future scenarios. This lies within the province of the Urban Planning and Land Administration programme. On the other hand, the flooding of river areas would be handled in the Water Resources and Environmental Management programme and would involve simulations, maps and models. "If you want to predict flooding and see what measures have to be taken, then this model is very important. It depends on the knowledge of people in water resources, and how well the model will link to reality."

The Natural Resource Management programme deals with managing problems of the environment, and maps are used for making inventories of vegetation, human influence on the landscape, geology, and endangered species. Attempts are made to combine these maps to ensure the survival of such endangered species. Then of course the Earth Resources and Environmental Geosciences programme looks at hazards that might occur in our world. For example, these may be volcanic eruptions or may be related to plate tectonics.

Turning his attention to the third world beyond the map, Professor Kraak said: "All the uses of maps in the educational programmes that I've shown you till now are conventional ways of using maps to try to solve problems - and of course my colleagues can use them in more advanced ways than I can demonstrate here. But what I would like to do now is to open your eyes and make you think alternatively, make you think differently, and see how maps have a role to play here. If you always follow a path that is already marked out, then you will never discover anything new. And at the end of the day, that's what you want: to discover something new. So we will see how the map can be used to support our thinking, to build hypotheses, and to enrich our knowledge of what happens over the globe."

For example, the map is very useful as part of a geodata infrastructure. Two disasters in recent years have prompted the Dutch government to commission a map of the Netherlands that indicates all the risks. This will ensure that people are aware of any dangers in their area. Clicking on individual symbols will access the database, and the relevant information will be displayed. Such information can then be queried or linked to other information.

Another relatively new realm that can be mapped is cyberspace. On the Internet, for instance, "You could trace how your request for information goes over the globe. Which servers do you visit? Before downloading new software, you could see where it really comes from, where it is being processed. Or how about mapping an e-mail network to see who is in the centre of a certain community, who gets the most requests, who gets the most tasks." Then there are maps in re-

ality, using virtual reality animations to compare the real world we live in with a future scenario, perhaps to obtain political backing for planning projects.

All in all Professor Kraak's stimulating first lecture of the academic year left his audience with plenty to think about and the firm resolution to "Be critical. And always ask why."

Klaas Jan Beek Award 2003

As the official programme moved into its final stages, it was the pleasant duty of Rector Professor Martien Molenaar to invite Professor Klaas Jan Beek to present this award to the author of the winning MSc thesis. First, however, he said a few words about the winner and the subject of his thesis.

"The best thesis, placed first by almost all members of the Scientific Council, and thus

the one winning the award this year, was written by Mr Chokalingam Jeganathan from India and was entitled *Development of fuzzy logic architecture to assess the sustainability of the forest management.* Mr Jeganathan joined the GFM MSc programme in September 2001 in preparation of the joint GFM course GEONEDIS of IIRS and ITC. He is now a lecturer in geoinformatics and the co-coordinator of the joint GFM course, which now runs mainly at the Indian Institute of Remote Sensing in Dehradun, India.

The overall objective of his thesis was the exploration of the role that fuzzy logic can play in improving the decision-making process for assessing the sustainability of forest management; this is for the purpose of forest certification. Mr Jeganathan had a very clear idea of what was to be the topic of his MSc research and he proceeded in his research in a very independent manner. He was able to develop a highly technical procedure and to apply it in a complex application."

Mr Jeganathan was presented with a certificate, together with a cheque for €1,000, by Professor Beek. He also received flowers, and a generous round of applause from those present, in recognition of his achievement.

With that the Opening of the Academic Year 2003-2004 had reached its conclusion, and the organ music signalled that the time had come to vacate the seats and leave for the reception across the square.

Mr Chokalingam Jeganathan (first row, second from left) with some of the new course participants

In the foyer of the Twentse Schouwburg, Enschede's theatre, ITC News was hoping to waylay an unwary student or two, and met with a certain amount of success.

Ms Sharmistha Saha comes from Bangladesh, where she works in Dhaka as the assistant superintendent of survey for a government organisation, the National Survey of Bangladesh. She holds a BSc in civil engineering and has enrolled for the PM degree programme in Geoinformatics. She arrived in the Netherlands some ten days ago and, although she's met the programme director and had an introduction to Blackboard, since formal classes do not start until next week, she's taken the opportunity to explore the neighbourhood a little - the hotel, the shops, not too far afield. Ms Saha is greatly attracted by the mix of cultures that she's found at ITC and the chance to learn from one another. The only drawback is leaving her home and family, especially her husband. That's very difficult. Her husband is a computer professional and they have written a book together on computers. But before you try to reserve it at the ITC library, make sure you understand Bengali! Anyway one thing's for sure, computers hold no terrors for her.

And her compatriot **Ms Refat Fatema** also feels completely home at the keyboard and monitor. "You could say the computer is my best friend," she says jokingly. Computer in the office, computer at home, and she enjoys chatting on the Internet. This "necessity" of modern life comes tax-free in her country, which means prices are not so high - evidently Bangladesh is very computer-friendly. Ms Fatema, who holds a bachelor's degree in urban and rural planning, will be following the MSc degree programme in Urban Planning and Land Administration. She works as a planner for a private urban planning and GIS organisation and in fact it was

her employers that suggested she come to ITC. She's involved in a project concerning a detailed aerial plan of Dhaka (part of the master plan) and GIS expertise is highly important. But Enschede has an additional attraction as far as Ms Fatema is concerned: her husband is also an MSc student at ITC. Unfortunately he's away in Nepal at the moment, so just for the time being it's back to chatting on the Internet.

Messrs **Tesfay Ghebray Woldemariam**, **Abraham Hailemelekort Melkamu** and **Desta Hagos Tefera** came in together on a flight from Ethiopia on 16 September. And first impressions of the Netherlands, or at least Enschede, seem to be favourable: neat, well scheduled, good amenities … and tall people. They are all looking forward to studying in a developed country, with more comprehensive facilities. Mr Abraham and Mr Desta have something else in common. Fourteen years ago they shared the same campus, where they both gained BSc degrees in agriculture, the former specialising in plant science and the latter in agricultural economics.

Mr Abraham works in Addis Ababa as a senior agricultural expert in the environmental impact assessment service for the Environmental Protection Authority, while Mr Desta is a senior socio-economist at the Department of Planning and Project Preparation of the Bureau of Water Resources Development in Mekele, Tigray. They have both enrolled for

the MSc degree programme Natural Resources Management but have opted for different specialisations: Mr Abraham for Environment & Systems Analysis and Management and Mr Desta for Planning and Coordination in Natural Resources Management.

And Mr Tesfay? Does he fit into this pattern? To a point, yes. He holds a BSc in forestry and has worked as a forestry researcher for the Mekele Agricultural Research Center of the Tigray Agricultural Research Institute for the last four years. He too has enrolled for the Natural Resources programme but will take the PM path. And why this difference? Why PM? The choice was made for him; it's a matter of departmental policy and guidelines. He's hoping the course will benefit his career by opening up more opportunities in the research field.

The three new course participants have come well prepared for their studies. They have toned up their computer skills by following some basic courses, and English as the language of instruction is no novelty. In Ethiopia English is taught as a subject in the lower school, while at high school it is the medium used right across the board.

As the foyer grows busier, and the clinking of glasses (and occasional crash) from the reception becomes ever more insistent, it seems only right to release the students to join in the fray, and to wish them every success in their studies.

Masters of Their Profession

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Enter the reception hall of the ITC building on any ordinary weekday between 9.00 and 9.30 in the morning and you're likely to be struck by the peace and quiet that befits academic industry.

But to pass through the automatic doors on 5 September 2003 was to be met by a sea of faces and the buzz of conversation as people arrived to attend the PM graduation ceremony. People not only gathered in the hall but also spilled over into the courtyard and gardens, a setting that provided a splendid photo opportunity for private and professional photographers alike. Class photographs this time round will clearly show that, contrary to malicious rumour, the sun actually does shine in the Netherlands.

A word of explanation may be in order here. Given the number of PM students graduating this year, it was decided to hold four graduation ceremonies spread over two days. In this way, the auditorium would comfortably accommodate all those who wished to attend. The ceremonies for Geoinformatics and Natural Resources Management were held on Thursday, 4 September, while it was the turn of Geo-information Management and Urban Planning & Land Administration on Friday morning, and Earth Resources & Environmental Geosciences and Water Resources & Environmental Management in the afternoon.

Hopefully this account of the proceedings on Friday morning will also strike a chord with those who attended the other ceremonies. By 9.30 am students, staff, family and guests had taken their seats and were waiting expectantly for the ceremony to begin. They didn't have to wait long. Sharp raps on the floor and ITC bedel Loes Colenbrander, carrying her staff of office specially made in

Mr Mohammed Issifu Segda (GIM.3), Ghana

"always smiling, and gave a plenty of support to others"

No one would quarrel with that thumbnail sketch of Mr Issifu Segada. He came to ITC to acquire new skills but while acquiring, he also gave. He served as assistant secretary general and communications commissioner on the Student Association Board and he feels that this rewarding work would be "a very good experience for anyone". The SAB looks into the problems of fellow students and "the joy of being able to help" is considerable. So he now has two certificates (see main article) to carry home to his wife and children (a girl and a boy) in Ghana.

A valuer by profession with the Land Valuation Board in Cape Coast, he found that the GIM programme fully lived up to his expectations. And a positive reaction too when it came to accommodation and the general facilities. Working in a purely analogue environment back home, he leaves Enschede with the confidence that at least there is hope. On the one hand bombarded with data and on the other confronted with the unavailability of data, he now knows there are the tools to assist and to capture such data effectively, as well as the people to apply them. Computers and software lie at the core of the GIM programme, and Mr Segda would advise any would-be students to check out the relevant software beforehand, if at all possible, and cover the basics. "Such exposure would certainly help a lot."

And life in the Netherlands? Well, not so very different from life at home. There are plenty of shops selling all varieties of food so, if it's typical African food you're after, you won't be disappointed. But the winter is excessively cold, and of course there are the mysteries of the Dutch language to contend with. Communication difficulties tend to restrict most social contacts to ITC circles, although some people in the shops and streets are only too happy to respond. In the past the SAB and the dean of students have made arrangements for students to visit Dutch families, for example via the Rotary Club in Hengelo. Unfortunately this was not possible this year. Still, Mr Segdaa thinks it is important for the students to have links outside the Institute, to make them feel part of the wider community. Positive and optimistic, he looks for the best in people and situations … it's no wonder, he finds it.

Mr Saswata Bandyopadhyay (UPLA.3), India

"the motor in the group"

When Mr Saswata Bandyopadhyay arrived in the Netherlands a year ago, you could say that weather-wise he was thrown in at the deep end. Leaving India with its 300 days of sunshine, he disembarked at Schiphol and promptly exchanged a temperature of 40° for one of 4°- and no sign of the sun in the sky. As he himself puts it: "Not a cultural shock, a climatic shock." He also arrived a little late and missed the official Opening of the Academic Year. Paperwork was the cause of the delay, as it seems that "legislative wheels turn slowly" in India.

At ITC he found a cultural "melting pot", with people from all over the world, a bit strange at first but certainly invigorating. It was also a bit strange to be a back studying in a classroom again after eight years. In fact we're talking here of role reversal, as Mr Bandyopadhyay is a lecturer at the School of Planning in Ahmadabad. He followed the UPLA programme, opting for the specialisation in Urban Infrastructure Management, which deals with water, sanitation, traffic issues, and the like. In particular, he feels his newly acquired skills in using GIS as an urban management tool should be useful on his return home.

Nothing if not practical, Mr Bandyopadhyay set about investigating the road and rail infrastructure of Europe. He took advantage of the good roads to explore the countryside around Enschede, cycling miles and miles over the weekends. And then he discovered a second vocation as a travel agent. They started out as a group of four, visiting Germany, Belgium and Italy and tacking days onto the weekend whenever they got the chance. Come the end of the year they'd seen most of Europe and the group had grown considerably in number. In fact by the time they visited Switzerland, there were no less than 30 - "which gave the immigration authorities a bit of a jolt".

Amidst all this activity, you'll be happy to know Mr Bandyopadhyay did find time for his studies, and he was awarded his degree "with distinction". Not only that, when he arrived in the Netherlands he could barely cook an egg, but that has all changed. He has enjoyed acquiring culinary skills along the way, a fact that is likely to find favour with his fiancée on his return home.

Nigeria for ITC, led the cortège headed by Rector Professor Martien Molenaar into the auditorium.

Once everyone was settled, Ir Jan de Ruiter, the dean of students, was soon on his feet in his role as master-of-ceremonies, introducing the various speakers. First to congratulate the students on their notable achievements, both academic and social, was Drs Sjaak Beerens, ITC's director of external affairs. Academically they had acquired new technical and managerial skills to deal with a rapidly changing world. Socially they had left the security provided by family and friends to come to the Netherlands and adapt to a new climate, a new environment and new customs, as well as to cope - and remarkably well at that - with new regulations.

Conscientious cyclists obeying the highway code that was nonchalantly disregarded by local residents were instantly recognisable as ITC students. In this fast-moving technological age, skills need to be upgraded from time to time, and ITC's director of external affairs expressed his hope that contacts would be not only maintained but also renewed when appropriate via refresher courses. In closing, he wished ITC's new ambassadors (unfortunately denied such trappings as chauffeur-driven cars) success in their careers and a happy reunion with their families.

Geo-information Management (GIM)

And so to the GIM programme and Dr Mike McCall, who congratulated the students on surviving their year at ITC - "surviving" perhaps being the operative word. It had been a new programme so the students had undertaken the role of guinea pigs; however, they had passed with flying colours and emerged as "guinea pigs with gold stars". The programme had been tried, tested and proven. As Dr McCall reminded his audience, it's often said that those who can, do; those who can't, teach; and those who can't teach, do research. If this was the case, he had no hesitation in placing the PM students fairly and squarely among the doers!

Ir Kees Bronsveld, the GIM programme director, returned to the theme of innovation, explaining that professionals the world over had been consulted in redesigning the programme (both lectures and practicals) and some had even dropped by during the modules. He thanked all who had contributed, and added that for the students the end of the course meant the beginning of a new life as a professional: "the proof of the pudding is in the eating back home."

To Mr Sjef van der Steen went the agreeable task of presenting the degrees personally to the students. As each student ascended the platform to a warm round of applause, he gave a thumbnail sketch of the new professional master, highlighting both problems and humorous events of the past year. Digital cameras were much in evidence to capture the moment. And rightly so, as several students - mainly ladies, although one or two gentlemen were not to be outdone - added a splash of colour by wearing traditional dress.

Mr Sudarshan Karki (GFM.3), Nepal

"a greater number of people could benefit"

Decentralisation has found an advocate in Mr Sudarshan Karki. He feels the cost of sponsoring two students at ITC may well cover the expenses of providing a lecturer for a course in the home country, where a greater number of people could benefit. But there would be a downside. In Enschede students can concentrate completely on their studies, often working till late in the evening, whereas studying back home would mean juggling the demands of normal family life. On a personal basis, however, Mr Karki feels his ITC course will help him considerably in the future. Not just the knowledge acquired but the actual certificate itself. "I will be able to try for promotion. It gives you confidence in what you know, and gives others confidence in you."

A survey officer at the Survey Department in Kathmandu, Nepal, he successfully completed the PM course in Geoinformatics and was awarded his degree on Thursday, 4 September (so an alumnus of slightly longer standing). Looking back over the whole year, it's gone quite well but there were low periods when naturally enough he missed his wife and daughter. "The first few weeks are okay - new environment, new friends, new everything; it's a novelty. But when you settle down, you start to feel homesick. What am I doing here? But there are people from all over the world, and if they can do it, why can't I?"

He feels he had advantages too. His background in computers was very useful, so much so he sometimes acted as a "third supervisor" in practicals. Many of the students were seeing a computer for the first time and this meant they had to work harder. Although they generally picked it up very quickly, there's no shortcut and sometimes this put them under stress. No problem with the climate either for Mr Karki. In Kathmandu temperatures can drop to -2°C, whereas for students from Africa the Dutch weather can be "a shock to the system". Many students keep a weather eye on the monitor, and a low temperature displayed immediately triggers an attack of the shivers.

How does he feel about ITC News? Any suggestions? He'd like to see more contributions from the students themselves and also articles from different writers covering a broader spectrum. "If you see the same names, you know what's of interest to them and can guess what the article is going to be about."

Urban Planning and Land Administration (UPLA)

It was then the turn of UPLA, and from Mr Richard Sliuzas came congratulations to those who had successfully completed their PM programme and best wishes to the MSc students returning to China to complete their studies. They were now equipped "with additional baggage to do the job". He emphasised the importance of such studies in the context of today's dynamic world, with its growing and rapidly changing cities. Programme Director Ir Mark Brussel, who presented the degrees, praised the way in which the students had bonded together as a group. In fact it would seem that UPLA really gets into the bloodstream. Travelling by train in Italy, one student, when asked where he was from, replied without thinking: "From UPLA." It has also inspired a song. Unfortunately the lyrics cannot be printed here … conflict of copyrights perhaps?

As the programme director pointed out, when some students arrived at ITC, the digital world was not their world; however, it has since become their world. They have achieved good results, while simultaneously providing input and contributing to changes in the Dutch higher education system. One student, not content with submitting his individual final assignment, even found time to write a report that will be used in next year's programme. So time well spent!

Joint MSc Urban Planning and Management with the School of Urban Studies (SUS), Wuhan University

A special relationship between ITC and Wuhan, China, lasting 25 years is certainly something to celebrate. As Dr Jan Turkstra explained, this relationship has evolved since the 1980s, with traditional study programmes gradually giving ground to new partnership arrangements. Today the first party of Chinese students following the joint MSc programme received formal statements covering their period in Enschede, where they had been engaged in writing theses on subjects such as urban poverty, environmental quality and urban renewal. Although not graduates as yet - graduation day was scheduled for June 2004 - their accomplishments at the Institute merited great respect, and congratulations were most definitely in order. Representing the Chinese students, Ms Dou Kaili expressed their sincere gratitude for the chance to study at ITC and carry out research, a chance that would benefit their whole professional life.

Certificate of Merit

One special presentation still remained. Speaking on behalf the Student Association Board, Mr Acharya Parthasarathi presented a Certificate of Merit to Mr Mohammed Issifu Segda, and thanked him for the time and energy he had devoted to the SAB. His name cropped up frequently in student reports - an acknowledgement of just how much his help and support had been appreciated. Replying, Mr Issifu Segda said he hoped that

the new alumni, "although itching to go home now", would stay in touch. And then with his multicultural audience in mind, he expressed his thanks in several languages, including Dutch.

With that the official ceremony came to a close and there was a general move towards the restaurant annex to celebrate graduation (or independence) day in time-honoured fashion. But of course there was a sting in the tail. The time had come to say goodbye

to new friends, and the strong emotions that surfaced took many people by surprise. Thank goodness for e-mail!

When exactly does a student become an alumnus/alumna? This was one question raised during the proceedings. And the answer? On receipt of the diploma. So even without the aid of a computer, we can calculate that ITC's alumni network received a significant injection of energy and professionalism in the first week of September.

Guest Lecture:
Professor Shunji Murai

Professor Shunji Murai

On Monday, 29 September, ITC was honoured to host a guest lecture by Professor Shunji Murai, fellow of ITC and professor emeritus of the University of Tokyo. Professor Shunji Murai was elected fellow of ITC in 1993 in recognition of his contribution to the work of the Institute.

Three-Line Scanner for Large-Scale Mapping

Shunji Murai*, Michikazu Murakami**, Koichi Tsuno**, Kazuya Morita** and Tianen Chen**

ABSTRACT
This paper introduces a high-resolution helicopter-borne three-line scanner (TLS) for large-scale mapping. Since a high-performance stabiliser for the TLS camera absorbs the vibration of the aircraft and stabilises the camera's axis within a single pixel, original images can be acquired with very little waving or blurring, posing fewer post-processing problems. The TLS principle secures line perspective images with very little distortion in the flight direction and is effective for generating seamless orthoimages, especially for linear-shaped objects such as roads and rivers. The system also measures the position and attitude data of the camera for each line image, using a global positioning system and an inertial measurement unit. This means fewer ground control points are needed for image orientation. This paper describes the system configuration, including the data processing system, of STARIMAGER® , developed by STARLABO Corporation, Tokyo, Japan. It also refers to a variety of applications featuring the TLS principle.

1. Introduction
A line sensor system is widely used in a satellite for easy multi-spectral image acquisition, while an area sensor system is coming onto the market, positioned as an extended form of a conventional analogue aerial photo system. These two approaches have been intensively studied as an airborne, fully digital, spatial data acquisition system. Owing to the constraints of semiconductor manufacturing processes, however, the line sensor system is always ahead of the area sensor system be-

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cause more pixels can be aligned in a CCD sensing device for acquiring a high-resolution image. This paper explains the system configuration, features and applications of STARIMAGER®, a state-of-the-art helicopter-borne three-line scanner (TLS) system developed by STARLABO Corporation, Tokyo, Japan (see Figure 1).
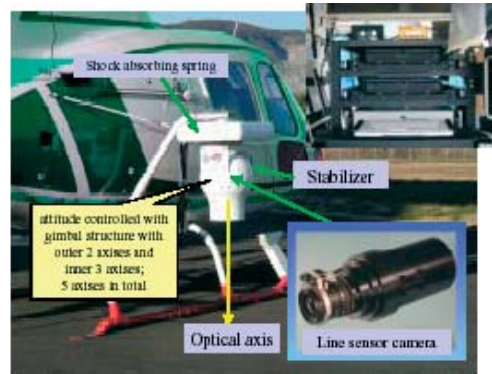

Figure 1 Three-Line Scanner - STARIMAGER®

2. System Overview

2.1 Principle of STARIMAGER®

The stabiliser with the TLS camera is installed on the arm outside the helicopter and absorbs the vibration of helicopter movement. As shown in Figure 2, four CCD line sensor packages are placed in parallel on the focal plane of the camera lens system. Three of these sensors are for forward looking, nadir looking and backward looking. Each sensor package has three lines, R (Red), G (Green) and B (Blue), to generate a colour image. In addition, between the sensors for backward looking and nadir looking there is another CCD line sensor package for near infrared
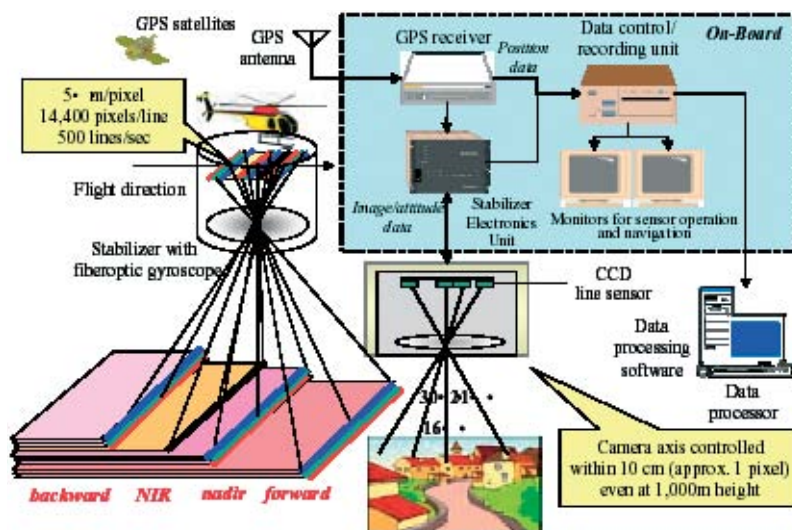

Figure 2 STARIMAGER® and its principle

(NIR) images. Each line sensor can obtain high-resolution 2D images in accordance with the flight of the helicopter, acquiring ten images in total, which are 100% over-lapped with each other as shown in Figure 2. The position and attitude data of the TLS camera for each line image are acquired with a global positioning system (GPS) and an inertial measurement unit (IMU). An antenna for the GPS is installed on top of the helicopter, while a set of fibre-optic gyroscopes is placed on the TLS camera within the stabiliser. In principle, such a spatial data acquisition system does not need aerial triangulation with any ground control points (GCPs) at all (see Murai et al., 1994; Murai et al., 2000; Murai, 2001). STARLABO Corporation has acquired the patent rights for the system in Japan, the USA, Europe, Australia and Canada (see Murai et al., 1993).

2.2 Features of STARIMAGER® and Advantages

The advantages of STARIMAGER® can be described as follows (also described in Tsuno, 2002a, 2002b).
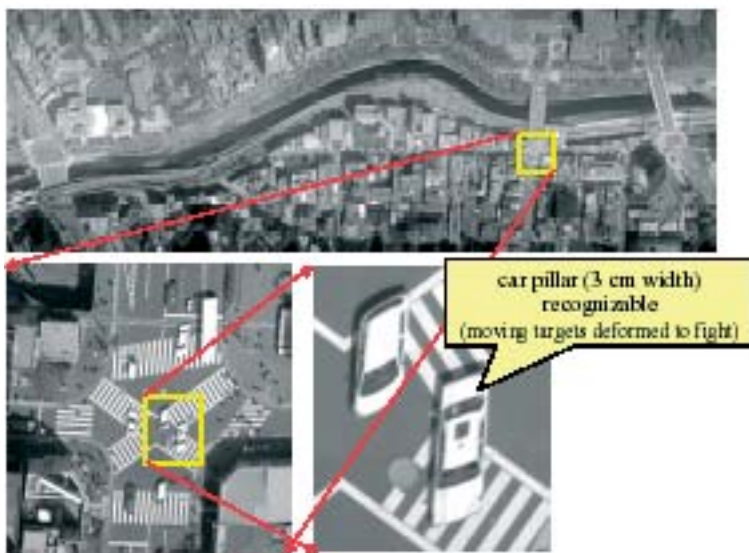
1. Photograph developing and scanning processes are unnecessary and there is no image/film deformation, such as damage or deterioration. Moreover, since the dynamic range of an output image that is linearly proportional to the luminance of the image plane is wide, it is possible to easily recover even an image part that is in the shade of a building, a cloud, etc., by increasing image intensity. This reduces field survey after data acquisition.
2. The GCPs for orientation may be fewer, or even unnecessary, because of the existence of a GPS/IMU. It is therefore suitable for data acquisition in emergencies, at sea, etc., where GCPs are difficult to obtain.
3. Since the high-performance stabiliser ensures that the original image acquired is not wavy or blurred, it is suitable for images in emergencies and the post-processing load can be reduced. Furthermore, the oblique photographs realised by slanting the stabiliser are effective in acquiring the texture of building walls (Figure 3).
4. A helicopter allows low-altitude low-speed operations, leading to high-resolution images (see Figure 4). Since the low altitude ensures that the influence of field visibility and weather conditions is only

small, the photography can be carried out more frequently than conventional aerial photography. Moreover, it can efficiently take pictures of linear-shaped objects by following them at low speed.

5. Using the TLS principle, image scale suffers very little distortion caused by the height of objects in the flight direction (a line per-

Figure 3 An image sample by oblique viewing

car pillar (3 cm width) recognizable (moving targets deformed to fight)

Ochanomizu on Chuo-line; 2001/4/17; height: 300 m; speed: 60 km/h; nadir

Figure 4 High resolution TLS image

Figure 5 Color image (left) and NIR image (right) - (The NIR image distinguishes more vegetation area - upper-middle - along the river than the color image)

spective image as compared with a conventional central perspective image) and is suitable for orthoimage generation. The system does not require mosaic processing in the flight direction or the scrapping of parts and it can seamlessly acquire spatial data of linear-shaped objects such as roads, railroads and rivers. Also the system can obtain redundant images; the photography in three different directions (three different times) means little is lost, thus reducing the burden of field survey after the data acquisition. Furthermore, a corresponding point searching in stereo matching is easy because the stereo angles are constant, and measurement precision is improved by triplet matching, as simulated in Shibasaki et al. (1987). It facilitates multi-spectral data acquisition and allows a colour image to be obtained by integrating RGB three-line sensor images, with as index a NIR image, which shows vegetation and water in the soil more distinctively than a colour image (see Figure 5).

2.3 System Configuration of the STARIMAGER® Photographic System

The focal distance of the TLS camera lens system is 60 mm, the stereo angles are 21, 30 and 51 degrees between forward and nadir, nadir and backward, and forward and backward, respectively (see Figure 6 for the system specifications). Each line sensor consists of 14,400 CCD pixels with 5 µm spacing, and acquires 500 line images in 1 second (2 msec acquisition interval); these are recorded in a controlling and recording device installed in the helicopter cabin. On the other hand, a GPS antenna acquires the camera position signal at 5 Hz and the IMU on top of the TLS camera acquires the camera attitude signal at 500 Hz. The stabiliser has a vibration-absorbing spring and five gimbals, absorbs the shaking of the helicopter, and keeps the optical axis direction of the TLS camera stable within a single pixel of the line sensor. This prevents the shaking of the helicopter from causing wavy or blurred images (see Figure 7).

2.4 Characteristics of TLS Data and Measurement

The swath width at the flight altitude of 400 m is approximately 480 m, the resolution on the ground (or ground sample distance; cor-

configuration	item		specification
TLS Camera	CCD Elements	pixels/line	14,400
		pixel pitch	5· m
	Number of Sensors		10 (3 direction/RGB for each and NIR)
	Intensity dynamic range		11 bits or more
	Lens focal length		60 mm
	Stereo angle		21· ;30· ;51· ;etc.
	Number of capturing lines		125, 250, and 500 lines/sec
Stabilizer	Angle resolution in attitude		0.00125· ·
	Spatial stability		0.00029· ·
	Maximum angle velocity		30· /sec
	Data output (acceleration/attitude)		500 Hz
GPS Receiver	2fkinematics ·post processes·	planimetric accuracy	2 cm + 2 ppm
		height accuracy	3 cm + 2 ppm
	Data output		5 Hz
Recorder	HDD recording	recording speed	150 MB/sec or more
		recording capacity	320 GB

Figure 6   STARIAMGER basic specifications

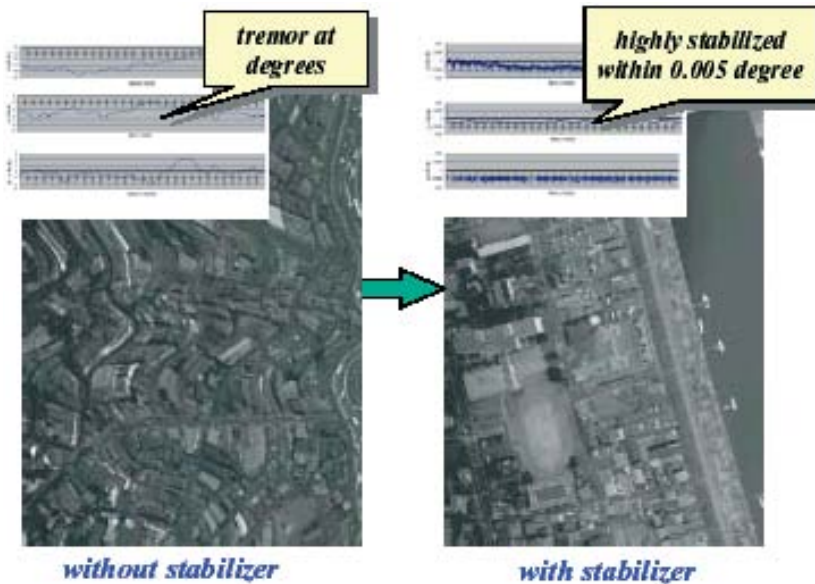without stabilizer   with stabilizer

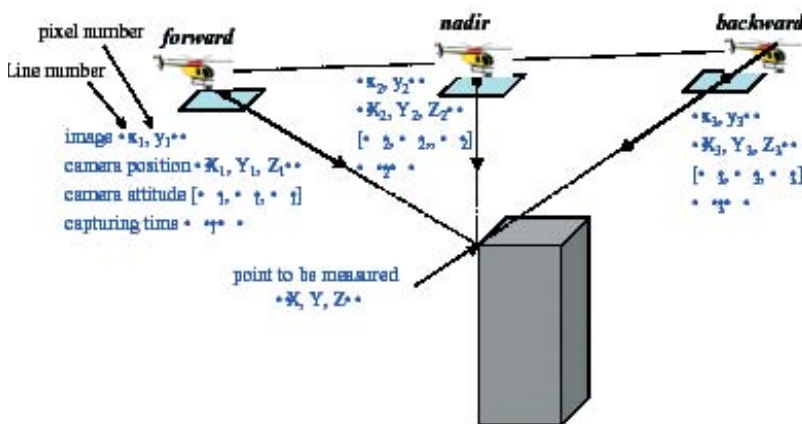Figure 7   Stabilizer's effect

Figure 8   3D position measurement

responding to a CCD pixel) perpendicular to the flight is 2.5 cm. On the other hand, the resolution in the flight direction is determined by the flight speed and a 2.5 cm resolution can be realised by flying at 60 km/hr (to proceed by 2.5 cm for the standard image sampling period 2 msec).

A point to be measured on the ground is acquired first by the forward-looking sensor, and then by the nadir-looking and backward-looking sensors (as shown in Figure 8), and recorded as a line image with each line and pixel number. And since the position and attitude information of the TLS camera centre for every line image is measured simultaneously, it is possible to get the point position information of three dimensions by the forward intersection method. Aerial triangulation is applied to perform absolute orientation with better accuracy by using a number of GCPs, in consideration of the drift of the IMU signal and the restriction of the acquisition frequency of the GPS data. As a result, with a sufficient number of GCPs it can get a 10 to 15 cm accuracy in a planimetric direction and a 15 to 20 cm accuracy in the height direction at 500 m height, as verified in Chen et al. (2001) and Morita et al. (2001). This opens up the possibility of mapping at a large scale, such as 1:500 (with 25 cm RMS for both planimetric and height accuracy) or larger. An important issue is considering how to plan a set of flight courses and GCPs in order to meet a particular accuracy requirement. Figure 9 shows that it is better to fly a target area with multiple courses as well as additional courses crossing the multiple courses to use fewer GCPs, where it is essential to get a reasonable number of tie-points (inter-strip) and pass-points (intra-strip) in and between course strips.
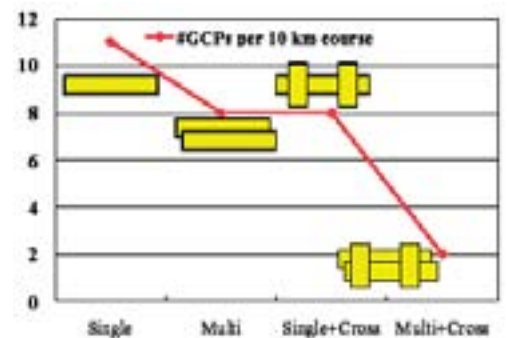

Figure 9   The number of GCPs with1/500 map accuracy

2.5 Overview of TLS Data Processing System

STARLABO Corporation has been developing the TLS data processing system with Professor A. Gruen of ETH (Swiss Federal Institute of Technology, Zurich) and Professor R. Shibasaki of the University of Tokyo. The system has realised functionalities equivalent to those of existing digital photogrammetry systems, such as aerial triangulation (see Gruen et al., 2001, 2002a; Chen et al., 2003), automated random altitude points extraction (see Gruen et al., 2002b), the generation of DEM data and an orthoimage, contour generation, and the acquisition of polylines and polygons.

As described above, the TLS principle can eliminate such photographic processes as developing, image scanning and mosaicing

Figure 10 Image with less distortion

Figure 11 Image GIS viewer

in the flight direction, which are required by conventional aerial photography. Reducing the number of GCPs significantly reduces the costs of survey processes such as setting, measuring and tearing down GCPs, and aerial triangulation. Moreover, an image with a broader dynamic range, less distortion and occlusion (see Figure 10), and more redundancy reduces the burden of field survey.

2.6 Image GIS

One issue has been the costly mapping and plotting based on aerial photos for constructing a geographical information system (GIS). A digital map may not be necessary right from the very beginning in order to fulfil most field applications. A new concept called "Image GIS" has been presented to resolve this issue. Figure 11 shows an example of a viewer materialising such a concept. An orthoimage serves as a background image for a 2D map obtained from another source, on which distances and areas can be measured. In addition, the Image GIS viewer is equipped with a mono-image measurement system, where as the centre of the orthoimage moves, so the target image for the measurement system moves. When you want to measure the 3D position of a point precisely by pointing to it on the orthoimage, the viewer produces its corresponding image set (forward, nadir and backward) for the 3D measurement. In this way, you can grasp the real 3D situation surrounding a certain target object without going to the actual spot, and then store the 3D data in a database attached to the GIS viewer.
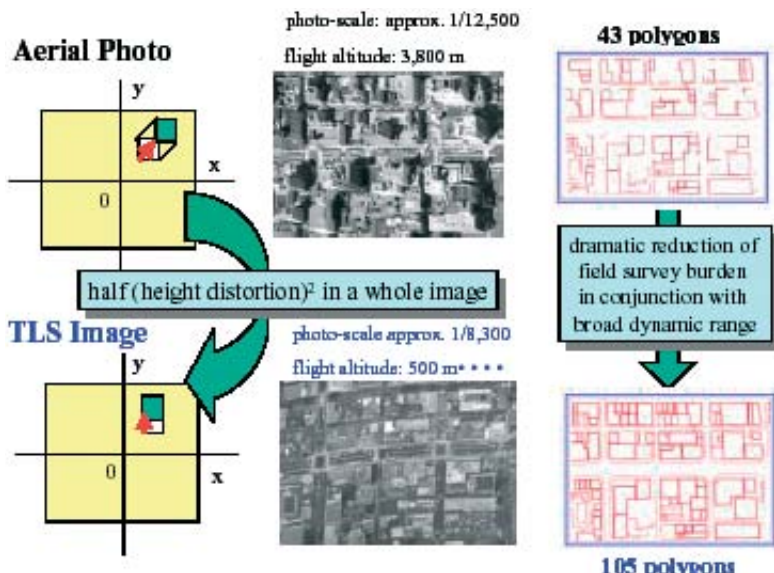
3. Applications of TLS

The features of the TLS data are stimulating greater demand for efficient 3D seamless high-resolution information on linear-shaped man-made objects and terrain. Linear-shaped man-made objects include roads, bridges, railroads, power cables and pipelines; information is used for investigation purposes before construction, for maintenance and management after construction, and as base data for a variety of GISs. Figure 12 shows a river environment, and can be used for investigating vegetation, the gravel grain diameter distribution of a dry riverbed, the river floor profile, etc. (as described in Fukami et al., 2002).

Figure 12   Survey for river environment

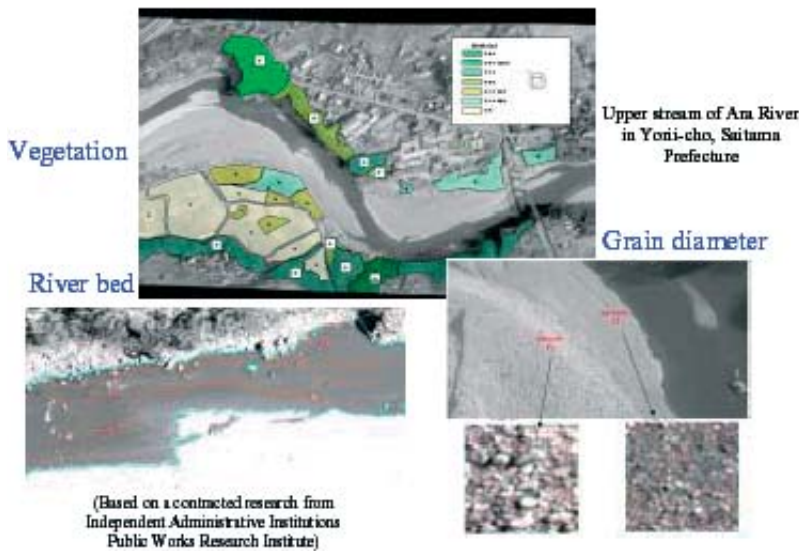TLS data can also be used as base ground data for simulating floods with high precision in order to judge whether water will rise above or remain below a Japanese raised floor. This cannot be assessed based on conventional 50 m meshed terrain data (see Figure 13). Three-dimensional city models of high definition are expected to be used for city planning, landscape simulation, auto-navigation, gaming and so on. When the helicopter flies along a road, the wall texture facing the road can be acquired with a nadir-looking image. The wall textures perpendicular to the road can be acquired with either forward-looking or backward-looking images. Textures can be semi-automatically mapped onto 3D polygons. The texture of

the building walls facing a trunk road can also be efficiently acquired with oblique-viewing images. A website application using such TLS images is shown in Figure 14.

Figure 15 shows an example of perfect orthoimages (TrueOrtho^{TM}), where the TLS data are highly overlapped between courses. These were processed with the cooperation of ISTAR in France. A conventional orthoimage has leaning buildings with side walls that occlude roads because the image is generated based on terrain data only; a perfect orthoimage takes into account the height of buildings as well. Consequently, this is useful for preventing inappropriate digging in cases of construction, because the position of gas or water pipes under roads can be precisely and realistically described. Furthermore, using the characteristics that can acquire images of three directions with a constant time lag, the systems can measure the speed of a car or running water and the traffic flow along a road, and they can also be used for investigating illegal parking (judging by the image deformation of a car, the distance from a road edge, etc).

4. Conclusion

The day will soon come when a conventional spatial data acquisition tool based on aerial photographs is replaced by TLS. This paper has presented the TLS principle and its applications at an early stage. The biggest challenge is to improve the accuracy of the position and attitude measurements of the
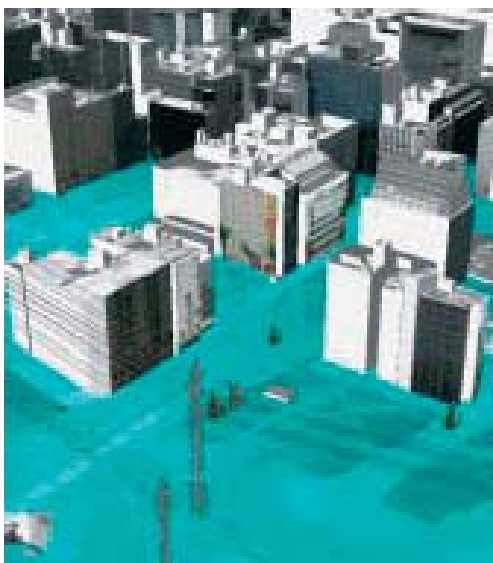

Figure 13   Flooding simulation

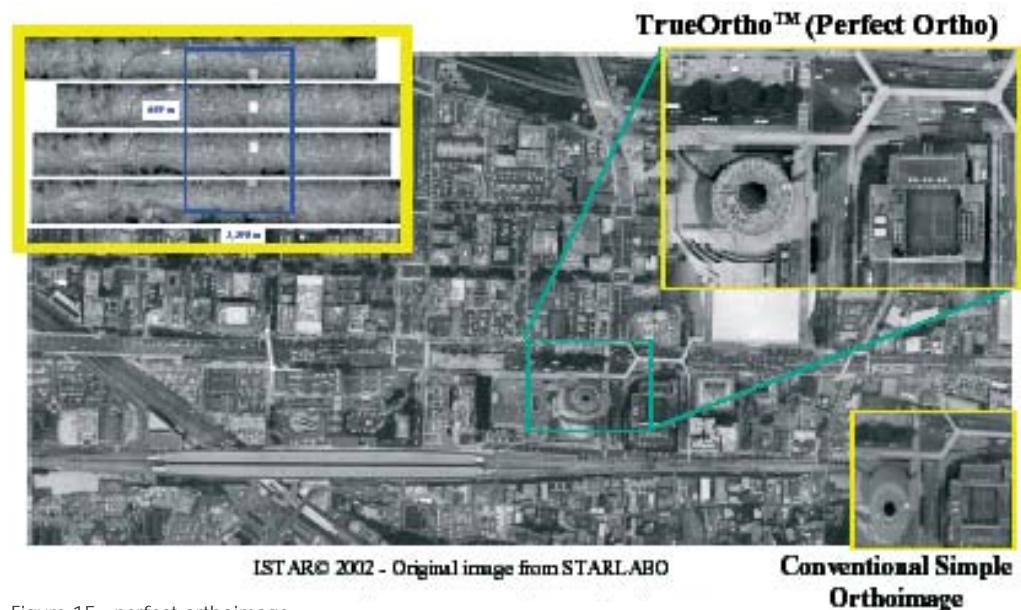Figure 14   An example for web content

Figure 15   perfect orthoimage

TLS camera centre by the GPS/IMU so that as few GCPs as possible are needed. Furthermore, the extraction of changes between images taken at two different times, the automatic extraction of man-made objects such as buildings and roads (as described in Nakagawa et al., 2001), and the measurement of the speed of cars and rivers should be studied.

Acknowledgement

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ITC's Extracurricular Activity - Run4Fun

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While studying (or working) at ITC, students have the opportunity to be trained in other fields besides their academic domain. The most important objective of such activities is, of course, to free the mind from the sometimes-strenuous course work.

In addition, participants meet staff members and students from other courses and disciplines in a social setting. After all, study (or work) is not the sole objective of our life on Mother Earth.

One of the activities you can participate in is Run4Fun. It's all in the name: running for fun. Run4Fun is in fact a follow-up to the historic initiative set in motion by Piet van der Hulst and Juud de Lange, which ran from 1984 till 1991. In those years an ITC team of students and staff would train for, and take part in, the *Batavierenrace* (http://www.batavierenrace.nl/en). Since 1998 this running initiative has been revived and extended. Although the major objective is to run for fun, history shows that the popularity of the training strongly correlates with approaching running events. Therefore Run4Fun organises and participates in several sports competitions annually:

- International Sports Day (March)
- Batavierenrace (April)
- ITC Sports Day (June)
- Singelloop Enschede (September)

Those who take part in these events - as well as those that show perseverance during training - receive a special Run4Fun T-shirt to commemorate this extracurricular activity and to prove to their family and friends that they indeed did practice running.

In 2003 ITC participated for the 11th time in the Batavierenrace, a race that consists of 25 stages varying in length from 3 to 12 km. According to the organisation, this event is the biggest student relay race (party) in the world, since close to 300 teams sign in. Many of you have participated once and once only - as G. Coulibaly admitted sadly in 1991. He would have liked to join in again the following year. The list of fastest participants shows Yovanny Martinez ahead of both staff and students. Running the final stage from Boekelo to Enschede in 1990, he entered the athletics stadium at a blistering pace. His average speed of 17.42 km/hr over

Run4Fun cross team wins running event at the International Sports Day 2003

Overview ITC Sports Day 2003

a stage of 8.4 km will probably never be beaten! But other ITC students too have made their mark. In 2000, for example, there was Jaya, who registered just a couple of weeks before the race but finished smiling. And we mustn't forget Tarek Agag, who ran his stage in dress shoes. What about Fusun Dusgun? Although slightly hindered by a handicap, she practised diligently and finished the first stage in 2000. Fan Shienta was especially happy: "I was able to pass a guy bigger than me.".

Juud, the front runner, enters the UT arena (1985)

The ITC night and morning teams of the 2002 Batavierenrace

Fan Shienta tells Allan Brown that he was surprised to overtake a guy bigger than himself *(video snapshot)*

The ITC night and morning teams in the Batavierenrace 2003

The paragraphs below are written by students who took part in the 2003 Batavierenrace. Ronald Brown joined the night team as a supporter and proudly carried the ITC banner. Issah Mbura ran the first stage for the morning team and surprised both himself and the coach. Quite relieved - that's how he felt after the race. Joe Mwandawamufu ran the final stage for the noon team and finished in Boekelo as third in his group. They relate their own experiences but have to admit it's impossible to capture on paper the actual atmosphere during the race.

Ronald Brown: Night Team
I had been waiting for this moment for a very long time!

Words cannot describe my true feelings as the hours ticked away on the night of Friday, 25 April 2003. I believe I'd had a continuous rush of adrenalin throughout the entire day. "I cannot afford to be late for this date," I kept telling myself.

I reached the ITC hotel with half an hour to spare. I wanted to arrive as early as possible to build up my energy level. The bus arrived promptly at 9:30 pm, driven by our captain Edith Howard. Everyone was prepared for the adventure.

At Nijmegen the atmosphere was electrifying. Voices and music filled the night. All I could think of at that moment was the phrase "the thrill of victory and the agony of defeat". At Nijmegen we met up with Wan, and of course left Kim to start the ITC conquest. But most importantly, it was there that I was handed the *ITC banner*. We did not stay to watch the start but my mind was on Kim, running the first leg for us – my fingers were crossed. We hurried back to our bus and we were quickly on our way to the next stage.

As we went along, I became a bit worried, "Where on earth are we"? This is total darkness! What have I got myself into?" I didn't dare ask if we were lost. It seemed to me we were in the middle of nowhere. Actually we weren't. As we approached the start of the second stage, we found that we were pretty close to a major road.

Preparations were still going on. I was fascinated by the age of most of the members of the organising group. I was expecting grey-haired men and women. No way! These guys were pretty young. Soon the first runner to arrive was announced … then minutes after, *"Achtenveertig! Achtenveertig!"* "48, that's us!" The ITC banner shot up into the air to attract the attention of the cyclist. This was followed by shouts of "ITC! ITC!" Martin, who in the meantime was already at the changeover position, quickly got the jersey from Jan and was off in a flash. Daniel navigated his way through the crowd over

Ronald Brown proudly presenting the ITC banner at relay point Oraniendeich (Germany), accompanied by Peter Kityo and Heleen Bakx

to us and passed the bicycle on to Wim, who in turn disappeared quickly to catch up with Martin. It happened so fast. Wow!

The adrenalin flowed. My heart was pumping. I like this job!

As we hurried back to the bus, I held the ITC banner over my shoulder for all to see. It was like in the days of old, when armies marched with their flag bearers in the lead. All eyes were on us! I was enjoying myself.

I was disappointed not to see many spectators along the route. I was expecting to see a lot of people along the roadside. But I could understand. The night was pretty cold, as well as rainy. For another thing, most of the changeover zones were in "remote areas". At the start of each journey, I always wondered, "Where next?"

The most adventurous part of the journey turned out to be the journey to Marmelhorst. Up till then, Daniel had been Edith's navigator. But now it was his turn to run, so I was the new navigator. Watching how they both found their way so easily, I was confident I could handle the job. It took only two minutes to find out otherwise. I was no help at all to Edith. Plus all the other

buses were nowhere to be seen. To add to the confusion, the English translation was different from the Dutch. Oops! "Wi lass!" I thought (in Jamaican). However, Edith was more determined than I was. Eventually we were saved by the approach of other buses. We just followed them to the end of the journey.

Throughout the whole event I tried to pick up the vibes of our runners. Kim's I missed because she did not rejoin us. For Jan it was the same.

Martin's was the first experience that caught me. At the finish, he was breathless. It was a good run but the conditions were difficult. Wan was the veteran, but he benefited from some good riding from Peter, who cycled ahead to minimise the impact of the wind in Wan's face. I felt sorry for Wim and Ki; the rain was pelting down at that stage. I saw the map of the route getting wet and I started to think the worst. But at that point it was C-O-L-D.

I think Peter enjoyed his stage the most because at the end he wanted to continue running. According to him, he was just getting into the groove. Helen epitomised the real athlete. I thought she was the most anxious to get going. Her preparation was intense. She did some short sprints to keep warm, while at the same time looking over her shoulder every so often for the approach of the runners. Ki enjoyed his performance totally. He was anxious throughout the journey from Enschede. It had been a long time since he'd last run and he didn't know how he would perform. But at the finish he was all smiles.

At the end of the night team's performance in Dinxperlo, the carnival atmosphere returned. Day was breaking; there was a camp; people were milling around. The next set of runners was arriving; some were already present. Electricity yet again crackled in the atmosphere. It was here, more than in Nijmegen, that I really witnessed the impact of Run4Fun. I was only sorry that I had to leave.

We quickly searched for the morning team.

They were as anxious as we were for the start. We exchanged greetings and experiences. I had a major task to perform - to hand over the ITC banner to Bert Jan. We took some group photos, waited for the start of the morning leg, and then we were off back to Enschede.

The night was total fun!

Issah A. Mbura, Stage 10, Dinxperlo to de Heurne (6.4 km)
"Issah, are you going to London or are you joining the running team?"

It was on the stairs of the second floor that I met Wan and he asked me the kind of question I hate most. Such questions tend to be easier to answer, being Boolean in character, but they keep generating more questions. I had encountered them in ArcGIS exercises. Well, I had to think fast and I replied, "I'll join the running team."

The event started on the eve of the 26th when, for the first time in more than a decade, I went to bed around 9 pm, only to wake up suddenly at 4 am. My mind was racing - planning how I would run, giving it shape, formulating strategies (SWOT), thinking of all the "what ifs" - still, knowing that one of my team-mates was our Institute's nurse put my mind at rest.

Issah A. Mbura finishes his stage and feels relieved

We gathered at IIH and set off for Dinxperlo on time, despite the rain and some of us coming from far away. More fun … we got lost on the way. But quickly we managed to trace the route - remember we're experienced map makers/map users! At Dinxperlo the weather was good and we met our colleagues of the night team who had already successfully finished. They gave us the vest and bicycle ready to start at 6.30 am. Tsolmon reminded me that I was the one to start in our team, so I had to do a warming-up by stretching and running a few metres. At the starting line my team-mates were there to see me off. Having looked at the other runners and seen their enthusiasm, I felt a bit out of place. Still, I said to myself, "Stick to your own pace!" I was really happy to reach the relay point and hand over the vest to Ethel Yuliana.

It was even more fun at the UT, where the race finished. Despite the rain our team-mates did well. Some of the runners were there for the fun. I will never forget the one who was carried to the finishing line by his fellows acting as a first aid team. He was on a stretcher with a bottle of beer set up as a drip.

Joe Mwandawamufu, Stage 23, St Isidorushoeve to Boekelo (7.9 km)
"What a thrill' is all I can say."

Before the actual day, I couldn't help thinking, "How on earth can 284 teams do a relay run over a distance of 180 km? And as if that isn't enough, they decide to start the race at midnight!"

Anyway with that still on my mind we finally left IIH. We arrived at our starting point only to be welcomed by one of the participants almost collapsing after she'd completed her stint. And you can easily guess what was running through all our minds. The other thing I should mention is we had the best of supporters, Jema and Evelyn. After seeing the lady almost collapse, I remember Jema saying, "Hey Joe, I'm waiting to see you in that state!" Obviously she was only joking but it certainly gave me something to think about.

The noon team of the Batavierenrace 2002 in front of the famous Boekelo salt tower

"*Hakuna Matata*" is what you tell yourself as you hit the road for your stage. You've only one thing in your mind - I have to reach the finishing line - and you set your sights on achieving just that. As you get closer to the finishing line, so your energy level starts to drop. You're almost boiling inside and you feel as if the finishing line is also moving, but at a slower rate than you. And you begin to wonder.

Finally you see the 1 km mark and suddenly you can hear the people cheering. Then you know you've made it, and like a miracle your body is suddenly charged with enough energy for you to make that final sprint. As you pass the timer, all that's in your mind is "Yes! Who said I couldn't run!" And you can't believe you passed all those people that looked like hardened athletes, well able to cope with a simple run of 7.9 km. (Hey, I mean guys from the Military Academy and those that looked super-fit.)

Well, the best part about the whole thing is cycling and just enjoying the views of nature. You also see the runners sweating it out, pushing themselves to the limit. You say a few words of encouragement, hoping they can hear what you're saying. After all, it's a sport and everyone needs everyone.

But while you're still thinking about the experience and efforts of other participants … *wham*! It suddenly hits you. It's your turn to persevere and the turn of your friends and fellows to maybe laugh or encourage you.

More experiences of the Run4Fun participants, as well as photographs, can be found on the ITC Intranet pages: http://intranet.itc.nl/recreation/run4fun Unfortunately that excludes many of you - but keep an eye on the ITC Internet pages; Run4Fun events might appear there as well.

An alternative training session in the week before the Batavierenrace to practice the relay

Preparation in the dunes near The Hague for the International Sportsday 2003

announcements

Changes in ilwis Distribution Policy as from 1 January 2004!

Background

For some time now, the development of ILWIS software has been reoriented and integrated into the ITC research programme, with the aim of enhancing ITC's research capacity and position. Further software development will depend on (the output of) ITC's research, which will gradually turn ILWIS into a scientific rather than a commercial product.
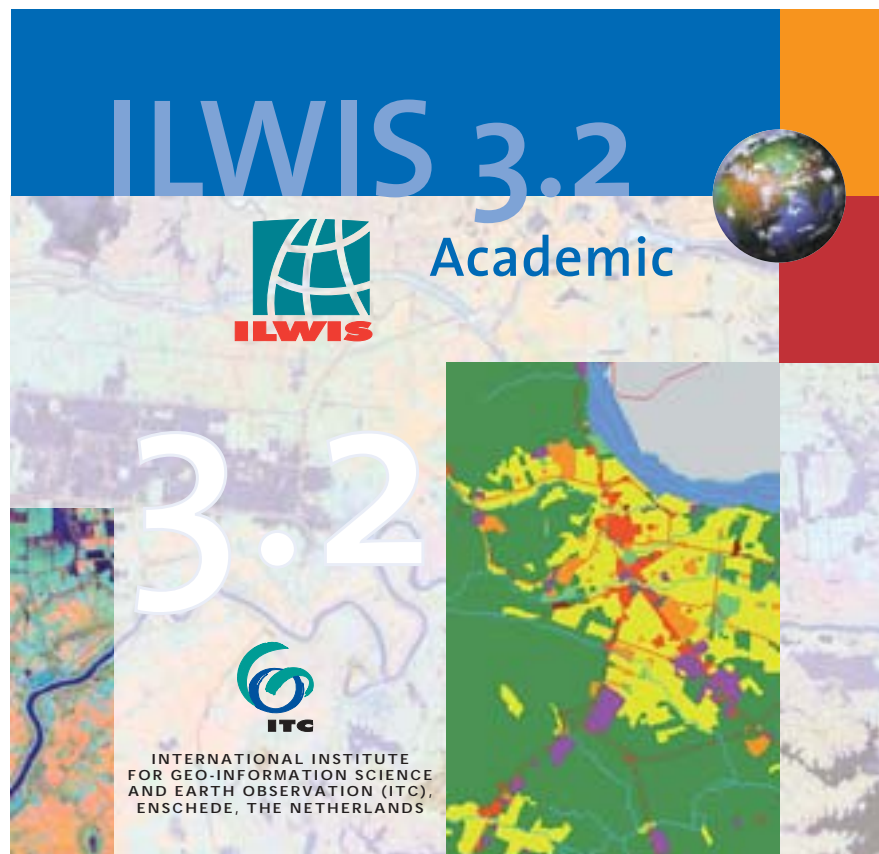
As a consequence, it is no longer appropriate to distribute ILWIS on a commercial basis. PCI Geomatics of Toronto, Canada, has handled the commercial distribution of ILWIS software since 1999, but now PCI and ITC have come to an amicable arrangement to terminate their agreement on 31 December 2003.

Distribution Policy as from 1 January 2004

As from 1 January 2004, ILWIS software will be distributed solely by ITC as shareware to all users, irrespective of their relation with ITC. The new functionalities resulting from ITC's ongoing research programme will be incorporated in *ILWIS Academic 3.2*, to be released on that date.

- Existing users of versions 3.0/3.1 or later, both ITC and PCI customers, will be entitled to version 3.2 upgrade patches free of charge.
- New users, irrespective of their relation with ITC, will be entitled to try out ILWIS software for an evaluation period of one (1) month free of charge, and can subsequently obtain a permanent licence on payment of €100 (one hundred euros).
- ILWIS Academic software will be released without guaranteed support services.

- If questions arise, users can consult the discussion list, FAQ and user documentation available on the ILWIS website.

As from 1 January 2004, ILWIS Academic 3.2 can be downloaded from ITC's website (http://www.itc.nl/ilwis/ downloads/default.asp) or obtained on CD-ROM from ITC's bookshop. ILWIS will not be distributed by regular mail.

ILWIS 3.2
Academic
ILWIS
3.2

ITC

INTERNATIONAL INSTITUTE
FOR GEO-INFORMATION SCIENCE
AND EARTH OBSERVATION (ITC),
ENSCHEDE, THE NETHERLANDS

Jonathan Shadreck Gwaligwali:

Winner in Avenza Systems' 2003 MAPublisher Map Competition

Wim Feringa

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The map City of Blantyre, Malawi, the result of Mr Jonathan Shadreck Gwaligwali's final assignment in the ITC Geoinformatics Diploma course, was selected as winner in the category "Best Academic Map Individual" of the 2003 Avenza MAPublisher Map Competition. Jonathan works at the Ministry of Lands, Physical Planning and Surveys of Malawi, Blantyre, Malawi.

The map, a scale 1:25,000 topographic sheet of Blantyre, Malawi, was produced using data from the Survey Department of Malawi. A map of Blantyre was last produced in 1976 by the Ordnance Survey of England but it had never been updated. The winning map was produced as a fully revised version of the original topo sheet.

The final assignment is an important part of the GFM4 curriculum. One of the subjects that can be selected for this final assignment is the design and production (including workflow planning) of a map or an application that serves the student's institute or organisation. Jonathan decided to work out a low-cost but (graphically) top-quality production line for updating and producing topographic sheets.

The map was fully compiled and created using Macromedia Freehand 10 software in combination with the GIS-import plug-in filter Avenza MAPublisher. After digitising the aerial photos in Freehand (which offers a number of easy-to-handle drawing tools for this purpose), MAPublisher 4.0 was used to export the data in Arcview's Shape file format for other GIS-based activities. Once the data were complete, the author created a set of graphic styles within Freehand, which were then applied to the Shape file data. The total work process, including setting up map specifications, workflow planning, creating a style sheet, updating, editing and production, took less than six weeks.

Recently the surveyor-general of Malawi sent ITC a letter stating that " … he (Gwaligwali) produced one of the best topographic maps …" and "… the map impressed the entire department." Mr Gwaligwali was asked to complete the map because it is in such high demand.

City of Blantyre, Malawi, a 1:25,000 scale topo-sheet

project news

Milestone in Indigeo Project: Over 500 Geoscientists Trained

Phil Westerhof

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Indigeo is a SAIL-supported project jointly implemented by the Geological Survey of India (GSI), the Association of Exploration Geoscientists (AEG, India), the Maastricht School of Management (MSM) and ITC.

The project focuses on the institutional strengthening and human resource development of the GSI and other geoscience institutes in India and the South Asian sub-continent. Overall objectives include:
- raising awareness of the state of the art in digital geoscience mapping, and gaining insight into the organisational and management implications for effective acquisition, publication and archiving of the national geoscience database
- creating new capability in research and development, and implementing the application of sound management practices in the earth science sector oriented towards future methodologies
- assisting in drafting a human resources development plan, including course design, curricula and infrastructure (equipment) for a variety of short courses on topics related to management and digital methods.

To this end, training and teaching facilities have been established on the campus of the GSI Training Institute in Hyderabad. These include classrooms, computer laboratories, a library and accommodation for the faculty. In addition the hostel facility for trainees has also been remodelled, thus enabling participants to stay on the GSI campus.

Although officially started in January 1998, the project actually became effective after the first steering committee meeting and the signing of an MoU in August 1999. Since then the project has been smoothly implemented and has developed according to schedule. GSI staff have successfully attended PM courses at MSM and ITC, and 26 trainees have followed the three-month Training-of-Trainers programme at ITC. In turn, these trainers have trained many GSI staff and geoscientists from India and the region in a variety of training programmes, covering GIS, digital image processing and digital map processing for scientists and technicians. In combination with ITC and MSM experts, courses have been provided on GIS, an exploration project, aerial geophysical mapping and strategic change management. There is a strong demand for these courses from both GSI staff and staff of other geoscience organisations in India and neighbouring countries.

The project will run until July 2004. Till then the input of ITC and MSM will be strengthened. A course on advanced and Internet GIS was conducted in June by Ellen-Wien Augustijn and Barend Köbben. Two more courses and an end-of-project workshop are foreseen. In July a joint MSM-ITC course was given, with input from the Administrative Staff College of India (ASCI) and with Phil Westerhof as lecturer for the module Exploration Project. The course was attended by 19 staff, including the 500th course participant. The multiplier effect of the Indigeo project is impressive and the project can be considered highly successful.

Course participants, staff of the GSI Training Institute, and guest faculty from ITC, MSM and ASCI (with the completion of this course the number of trainees reached 502)

research news

PhD Graduation: Jianquan Cheng

Wednesday, 7 May 2003, Utrecht University

research@itc.nl

Jianquan Cheng was born on 5 October 1966 in Shucheng, Anhui, P.R. China. He completed his secondary education at the No.1 High School of Luan in 1984. He received his BSc degree in mathematics from the University of Shandong in 1988. He joined Wuhan Technical University of Surveying and Mapping (WTUSM) in 1988. In his early years at WTUSM, he took part in various projects involving remote sensing and geographical information systems for urban applications. He embarked on the MSc degree course GIS for Urban Application in September 1993, and earned his MSc degree with a thesis entitled "GIS for urban redevelopment in transformation, a case study of Wuhan City, P.R. China". Since returning to WTUSM, he has been involved in lecturing and GIS applications in the context of urban systems engineering, and relevant projects regarding GIS construction.

With the financial aid of the DSO project between China and the Netherlands, he started his doctoral research in April 1999. This research has resulted in some ten scientific papers in international peer-reviewed journals (submitted or already published) and in the proceedings of international conferences/symposia in which he participated.
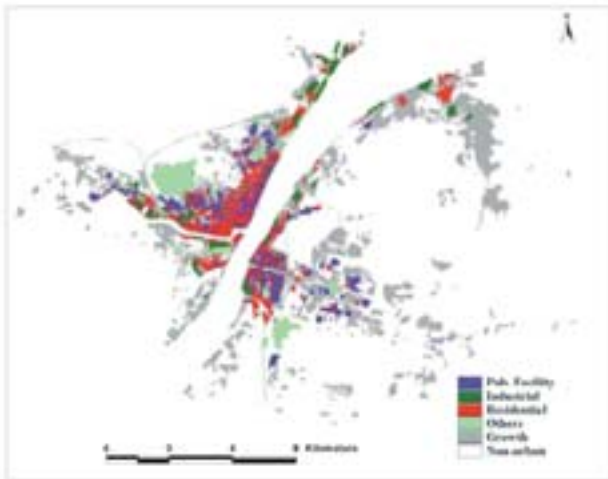
Modelling Spatial and Temporal Urban Growth

In an effort to better understand the complexity inherent in the urban growth process, the aim of this research was to develop a theoretical framework and methodology that focused on:

1. analysing the complexity of the urban growth system and evaluating the current methods available for modelling this complexity
2. monitoring the urban growth of a fast-growing city (Wuhan) in a rapidly developing country (P.R. China), based on remotely sensed imagery, and evaluating its structural and functional changes by modelling
3. developing and demonstrating a quantitative method for the comparative measurement of long-term temporal urban growth
4. developing and demonstrating an interpretable method for urban growth pattern modelling
5. developing and demonstrating a spatially and temporally explicit method for understanding the urban growth process.
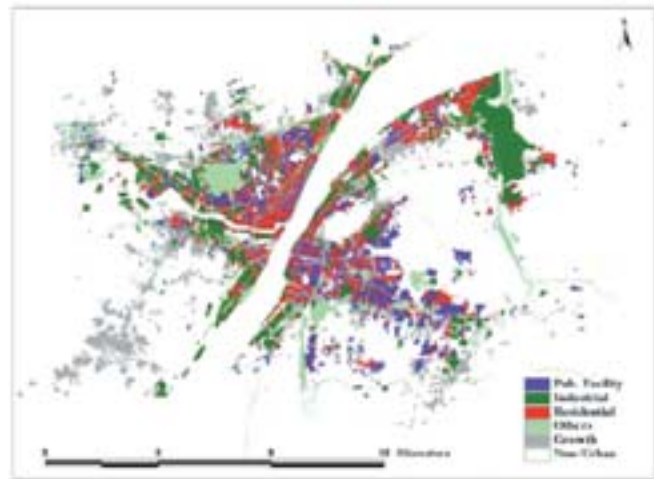
First, urban growth is defined as a system resulting from the complex dynamic interactions between the developable, developed and planned systems. Its complexity can be distinguished by projecting onto the spatial, temporal and decision-making dimensions. The specific complexity is linked with the major current methods of modern urban modelling, such as cellular automata, fractals, neural networks, multi-agent and spatial statistics. This confrontation makes it possible to indicate the possibilities of various modelling methods to understand urban growth complexity. Based on the theoretical and operational considerations, this study concentrates on the complexity in structural and functional change, temporal comparability, spatial patterns and spatial-temporal processes.

Second, with remotely sensed imagery (Spot and aerial photographs) and secondary sources, this research presents a methodology for monitoring and evaluating structural and functional changes in the last five decades. This methodology primarily comprises morphology analysis, urban land use structure change and spatial pattern analysis, using fractal and landscape metrics approaches. The findings show that the

Urban growth (1955-1965) and land use (1955) in Wuhan

Urban growth (1993-2000) and land use (1993) in Wuhan

integration of multiple spatial indicators can improve the capacity for interpretation, such as evaluation. This case study reveals temporal variations in the spatial urban growth process.

Third, this research presents an innovative method for the temporal measurement of long-term urban growth for the purpose of comparing urban sprawl. By using the concept of relative space, the temporal complexity can be transformed into spatial complexity, indicated by the complex spatial interactions between urban sprawl and urban social and economic systems. The method comprises temporal mapping, data disaggregation, integration on spatial gravity, and global evaluation. The findings reveal that the macro patterns of urban sprawl can be interpreted and compared from micro urban activities, as activities are directly linked with actors and their behaviour. This research also shows that pattern, process and behaviour must be integrated into a whole towards understanding the complexity in urban growth.

Fourth, this research presents a preliminary multiscale perspective for understanding spatial patterns based on spatial hierarchical theory. The spatial hierarchies comprise planning, analysis and data, which are interrelated. Multiscale in analysis hierarchy refers

to the probability of change (macro), the density of change (meso) and the intensity of change (micro). Multiscale analysis seeks to distinguish spatial determinants on each of the three scales, which are able to provide deeper insights into urban growth patterns shaped by spontaneous and self-organised spatial processes. The framework is implemented by using exploratory data analysis and spatial logistic regression. This combination is proven to have a strong capacity for interpretation. The scale-dependent and scale-independent determinants are found significantly on two scales.

Fifth, this research presents an innovative method for understanding spatial processes and their temporal dynamics on two interrelated scales (municipality and project), using a multi-stage framework and dynamic weighting concept. The multi-stage framework aims to model local spatial processes and global temporal dynamics by incorporating explicit decision-making processes. It is divided into four stages: project planning, site selection, local growth and temporal control. These four steps represent the interactions between the top-down and bottom-up decision making involved in land development for large-scale projects. Project-based cellular automata modelling is developed for interpreting

the spatial and temporal logic between various projects forming the whole urban growth. As a non-linear function of temporal land development, dynamic weighting is able to link spatial processes and temporal patterns at the project level. The findings from this research suggest that this method can facilitate and improve the temporal and transparent interpretation and visualisation of the dynamic process of urban growth globally and locally.

Finally, this research has found that complexity theories such as hierarchy theory and self-organising theory are very helpful in conceptually and methodologically understanding the specific complexity of a complex system. Spatial and temporal modelling based on complexity methods such as cellular automata can improve the analytical functions of GIS with the aid of remotely sensed imagery.

education

Fieldwork Adventures and MSc Research in a Chinese Wetland

Iris van Duren   vanduren@itc.nl

This short report was written shortly after my return to the office while the students were still in the field.

After weeks of preparation it was a pleasure to assist two Chinese students (from the ENRICH project) in starting their MSc fieldwork in their home country. Accompanied by Xu Weihua and Xin Shen, I left for Beijing on 9 September. We were picked up from the airport by Weihua's wife and two drivers from the Research Centre for Eco-Environmental Sciences Beijing (RCEES), the home base of the students before they came to ITC. Directly after dropping my luggage off at the guesthouse and a quick lunch, I was introduced to Professor Ouyang Zhiyun from RCEES. There was no opportunity to enjoy my jet-lag because, according to Professor's Ouyang's tight schedule, when it came to giving my lecture on wetland research there was no time like the present!

Hunting for good advice, useful contacts in the fieldwork area, and additional data, we spent the next few days in Beijing visiting several organisations and institutes involved in wetland research and conservation. We announced our plans and generated new ideas, meeting many helpful people at the State Laboratory of Environmental Chemistry, the Freshwater Programme at the headquarters of WWF China, and the Ramsar Implementation Office of the Division of Wetlands Conservation of the Department of Wildlife and Plant Conservation. A particular pleasure was our visit to Professor Chen Kelin and Ms Zhang Xiaohong from Wetlands International China. Their drive and enthusiasm also offer potential for future cooperation.

On Saturday, the train delivered us to Baoding, 200 km south of Beijing, where we were warmly welcomed at Hebei University by Dr Liu Cunqi and colleagues. Plans and mutual interests were discussed over lunch, after which Liu Cunqi took us to our fieldwork destination, Lake Baiyang Dian. This wetland has undergone dramatic changes during the last decade. Owing to activities upstream and less rainfall over the past years, water levels have dropped several metres. The impact is clearly visible: a large shift in services provided by the wetland to the local people, and consequently enormous land cover and land use changes, as well as socio-economic changes.

Hopefully the MSc research of the students will contribute to future management plans for the lake and surrounding area. Xin Shen is focusing on an analysis of how wetland services such as fishery, reed harvesting, tourism, transport and fruit production (Lotus and others) have changed, while also investigating (possibly using remote sensing) what indicators could be useful in monitoring the wetland. This might offer policy makers interesting additional views. Xu Weihua will concentrate on the spatial ecological analysis of how the changes in hydrology have influenced the reed vegetation. Reed vegetation is economically important in the area, but it is also the habitat of many bird species.

The visit to the management office of Lake Baiyang Dian and the reconnaissance survey by boat helped us to adapt and finalise the data collection plans. Housed at Hebei University, we could optimally prepare the fieldwork, as well as hugely enjoy ourselves by playing table tennis and competitively eating peanuts with chopsticks.

The first real sampling days in the field were filled by collecting data for the land cover and land use maps

Information sign on Lake Baiyang Dian

Fishing in shallow water

Students planning tomorrow's activities

Reed transport in the Lake Baiyang area

Xin Shen back at the boat and out of the mud

Xu Weihua testing if he could keep a dry suit while sampling

that will be part of the output of these studies. It was top entertainment to see the students trying out the fishing trousers and avoiding a wet suit. A great result if the first 20 cm of wetland bottom are muddy clay and boot size is much larger than the student's feet!

We had arranged accommodation with local people instead of staying in a hotel. A very hospitable elderly couple took care that we slept well, were fed three times a day, and arrived where we wanted to go. Our landlord was the best guide imaginable. And the fact that I don't speak Chinese and he didn't speak one word of English appeared no problem at all after a stiff drink at the dinner table.

Together with the students, I travelled back to Beijing on 21 September. After a week and a half of intensive discussions and optimising their sampling designs, they should be able to manage the rest on their own. I had arranged a follow-up meeting with Wetlands International China and a last visit to Liu Xuehua, with whom I had become good friends during the time she spent at ITC for her PhD

studies. It was nice to find out she was doing fine and was happy with the opportunities available at Tsinghua University. One last lunch and a sightseeing tour of the university campus and it was time to say goodbye and fly back to the office. And I agree, China is a vast and fast-developing country with many opportunities.

Aamsveen, Buurserzand and Haaksbergerveen:

A Rapid Field Survey by the Participants of the Natural Resource Management Programme 2003

Participants NRM 2003 Programme   mccall@itc.nl; groenendijk@itc.nl; dopheide@itc.nl

In September 2003, a new group of course participants arrived at ITC, some 60 of whom came to follow the Natural Resource Management programme. This programme begins with a multidisciplinary module reflecting upon the participants' professional knowledge and experiences. This interactive training formula has been successfully applied at ITC for ten years now. The introductory module concludes with

a rapid field survey in the neighbourhood of Enschede.

On 9 October 2003, the rapid field survey was conducted in southeast Twente, in the province of Overijssel. The objective of the survey was to gain insight into the conflicting land use issues and stakeholders in natural resource management in the Netherlands, while at the same time making optimal use of available spa-

tial and non-spatial information sources.

Three different groups visited the three nature conservation areas Aamsveen, Buurserzand and Haaksbergerveen, as well as three farmers in the area. Each group planned and prepared their survey, including interviews with a farmer and a representative of the organisation managing the conservation area. The

Identifying areas of potential conflicting landuses in the area south-southeast of Enschede using maps from the Provincial Plan on Space, Water and Nature.

By 1996 Mr ten Thij had established himself at the present farm location, with a total land area of 25 ha (as against the 18 ha he'd had earlier). He stressed that an advantage of the process had been reducing the time and effort spent on transporting machinery and products from the scattered farmlands he had owned in the past. He seemed very pleased with the results of the plan, although he'd had to invest in new construction. Mr ten Thij mentioned that, despite proximity to the N35 highway, farm production had not been affected.

The second site visited was the nature reserve area of Aamsveen (176 ha), near the Netherlands-Germany border. The reserve is under the control of the provincial Landschap Overijssel, a non-governmental organisation involved in nature conservation.

The aim of setting up the nature reserve, according to Mr Henk van Lier, a retired economist and voluntary worker who acted as guide for the group, is to convert former farmlands and promote the growing of native flora and fauna populations. The fauna found in the area include insects (25 species of butterflies), amphibians, reptiles, birds and mammals (squirrels and deer).

The reserve also aims to conserve the peat areas extensively mined in the past for fuel - to preserve them for

three groups communicated their survey findings in a plenary presentation, a poster session, and the following three articles.

NRM Students Visit the Aamsveen Area in Overijssel

The public call for measures to restore the balance between agriculture and the environment has become more and more persistent over time in the Netherlands. Emphasis is laid on the relationship between agriculture and the conservation of nature and landscapes.

The target area for the survey by group A was Aamsveen, located southeast of the municipality of Enschede. The aim was to observe the interaction in land use among actors involved in urban development, nature conservation and agricultural development. The exercise started the day before, with identifying areas of conflict between the actors and using different maps and images (tourist map, topographic map and Spot images) to plan the reconnaissance survey. Two sites were visited: a dairy farm located about 300 m north of the N35 highway (linking the Netherlands and Germany) in the

Grevengoor area, and a nature reserve area.

By interviewing Mr ten Thij and his son, the owners of the dairy farm, it was possible to see the magnitude of the changes they have had to go through as part of the Land Consolidation Programme. Mr ten Thij mentioned they had been very lucky that the whole procedure had gone quite smoothly for them. It had started in 1991 when the Ministry of Agriculture, the Province of Overijssel and the Land Development Commission implemented the decision on land consolidation.

Participants interviewing farmer Mr. ten Thy and his son.

Walking through a thick layer of bracken *(Pteridium aquilinum)* in the Aamsveen Nature Reserve

the future and allow them to serve as an ecological corridor for the wildlife populations shared with Germany.

Mr van Lier stated that Aamsveen was being supported by several funding sources: the government, private companies, membership fees, some "nature friends", and rents paid by farmers for houses and for land used as temporary grazing areas under controlled conditions. Renting land to farmers has facilitated their involvement in conservation activities.

The trip provided the students with a general understanding of land use and land use planning in the Netherlands, and gave them the opportunity to enjoy some of the local countryside.

Nature vs Farms: Point of Confluence

Introduction

The primary land use in the Netherlands is farmland, which comprises about 70% of the total area. No wonder the Netherlands ranks 3rd after the USA and France in terms of value of agricultural exports. But nowadays, farming in the Netherlands is widely criticised for its environmental consequences and its possible conflicts with nature conservation. To address the growing public call in the 1970s for restoring an ecological balance, the government formed a national ecological network (EHS in Dutch). EHS is a planned network of nature reserves and nature conservation development areas, and its aim is to achieve a sustainable natural environment through the maintenance, rehabilitation and development of natural and semi-natural systems.

Field Activities

Group B of the NRM students undertook a rapid field investigation in Buurserzand, with the primary objective of developing an in-depth understanding of the land use types in the Netherlands and the relationship and conflicts between farmland and nature areas. Visits were paid to a farm and a nature area establishment in the Buurserzand area. Mr and Mrs Scholten were interviewed to hear the farmers' point of view, while Mr Jaap in't Veld of Natuurmonumenten explained the importance of activities undertaken in the nature conservation area.

Description of the Area

This area is a combination of agricultural, nature conservation and recreation areas. The agricultural land is used mainly for dairy cattle farming, and consists of grassland and cultivated land for growing forage maize. While the main objective of the nature areas at Aamsveen, Witteveen, Buurserzand and Haaksbergerveen is to conserve natural lands, recreation is also an important land use activity.

Discussion and Result

In compliance with the 1975 Dutch government policy on sustainable natural environment, approximately 700,000 ha of land were scheduled

Agricultural land used for cattle farming bordering the Buurserzand Nature Reserve

A landscape of nature reserve at Buurserzand

Mr. Jaap in 't Veld from Natuurmonumenten explaining the management of the Buurserzand to staff and participants

NRM in Twente: Asking for Sustainability!

Group C of the NRM students investigated the Haaksbergerveen area. Visits were paid to Mr Vedders, a dairy farmer from Haaksbergen, and, under the guidance of Mr Roy Dear of the State Forestry Service, to the Haaksbergerveen Nature Reserve. On the way, the group observed some important features pertaining to natural resource management in the area.

In this article, the group intends to include what they learnt from the farmer. The farmer owns 35 ha and a mechanised dairy farm with 65 head of cattle. Although the farm is producing on average 1,600 kg of milk per day, his official quota is only 530,000 kg per annum. The milk is sold through a farmers' cooperative. According to the farmer, at least 2 ha are essential for each cow, and all cows have computer identification tags for regulating their feeding. It is notable that each cow is fed according to the amount of milk it produces, i.e., the more milk the cow produces, the more feed it is given. As the farmer pointed out, the price of milk has been falling while the cost of production has been increasing. As a result, the farmer has been getting 12% less income for milk over the last two years. To safeguard soil from pollution, the farmer has a bookkeeping mechanism to regulate the amount of minerals being used and retained in the soil. Any excess chemicals and fertilisers used at the farm attract fines.

On the other hand, the aim of the nature reserve, which was established in 1969 and covers an area of about 600 ha, is to restore peat lands. The State Forestry Service manages the reserve in order to preserve its recreational, historical and ecological

for conversion to nature reserves as part of the EHS[1]. Most of the land demarcated for conversion was agricultural land. Execution of the EHS has been facing difficulties, mainly in terms of acquiring land in order to extend the reserves into farmlands.

Farming is not just an occupation to the Dutch people. It encompasses their way of life, their traditions and culture, their identity, their rights and their inheritance, giving a sense of continuity with past centuries. The farmers are therefore reluctant to hand over their land for nature areas. Moreover, they are confused by a government policy in which priority has shifted from agriculture to environmental conservation. The public call in the 1970s for the balance to be restored between intensive agriculture and the environment must be considered in terms of the sustainability of, and benefits to, agriculture. More specifically, the reasons found in government policy for developing nature areas are that intensive farming has been converting the whole country into an agricultural field, pushing the natural environment to-

wards complete extinction. Furthermore, signs of pollution and the over-exploitation of resources have also become evident.

Against this backdrop, the conservationists and farmers need to find the confluence point of a win-win situation to the benefit of both, and achieve sustainability in resource utilisation. Therefore, a national consensus regarding this conflict has become a necessity in order to set priorities. The suggestion of Mr Jaap in't Veld, forester with Natuurmonumenten at Buurserzand, could be a useful solution: "if extension of the nature area becomes complicated, then biological farming, at least on those farms adjacent to the nature area and/or located within the EHS, should be promoted". This could be a way out of the current deadlock, but of course has to be discussed at length.

[1] NRM Module 1. Participants' Manual – Block 8. Natural Resource Management in Twente, Background document, ITC, 2003

The farm of Mr. Vedders bordering the Haaksbergerveen.

Mr. Roy Dear of the State Forest Service

value, because it harbours a wide range of flora and fauna, including deer, snakes, lizards, frogs and many migratory birds. The funds for managing the reserve come from the Dutch government, the European Union and other sources. The government, farmers, recreational groups, hunters, NGOs and researchers were identified as stakeholders in the reserve.

The reserve was a forest of birch and peat lands. In the 1930s, the farmers used to harvest the land for peat, leading to land degradation. As a result, during the late 1960s, the reserve authority started to construct dykes and compartments to retain water for peat restoration. Experience of the whole restoration process was gained from Ireland and Estonia. In addition, the authority established a buffer zone around the peat land to serve as a transition from the reserve to other land uses.

The major challenges for the reserve are to control the growth of woody vegetation and eutrophication. In addition, the drainage of groundwater by the farmers has a direct impact on the level of the water table of the peat land in the reserve. However, some of these threats are being over-

come by creating a buffer zone around the core zone. Similarly, a corridor of about 600 m has been proposed, with a view to maintaining ecological continuity and the interaction between this reserve and the Buurserzand reserve.

From the above, it appears that there are conflicts of interest between the farmers, on the one hand, and the nature reserve authority and the government, on the other. One particular conflict concerns the government's plan to expand the nature reserves into farming areas. Other conflicts re-

late to excessive government regulations and water management in general. The farmers were, however, happy with the land consolidation process. The process has brought farm plots together and improved the efficiency of farm management. Although the farmers are prepared to maintain the natural land as proposed by the government, they are still not willing to leave the land voluntarily and seek compensation for settling elsewhere.

Peat restoration site at the Haaksbergerveen

visiting itc

Lithuanian Delegation Visits ITC

Connie Blok

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Within the framework of the Leonardo da Vinci agreement between Vilnius University in Lithuania and ITC, the Department of Geo-Information Processing (GIP) hosted five Lithuanian visitors from 22 to 28 September 2003. The goal of the visit was to improve and update the teaching/curricula in cartography provided by higher educational institutes in Lithuania, in order to raise the study level. Cartographers graduating in Lithuania should be able to work effectively in state and private enterprises.

The visitors came from various institutes: Jelena Vaitkeviciene is a lecturer in cartography at Vilnius University, Birute Vilunaite and Raimondas Jukna are GIS engineers from the national topographic company GIS-centras, Asta Kairiene is a cartographer at the Institute of Aerial Geodesy, and Audrone Jakniunaite is a database administrator at HNIT-Baltic Geoinfoservice.

The main elements of the programme were as follows: ITC, GIP, and the GFM educational programme; modern developments in cartography; mobile GIS, including field data collection with ArcPad; and the role and activities of the International Cartographic Association (Lithuania became a member this year). The GIP staff involved were Menno-Jan Kraak,

Connie Blok, Corné van Elzakker, Richard Knippers and Barend Köbben. In addition, Saskia Tempelman and Rens Brinkman introduced our guests to ITC and its building and to Blackboard. Last on the programme was a visit to Wolters Noordhoff Atlas Productions (the main Dutch educational publisher) in Groningen, where

Tjeerd Tichelaar discussed issues of toponymy and guided the visitors around the atlas bureau.
Home again, the visitors have reported they have great memories to look back on, particularly of Enschede and ITC's "great kingdom of Geoinformatics".

The Lithuanian guests, together with ITC's Connie Blok and Menno-Jan Kraak

Mobile GIS, including field data collection with ArcPad, featured on the programme

Obituary: Angela Muthini Syengo (1977-2003)

Jan de Ruiter   deruiter@itc.nl

Angela was born in Mombasa, Kenya, on 23 November 1977. She spent most of her early years in Mombasa, where she attended Mombasa Primary School (1984-1991) and then the Star of the Sea Secondary School. Here she excelled not only in her academic studies but also in swimming and dancing, and she represented her school in national school competitions.

On completion of her secondary education she moved to Nairobi, where she stayed with her brother Davies and her aunts while she pursued a professional hairdressing course at the Peacock School of Hairdressing. She was to use this skill later at Moi University to supplement her allowances.

She graduated with a BA honours degree in geography in the year 2001. While at Moi University, Angela was a member of the Geography Students Association and AIESEC, where she made immense contributions and acquired many friends. She also volunteered her services and time to the Remote Sensing and Survey Centre in South " C ", Nairobi, and it was through some of the contacts she made there and seminars organised on geo-information that she was able to secure the scholarship to study at ITC. She was at Enschede from September 2002 to the time of her sad demise.

Angela died on 11 August in the midst of people who loved her. To those who knew her, Angela was a loving and adventurous person and we will greatly miss her presence among us. She leaves behind a three-year-old son, Mark Kipyego Syengo.

It seems that winter is just around the corner and, as you can see, ITC's new students relished the first flurry of snow. But what happened next? Did the snowballs find their target or did the photographer beat a hasty retreat?

staff news

Sjef van der Steen Honorary Fellow ICA

Corné van Elzakker   elzakker@itc.nl

The 21st International Cartographic Conference and 12th General Assembly of the International Cartographic Association (ICA) were held in Durban, South Africa, from 10 to 16 August 2003. To his great surprise, our colleague Sjef van der Steen was awarded an ICA Honorary Fellowship on this occasion.

Sjef van der Steen has chaired the ICA Commission on Map Production Technology since 1995. He has been a staunch supporter of one of ICA's most important objectives: the exchange and dissemination of cartographic knowledge. As part of the international network of people interested in aspects of map production technology, he has made several presentations of his work with map production flow diagrams. As chairman of the commission, he has organised numerous seminars and workshops - some in cooperation with other ICA commissions - in venues such as Cuba, Indonesia, Chile and Turkey. Under his leadership, the knowledge generated by his commission has been disseminated not only in lectures and exercises at the seminars and workshops but also in proceedings and other outlets. He has led the

Sjef van der Steen (second on the right) and Dr Harold Moellering (USA) showing the Honorary Fellowships just received from ICA President Dr Bengt Rystedt (right) and Secretary-General Professor F.J. Ormeling (left)

ICA President Dr Bengt Rystedt explaining why Sjef van der Steen so well deserves the fellowship

commission through rapid technological changes in our discipline, provided a good new direction in geo-information production management, and demonstrated excellent networking and team skills.

The fellowship was awarded to Sjef van der Steen in recognition of his special contributions to ICA: his leadership on the Commission on Map Production Technology, and his role in teaching and communicating in the field of cartography. Sjef is the first Dutchman and the first ITC staff member to receive this prestigious award.

Welcome to ITC	Kim Veldhuis	Administrative Employee, Financial and Economic Affairs (per 25 August 2003)
	Ellen Groenewoud	Secretary, Bureau Project Services (per 1 September 2003)
	Jeroen Jansen	Personnel Advisor, Personnel and Organisation (per 1 September 2003)
	Dr Robert Strobl	Assistant Professor, Department of Water Resources (per 1 September 2003)
Staff leaving	Walid Belal	Lecturer, Department of Urban and Regional Planning and Geo-Information Management (per 1 August 2003)
	Kenneth Hiwat	Administrative Employee, Financial and Economic Affairs (per 1 August 2003)
	Drs Nicoline Emmer	Project Assistant, Department of Geo-Information Processing (per 17 August 2003)
	Ria Hummel	Secretary, General (per 17 August 2003)

life after itc

Alumni Reception Durban, South Africa

Sjef van der Steen

steen@itc.nl

During the International Congress of the International Cartographic Association, an ITC alumni reception was organised on 13 August 2003 at the Congress Centre in Durban, South Africa. It was organised by the participating ITC staff members and was attended by some 40 people. Amazingly a few alumni had been "over the horizon" for more than 20 years. Professor Menno-Jan Kraak described both current developments at ITC and plans for the future, while Sjef van der Steen highlighted the importance of the alumni interaction system, including the services ITC offers its alumni.

Since the ICA congress was organised in Africa, ITC African alumni were well represented. Among the delegates were ITC alumni Dr. Joseph Akinyede, Director Department of Space Application at NASRDA, Nigeria and Dr. Liu Yaolin, School of Land Resource and Environmental Science, Wuhan University, China. Informal discussions on topics such as social experiences and developments, as well as private talks, made the reception a great success. Moreover, the event gave alumni the opportunity to exchange addresses.

Alumni Meet during Map Asia 2003, Kuala Lumpur, Malaysia

Janneke Kalf

kalf@itc.nl

From 13 to 15 October 2003 ITC participated in the Map Asia 2003 Conference and Exhibition held at the Putra World Trade Centre in Kuala Lumpur, Malaysia. ITC's Lyande Eelderink and Janneke Kalf (wo)manned the ITC booth; furthermore, ITC was represented by Karl Harmsen, Yussif Hussin and Mostafa Radwan.

Map Asia 2003
Founded in the year 2002, Map Asia 2003 was the 2nd Annual Asian Conference and Exhibition in the field of GIS, GPS, aerial photography and remote sensing and was jointly organised by the Malaysian Centre for Remote Sensing (MACRES), the Centre for Spatial Database Management and Solutions, GIS Development and the Asian Institute of Technology (AIT).

Map Asia is evolving as a platform where all stakeholders such as researchers, users, technology developers and policy makers can discuss, deliberate and share knowledge and experiences for the benefit of the

The ITC booth: (from left to right) Y Bhg Dat' Nik Nasruddin Mahmood (Director MACRES), the Hon. Dato' Haji Zainal Dahalan (Deputy Minister of Science, Technology and the Environment, Malaysia), Karl Harmsen (Director CSSTEAP) and Janneke Kalf (Acting Head Communication ITC)

Asian Geoinformatics community. The objectives of Map Asia are fourfold: regional cooperation, public–private partnership, showcasing technology and applications, and bridging continents.

ITC Alumni Meet

On Tuesday evening, 14 October, 12 alumni from Malaysia, Pakistan, Singapore, the Netherlands, India and Indonesia attended the buffet dinner. It was a lively get-together, where anecdotes about the study period spent at ITC were exchanged with the ITC representatives.

Mr Falak Nawaz (alumnus EREG.3 200-2001) from Pakistan was also present. He expressed the desire to establish an official ITC alumni association in his home country and was very enthusiastic and positive about the success of such a venture in Pakistan. Only time will tell.

By strengthening ties with our alumni and founding alumni associations in different countries, we hope to be able to plan alumni gatherings in cooperation with these local associations. It is difficult to carefully plan activities "from a distance". The fact that only a handful of the 169

Malaysian alumni attended this gathering proves the need for a local organiser and advance planning. The free e-mail accounts for ITC alumni (http://www.itc.nl/alumni/alumni_mail box/default.asp) will certainly contribute to better and quicker communication between alumni and ITC. So if you have not yet signed in, do it now!

letter to the editor

Dear Ms. Janneke Kalf
I hope you will be OK. I am also fine here. We spent very nice time there in Kuala Lumpur especially meeting with ITC teachers and staff was very pleasant event. Thank you very much for dinner and get together party also. I returned back to my home on 18th but during my absence, my father had been died due to heart attack. This was sad news for me as I am the only son of my parents & during my absence, my family especially my wife face all problems related with funeral ceremony. Anyhow, now I am trying to recover from the incidence, as there is no way to out.
This year, I shall send four five of my students to ITC for MS or PM programme. All of these students are preparing their documents nowadays & I am hopeful that they will increase the dignity of ITC as they are very serious and studious students. This is good news for us that this year, The Netherlands govt has uplift ban on Pakistani students. We were suffering for the last 3 years as after 2001, none of our Pakistani students join ITC.
Our second batch of One-year post-graduate GIS/RS diploma course has been started. Last year we enrolled 12 students in diploma but now 28 students have applied in which we selected only 20. Now due to diploma, I can't go out also my boss don't like to relieve me as during my absence, no one can teach GIS and related subjects. Due to this reason, my PhD is also suffering, but I am trying to manage time and satisfied that besides that I am engage in diploma and teaching, I have better progress than any other teachers.
Last Sunday, there were interviews about a post in GIS expert. I was also a member of the selection board. During the interview, I was feeling proud as out of 18 applicants, 14 were my students and every body were saying that we can use ILWIS with full confidence, although they can use other software also. This feels me great satisfaction as now at least I have played my role to introduce ITC and ILWIS not only in my province but also in whole Pakistan.
Rest is OK with me. I am collecting fresh addresses of ITC fellows & until now, I have collected 43 addresses & waiting for some news contacts as soon as I collect it, I shall share it with you so that you should also upgrade your contacts.

FALAK NAWAZ, PAKISTAN
Email: nawaz03528@alumni.itc.nl

letter to the editor

Dear Editor,

Nigerian alumni (Photogrammetry P8, 1972) of Rivers State weep for Professor Visser

All the Nigerian ITC alumni in and around Port Harcourt in Rivers State who knew the late Professor Jan Visser wept when they heard the news of his exit from this life. It was a great shock to me when I first heard of it via a report on the visit of ITC's director of external affairs to South Korea.

I usually read my copies of ITC News from cover to cover and I wondered why I did not see the news of Professor Visser's death. I was also able to see the Internet page that presented a very brief obituary.

I have a feeling of great loss because I will not be able to see him again in this life to express my heartfelt gratitude for his kindness to me during my training at ITC. I remember I sent him a greetings card and a personal letter to which he replied during his retirement from ITC. "May his gentle soul rest in perfect peace".

I have visited Canada, the USA and Britain since my stay in Holland, but my affections are ever with Enschede in Holland because of the Dutch people, the late Professor Jan Visser and his friend Mr Johan ten Boss, through whom I met Professor Visser face to face. In me and with me, these two friends ever live. "The Dutch are good and always right." My aspiration is that, if God wills, I shall visit these two families in the near future.

I sincerely thank the ITC management for all the trouble it has taken to reach out to interested ITC alumni all over the world and keep them informed of day-to-day happenings in the sciences and life at ITC and in Holland for over 50 years now.

We, the ITC alumni of Rivers State, are looking for ways to optimise your efforts in making strides in development everyday, everywhere and at all possible levels.

I am looking forward to your reply with great hope. Thank you very much.

Yours faithfully,
Chief Gogo Tennyson John Horsfall
tenmodels@yahoo.com
Phone: +234-8023394753

Dear Madam,

I would like to take this opportunity of thanking you for sending me the ITC News publication, which I receive periodically.

I came to the Netherlands for the first time in 1999 and received a PM degree in engineering geology, and later in March 2002 I received an MSc degree.

Being here, far away from ITC, it is really very nice to read something about ITC life and to see in the pictures some of the staff members I met there. Unfortunately, I don't have an Internet connection so am unable to visit the ITC website. That's why ITC News is very important to me.

Thank you again!

Eddy Hernandez
Empresa Nacional de
Investigaciones Aplicadas
MICONS
Havana, Cuba
enialabh@ceniai.inf.cu
(for subject, please write
"Message for Eddy Hernandez")

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CONFERENCE CALENDAR

2nd FIG Regional Conference
02-Dec-03 - 05-Dec-03
Morocco, Marrakech

http://www.ddl.org/figtree/morocco/index.htm
l.tikdirine@acfcc.gov.ma

International Workshop on Radiometric and Geometric Calibration
02-Dec-03 - 05-Dec-03
United States, Stennis Space Center

http://www.edudevweb.com/isprs/
smorain@edac.unm.edu

ISPRS Workshop on Spatial Analysis and Decision Making
03-Dec-03 - 05-Dec-03
China, Hong Kong

http://kartoweb.itc.nl/sadm2003/
isprs@hkbu.edu.hk

ISRS Annual Convention/Symposium

09-Dec-03 - 12-Dec-03
India, Thiruvananthapuram

http://www.cessind.org/isrs.htm
msd@eth.net

International Conference on Web Information Systems Engineering

10-Dec-03 - 12-Dec-03
Italy, Rome

http://www.dis.uniroma1.it/~wise03/
dinamico/index.htm
wise03@dis.uniroma1.it

Workshop Space Technology and Disaster Management

13-Dec-03 - 17-Dec-03
Saudi Arabia, Riyadh

http://www.oosa.unvienna.org/SAP/stdm/
raechelle.newman@unvienna.org

Mobile and Internet technologies

26-Jan-04 - 28-Jan-04
Czech Republic, Ostrava

*http://gis.vsb.cz/gisengl/conferences/gis_*
ova/gis_ova_2004/gis_ostrava_2004.htm
jan.ruzicka@vsb.cz

Map India 2004

28-Jan-04 - 30-Jan-04
India, New Delhi

http://www.mapindia.org
info@mapindia.org
ITC attendance: John Horn, Martien
Molenaar, ITC Booth

7th Conference Global Spatial Data Infrastructure

02-Feb-04 - 06-Feb-04
India, Bangalore

http://www.gsdi.org/GSDI7/Gsdi7Firstann
ouncementFinal.pdf
astevens@gsdi.org
ITC attendance: Martien Molenaar

ESA-EUSC 2004 Conference

17-Mar-04 - 19-Mar-04
Spain, Madrid

http://earth.esa.int/rtd/Events/ESA-
EUSC_2004/index.html

Mobile Mapping Technology 2003 (postponed from Aug 2003)

29-Mar-04 - 31-Mar-04
China, Kunming

http://www.geoict.net/MMT2003/index.htm
tao@yorku.ca

EurEnGeo 2004

04-May-04 - 06-May-04
Belgium, Liege

http://www.ulg.ac.be/eurengeo
info@eurengeo2004.org
ITC attendance: Robert Hack

GISDECO 2004

10-May-04 - 12-May-04
Malaysia, Johor

http://www.fab.utm.my/gisdeco2004
b-haris@utm.my
ITC attendance: Richard Sliuzas

Workshop on Basic Space Science

24-May-04 - 28-May-04
China, Beijing

http://www.oosa.unvienna.org/SAP/
act2003/china/index.html
oosa@unvienna.org

Workshop of the EARSeL Special Interest Group

28-May-04 - 29-May-04
Croatia, Dubrovnik

http://www.zfl.uni-bonn.de/earsel/
earsel.html
earsel@uni-bonn.de

Geoinformatics 2004

07-Jun-04 - 09-Jun-04
Sweden, Gävle

http://www.hig.se/geoinformatics/
geoinformatics@hig.se

EARMA Annual Conference

24-Jun-04 - 26-Jun-04
Romania, Bucharest

XXth ISPRS Congress

12-Jul-04 - 23-Jul-04
Turkey, Istanbul

http://www.isprs2004-istanbul.com
oaltan@srv.ins.itu.edu.tr
ITC attendance: Staff t.b.d., students
t.b.d., ITC Booth

35th COSPAR Scientific Assembly

18-Jul-04 - 25-Jul-04
France, Paris

http://www.cospar2004.org/
cospar2004@colloquium.fr

ITALIA 2004, International Geological Congress # 32

20-Aug-04 - 28-Aug-04
Italy, Florence

http://www.32igc.org

SDH 2004

23-Aug-04 - 25-Aug-04
United Kingdom, Leicester

http://www.geog.le.ac.uk/sdh2004/

IGARSS 2004

20-Sep-04 - 24-Sep-04
United States, Anchorage

http://ewh.ieee.org/soc/grss/igarss.html

FIG Regional Conference for Asia and the Pacific

03-Oct-04 - 07-Oct-04
Indonesia, Jakarta

http://www.ddl.org/figtree/events/
events2004.htm
fig@fig.net

5th AARSE Conference

18-Oct-04 - 21-Oct-04
Kenya, Nairobi

ottichilo@rcmrd.org

5th International Symposium on Mining Science and Technology

20-Oct-04 - 22-Oct-04
China, Xuzhou

http://ismst.cumt.edu.cn/english.htm
ismst@cumt.edu.cn