FIG-President Univ. Prof. Dr. Holger Magel

“Shaping the Change: Visions on surveying and surveyors in a new century“

Lecture on 29th October 2003 at University of Technology in Kingston, Jamaica

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1. The only Constant is Change

“The overview of current surveyors activities and tasks is sufficient but the prospect of future is even more exciting with regard to the incoming variety and area of tasks and new chances. The ways of surveying will change. A lot of measurements will in future be carried out by machines or people with lower education. But at every time new methods and technologies must be developed, commanded and used … The education must consider and provide more theory and more general fundamentals …”

Prof. Karl Rinner, Austria one of the last universal surveyors and geodesists on 8 Nov. 1968* at University Bonn, Germany


The Global Drivers

- Technology development
  - GPS, GIS, Internet
- Micro-economic reform
  - privatisation, decentralisation, downsizing, quality assurance
- Globalisation
  - from local to global
  - events in one part of the world impact on people in other parts of the world
- Sustainable development
  - developments that effectively incorporates economic, social and environmental concerns in decision-making
  - meet the needs of the present without compromising the ability of future generations to meet their own needs

Source: Prof. Stig Enemark, Head of School of Surveying and Planning Aalborg University, Denmark, Intergeo, Hamburg, 12 September 2003
The Professional Challenges

The spatial information revolution and the evolving land management paradigm in support of sustainable development have had many influences on education and professional structures over the last two decades. Professions such as surveying are being re-engineered and re-invented to accommodate the spatial information revolution, while endeavouring to maintain traditional services. The international surveying profession and the national associations will have to adapt to these challenges and develop structures that accommodate a modern interdisciplinary profile. …

2. Shaping the Change: Impacts on Surveying and Surveyors

Main fields of challenges to surveyors

<table>
<thead>
<tr>
<th>Property (measured/ventilated)</th>
<th>Land and tenure management</th>
<th>Contribution (breath and soul)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical, legal, economic rights and their changes, land laws and policy, hum (city)</td>
<td>3D systems, databases, spatial databases, maps, and cadastre,</td>
<td>Sustainable, human, political, economic, social and cultural</td>
</tr>
<tr>
<td>sustainability, natural environment and society</td>
<td>Land law, water, marine, land use,</td>
<td>policy, sustainable development, infrastructure, economic and social growth</td>
</tr>
<tr>
<td>(living and just world)</td>
<td>policies, land market,</td>
<td></td>
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<tr>
<td></td>
<td>housing policy, sustainable</td>
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<tr>
<td></td>
<td>human development, urban and rural development and</td>
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<tr>
<td></td>
<td>rural development, urban and rural</td>
<td></td>
</tr>
<tr>
<td></td>
<td>infrastructure, economic,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>political and social goods</td>
<td></td>
</tr>
</tbody>
</table>

FIG-Motto 2003 – 2006 “Shaping the Change”

“Shaping the change” only possible by changing and broadening surveyors profession, activities and capacities

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UN Millennium Development Goals, Rio, Istanbul and Johannesburg Declarations
Agenda 21, Secure Tenure, Access to Land, Gender Issues, Civil Society, Good Governance, Poverty Reduction
Globalisation - New Technologies - New Networks
UN- and FIG-topics: urban-rural interrel. (for) sustainable development, Spatial Information Management, Land Management etc.

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Since the Rio Conference in 1992, sustainability has been the central principle of international development. In August 2002 the World summit on sustainable Development (WSSD) was held in Johannesburg and geomatics was unconditionally recognised as a significant part of the solution to making the world more sustainable. In the final WSSD Plan for Implementation there are many references, which will need geomatics input, including need for:

- Land reform;
- Land management;
- Monitoring the environment;
- Planning for sustainable developments;

**Plan of Implementation**

36. ...

(g) Promote the systematic observation of the Earth’s atmosphere, land and oceans by improving monitoring stations, increasing the use of satellites, and appropriate integration of these observations to produce high-quality data that could be disseminated for the use of all countries, in particular developing countries;

...
104. ... (a) Improve their use of science and technology for environmental monitoring, assessment models, accurate databases and **integrated information systems**;

... (b) Promote and, where appropriate, improve their use of satellite technologies for quality data collection, verification and updating, and further improvement of aerial and ground-based observations, in support of their efforts to collect quality, accurate, long-term, consistent and reliable data;

... 105. Establish regular channels between policy makers and the scientific community for requesting and receiving science and technology advice for the implementation of **Agenda 21**, and create and strengthen networks for science and education for sustainable development, at all levels, with the aim of sharing knowledge, experience and best practices and building scientific capacities, particularly in developing countries.

106. Use information and communication technologies, where appropriate, as tools to increase the frequency of communication and the sharing of experience and knowledge, and to improve the quality of and access to information and communications technology in all countries, building on the work facilitated by the United Nations Information and Communications Technology Task Force and the efforts of other relevant international and regional forums.

119. septies  Promote the development and wider use of earth observation technologies, including satellite remote sensing, global mapping and geographic information systems, to collect quality data on environmental impacts, land use and land-use changes, including through urgent actions at all levels to:

(a) Strengthen cooperation and coordination among global observing systems and research programmes for integrated global observations, taking into account the need for building capacity and sharing of data from ground-based observations, satellite remote sensing and other sources among all countries;

...
Plan of Implementation

38. ...

(b) Develop and implement integrated land management and water-use plans that are based on sustainable use of renewable resources and on integrated assessments of socio-economic and environmental potentials, and strengthen the capacity of Governments, local authorities and communities to monitor and manage the quantity and quality of land and water resources;

... 

Source: Plan of Implementation, World Summit on Sustainable Development, Johannesburg, September 2002

Main Phases in Humankind/Land Relationship

Up to late 1700s

Agricultural Revolution
Land = Wealth

Late 1700s–WWII

Industrial Revolution & Land Markets
Land = Commodity as well as Wealth

Post WWII

Post-War Reconstruction
Land = Scarce Resource as well as Wealth

Up to late 1700s

Agricultural Revolution
then Feudalism
Land = Wealth

1980s onwards

Information Revolution
Sustainable Development
Social Equity

Land = Community Scarce Resource as well as Wealth

Fiscal Transfer Planning Multi-purpose
Cumulative Evolution of Application for Cadastre

A Global Land Administration Perspective

Good Land Information
Better Land Policy
Better Land Administration and Management
Better Land Use

Sustainable development is not attainable without sound Land administration

The special thing Land ...

This fact makes it impossible to leave its use to be determined by the obscure interplay of market forces and the whim of the individual. An equitable legal and social system calls instead for the public interest to play a much stronger role in the case of land than in the case of other property assets. That is why land cannot be treated as moveable goods in legal relationships.

Source: German Federal Constitutional Court, 1967

The Land-Issue in urban and rural areas is in the spotlight of the international and national Community

- UN Habitat Global Campaign for secure tenure, urban-rural interface, urban governance etc.
- World Bank: Land policy research report
- Hernando de Soto: “The mystery of capital”
- Land reform, Land redistribution, sound cadastre and registration systems etc. in Europe, Asia, Africa, America as precondition for economic growth
- UN-FIG-Conferences (Bogor, Bathurst, Nairobi, Marrakech)

Source: Plan of Implementation, World Summit on Sustainable Development, Johannesburg, September 2002
The Institutional Challenges

Establishing appropriate institutional and organisational infrastructures is seen as a crucial key for achieving sustainability in any society. In a theoretical sense, the concept of property rights is such an institution. Appropriate cadastral systems play a most important role in terms of facilitating the real property transactions such as land transfers, land taxation and control of land use and land development.

Who needs access to coordinated geographic information?

- Land Records Adjudication
- Disaster Response
- Transportation Management
- Water, gas & electric planning
- Public Protection
- Defense
- Natural Resource Management
- Telecommunications Infrastructure
- Economic Development

The Three Pillar Model

The modern land administration system is concerned with detailed information at the individual land parcel level. As such it should service the needs of both the individual and the community at large. Benefits arise through its application to e.g.:

- guarantee of ownership and security of tenure and credit;
- facilitate efficient land transfers and land markets;
- support management of assets;
- and provide basics information in processes of physical planning, land development and environmental control.

The system, this way, acts as a kind of backbone in society.

Quotation from FIG Agenda 21 Chapter 6

Good decisions for Sustainable Development depend on access to reliable and relevant information and to a very large extent on information that is geographically referenced. The need for geographic information arises at all levels of government, from senior decision-makers to the grass roots and individual levels.

Considerable data exist, but access to data is often hampered by lack of standardisation, coherence and adequate services for data retrieval, including information about what data exist and where data are kept.

The Nairobi Statement on Spatial Information for Sustainable Development: Executive Summary

The objectives of the Nairobi Conference on Spatial Information for Sustainable Development (10/10) were to:

- Contribute to the international community’s effort to advance the implementation of UN Agenda 21 (www.un.org/esa/sustdev) and the Habitat Agenda (www.unhabitat.org);
- Understand the role of the surveying community in implementing the Habitat Agenda;
- Urge governments and stakeholders to implement integrated land information-management;
- Strengthen and promote the relevant information to support FIG Agenda 21.
Spatial Data and Spatial Information

Within FIG normally the term Spatial Data is used for „georeferenced data“. Combining data creates information. Spatial Information is information with a reference to a specific location (coordinate, an address, a property number, a cadastral number etc.)

Land Information Management

City Governments currently manage considerable collections of land related information. However, the traditional separation of this information into different component themes, combined with disjoint information management regimes, leads to a considerable loss in value of the information as a resource. Comprehensive and City-wide Land Information Management (LIM) provides the means to technically and institutionally integrate these component themes of land information into a truly corporate information resource (FIG/UN-HABITAT, 2002). Figure below illustrates how this concept can add value by combining information concerning use, condition, value, and tenure of land and disseminating this to the decision makers.

Spatial Data Infrastructure

Spatial Information and Knowledge Management

Knowledge management
Information management
Data management
Data processing

Interchange with data
Harmonisation of data
Integration of data
Conversion of data

Organisation Society citizen
3. The Professional Challenges and FIG’s Role

The Professional Challenges

The spatial information revolution and the evolving land management paradigm in support of sustainable development have had many influences on education and professional structures over the last two decades. Professions such as surveying are being re-engineered and re-invented to accommodate the spatial information revolution, while endeavouring to maintain traditional services.

The international surveying profession and the national associations will have to adapt to these challenges and develop structures that accommodate a modern interdisciplinary profile. This includes adoption of ethical principles and model codes of professional conduct suitable for performing this modern role.

The profile of the surveying profession in the third millennium will include a mix of technical surveying and mapping professionals, business practitioners, spatial data managers, land and environmental resource managers (in public as well as private sectors), and legal and financial consultants on land management matters.

FIG Commissions

Commission 1 – Professional Standards & Practice
Commission 2 – Professional Education
Commission 3 – Spatial Information Management
Commission 4 – Hydrography
Commission 5 – Positioning and Measurement
Commission 6 – Engineering Surveys
Commission 7 – Cadastre & Land Management
Commission 8 – Spatial Planning & Development
Commission 9 – Valuation and the Management of Real Estate
Commission 10 - Construction Economics and Management

The very latest challenge:
Partner for UNEP in the field of „disaster and risk management“

4. The Educational Challenges

The Educational Challenges

Traditional education of surveyors has focused on geometry and technology more than on land use and land administration. Taking a land administration approach to surveying education, there is a need to change the focus from being seen very much as an engineering discipline. There is a need for a more managerial and interdisciplinary focus as a basis for developing and running adequate systems of land administration.

A future educational profile for land administrators should be composed by the areas of Measurement Science and Land Administration and supported by and embedding in a broad interdisciplinary paradigm of Geographic Information Management. Such a profile is illustrated below.
Learning to Learn

Professional and technical skills can be acquired and updated later in one's career, while skills for problem solving and skills for learning to learn can only be established through the process of academic training at the universities.

International Trends in Surveying Education...

- **Management Skills** - versus specialist skills
  - from traditional technical skills and push button technologies
  - to interpretation and management of data meeting the needs of the clients

- **Project Organised Education** - versus subject based
  - from traditional technical skills (knowing how)
  - to management and problem solving skills (knowing why)
  - focus on "learning to learn"

Demands of German employers on graduates

**Professional Skills**
- well-grounded education
- efficient studies (but not in record time and not only-studies)
- good final degree

**Additional Skills**
- foreign language skills (English and another one)
- practical knowledge or previous vocational training
- activities in addition to the studies (social engagement, member of a orchestra etc.)
- studies abroad or an additional final degree of a foreign university
- knowledge of modern ICT
- good general education
- to be sovereign in superior spoken and written style

Demands of German employers on graduates

Key Qualifications (Soft Skills)

- diligence, determined action and staying power
- mental flexibility
- thinking in context
- results-oriented working
- knowledge of human nature, soft skills and managerial skills
- authority with convincingly arguments
- ability to team-work
- to approach problems by different ways
- close to reality
- fantasy and creativity
- and last but not least willingness for lifelong learning

Profile of Surveyors/Geodesists Education at Technical University of Munich (TUM)

- Preparation for activities in research and practice with the wide range „from the single parcel to the planet mars“
- Comprehensive scientific education in the fields of Geodesy, Geoinformation and Land Management
- The Graduates finally should have become a “wellgrounded Generalist”, based on ethical values and a commitment to society.

New Structure of the Curriculum for TUM-Geodesy and Geoinformation

Land policy is regarded in accordance with an Advisory Opinion of the Federal Constitutional Court in 1954 as a part of regional planning. It comprises the totality of the activities of public authorities in relation to land.

Land policy is understood as conscious action to bring about an optimal use of land as well as of a socially just distribution of landownership and of income from land.

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5. Enhancing Professional Competence

Enhancing Professional Competence

Deadline for Application
Deadline for the academic year starting each year in October: 31st of the same year.
Deadline for DAA D-Scholarship: October 15th of the previous year.
Application forms and further information about the Master’s Program are available from:
Prof. Dr. Ing. Holger Magel
Chair of Land Reclamation and Land Development,
FIG-President 2003–2006, Program Director
Dipl.-Geogr. M.A. Babette Wehrmann
Program Manager
Technische Universität München
Institut für Geodäsie, GIS und Landmanagement
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Arcisstr.21
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Phone: +49-89-289 25789
Fax: +49-89-289 23933
Email: master@landentwicklung-muenchen.de
www.landmanagement-muenchen.de

The Master’s Program “Land Management and Land Tenure” is supported by:
DAAD
Deutscher Akademischer Austausch Dienst
German Academic Exchange Service

Application Form and Information:
International Graduate Program
Master of Science (MSc) in Land Management and Land Tenure
Faculty of Civil Engineering
and Geodesy
Institute of Geodesy, GIS
and Land Management
Germany

Philosophy of the Program
To demonstrate and illustrate the important role of land rights and land policy, land management and land administration for a sustainable urban and rural development in the broader context of good governance and to teach adequate approaches and tools for their implementation.

List of Courses
Basic Elements
- Global Framework for Land Management and Land Tenure
- Rural and Urban Development
- Land Rights and Land Tenure Systems
- Land Policy
- Land Economics (Land Valuation, Land Markets, Land Taxation)
- Land Management
- Land Administration
- Natural Resource Management
- Land Management and Land Tenure in Germany
List of Courses

Methods and Tools
- Participatory Planning
- Conflict Management and Reconciliation of Land Conflicts
- Photogrammetry and Remote Sensing
- Visualisation of Geodata, (Internet-) Cartography, GIS and GPS
- Project Planning and Impact Monitoring
- Management Skills
- Study Skills
- Research Skills

Structure of the Program

<table>
<thead>
<tr>
<th>Summer</th>
<th>1. Term</th>
<th>2. Term</th>
<th>3. Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation</td>
<td>Basic Elements (Theory and Concepts)</td>
<td>Methods and Tools</td>
<td>Thesis</td>
</tr>
<tr>
<td>+ German Language Course + Orientation Month</td>
<td>+ Classes + Accompanying Examinations + Preparation for Internship</td>
<td>+ Wrap up + Classes + Accompanying Examinations + Preparation for Internship</td>
<td>+ Wrap up Thesis</td>
</tr>
</tbody>
</table>

5. Five Guiding Principles for Securing the Future of Surveying and Surveyors

1. Strengthening of self confidence. Surveyors are the obstetrician of geodetic referenced data and points!
2. Better information policy, public relations and marketing strategy. Especially the political decision makers must be contacted and informed about the needs and benefits of surveyors work like Geoinformation systems.
3. Extension of surveyors networking by a rich variety of partnerships
4. Smooth start of international activities backed by the public authorities
5. Broadening of the range of activities with new strategies, products, services and business plans; excellent education; use of modern technologies and finally: Be courageous and open to the change and the future

Prof. Reinhold Woosley, World Bank on 8 April 2003 at 8th Austrian Geodetic Days in Wels/Austria

5. Five Guiding Principles for Securing the Future of Surveying and Surveyors

The International Federation of Surveyors and its current council and commissions are strongly underlining these afore mentioned Guiding principles. The principles are an integrated part of FIG’s philosophy, strategy and work plans. All surveyors and surveyor associations of the world, either practitioners, business men or academics, can therefore trust in, that their global organisation FIG is a reliable and very competent partner in shaping and thus securing the future of surveying and surveyors.

FIG President Prof. Magel on occasion of his visit of Jamaica, Oct. 2003