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FIG COMMISSION 3
SPATIAL INFORMATION MANAGEMENT
REPORT ON ACTIVITIES 1998–2002

1. FIG COMMISSION 3

In 1998 the field of responsibility for Commission 3 was changed from Land Information System and GIS to Spatial Information Management. Today the term Spatial Information Management (or Geographic Information Management) has been adopted by several involved in the traditional GIS businesses.

The new field of responsibility found expression in the following "Terms of reference":

- Management of land, property and hydrographic information and the related processes, procedures and resources
- Spatial data infrastructure – data models, standards, availability and legal aspects, management of spatial knowledge
- The impacts on organisational structure, business models, professional practice and administration
- Management of spatial information supporting sustainable development.

Against the terms of reference the Commission formulated the following mission statement:
"Towards a digital earth" - How to change raw data into understandable information.

2. SPATIAL INFORMATION MANAGEMENT

Spatial information is an indispensable part of the basic infrastructure in the individual country, and it is a reality that spatial information affects a major part of human decision making.
In a few years spatial data will be integrated in all kinds of information systems. Sometimes they will be visible, in other cases invisible, but indispensable because they are the underlying basis in the different systems and services.
The increasing use of spatial data and information causes a strong need for people who can manage the technical and organisational aspects of combining data and in turning data into understandable information. Aspects comprising common standards, common data models, models for spatial information infrastructures etc. With other words, people who are skilled in **Spatial Information Management.**

*The concept of **Spatial Information Management** is based on the idea that data, people, software and hardware interact, and that it is practicable to obtain synergy by co-ordinating changes and development. The concept covers several very different disciplines such as data and information, information technology, organisational issues and spatial data infrastructure.*

Spatial Information Management is a key element in the processes which lead to users of spatial information, politicians, citizens and case attendants, having a better overview of

both simple and complex problems and which give users the possibility to create comprehensible and thus acceptable solutions and/or compromises.

Spatial Information Management is a discipline urgent as well to the individual organisation, administration or enterprise (micro level) as to society in general (macro level). On the micro level there will be a more technical approach. On the macro level as well national as international political and organisational issues will be highlighted.

Spatial Information Management is a dynamic concept. It changes in line with the technological possibilities and the political and organisational developments in society in general.
Spatial Information Management is also about human resources and organisational changes. Being involved in spatial information management means to be in the focal-point between man and technology.
Spatial Information Management as well as *Spatial Knowledge Management* is a growth field for surveyors**.**

3. CORE BUSINESS

As it emerges from the preceding the concept of Spatial Information Management (SIM) comprises several very different disciplines such as technology, organization, education and policy.
In the FIG context Commission3 is dealing with the general aspects of spatial information, whereas the practical implementation and utilizing takes place in the other commissions. Commission 3 concentrates its efforts on issues and topics on concept level up to the point where they are practicable.

Commission 3 monitors all aspects of trends as well as actual developments related to use and dissemination of spatial data and information to be able to be a strategic adviser for FIG, the member associations and the different external partners
In this context the Commission involves aspects as organizational impacts, education and capacity building a.s.o.

Much attention has been paid to the development and implementation of Spatial Data Infrastructure. Our efforts have been concentrated on this issue because it is a field of interest influencing many perhaps all member associations.

4. WORK PLAN 1998-2002

Commission 3 works through the Working Groups and by bringing people together. In 1998 three working groups were established:

- WG 3.1: Spatial information management: technical approaches
- WG 3.2: Spatial data infrastructure
- WG 3.3: Facilitating spatial information and knowledge management for decision support: through appropriate organisational, political, business structure.

At working weeks, annual meetings and seminars the Commission offer people from different countries the possibility: to share experiences, to become members of a global network and to become friends.

The results of the Working Groups and the meetings are made available to professional and political community in form of reports and proceedings.

Information on the Commission and its activities and results is available on the Commission homepage on http://fig3.boku.at.

5. WHAT HAS BEEN DONE UP TO NOW

The Commission is totally dependent on the involvement of the delegates and the correspondents. Fortunately many have put a lot of effort into the commission by participation as well by preparing country reports and presentation on specific topics.

The proceedings from the working weeks and the annual meetings are visible results of the activity within the Commission. The proceedings reflect the actual development and developing trends from the various countries.

In addition the FIG Office will publish two reports:
1. *The Nairobi Statement on Spatial Information for Sustainable Development.*
2. *Land Information Management for Sustainable Development of Cities – Best Practice Guidelines.*

All results are available on the FIG homepage: www.fig.net.

5.1 FIG Working Weeks

The Commission has contributed to the FIG working weeks as follows:

Place	Participants in Commission meeting	Number of Countries Represented	Number of Sessions	Number of Presentations
Sun City	20	14	2	8
Prague	26	15	1	5
Seoul	20	13	5	20

The purpose of a FIG working week and a Commission annual event is different. The result of a working week is an overall picture of the actual development within the frames of FIG, whereas the results of a Commission event are dedicated to a specific theme.

5.2 Annual Meetings

The annual meetings have been arranged by national associations with the aim to promote *Spatial Information Management and Spatial Data Infrastructure* in their country. Bringing people from different countries round the world together with colleagues from a host country, on the one hand gives us the possibility to share experiences and knowledge and on the other hand to create and maintain personal contacts and networks under the FIG umbrella.

There have been three annual meetings combined with seminars/conferences with the conference on Spatial Information for Sustainable Development held in Nairobi, Kenya in October 2001 as the culmination.

Place	Year	Number of Participants	Number of Countries Represented	Number of Presentations
Budapest	1999	80	12	30
Athens	2000	100	17	38
Nairobi	2001	Approx. 450	35	80

The theme of the meeting in Athens was "Spatial Information Management, Experiences and Visions for the 21st Century". The result of the meeting was "Experiences and Visions", related to Spatial Data Infrastructure.

The International Conference on Spatial Information for Sustainable Development was organized by FIG Commission 3 with strong support from the FIG Office, the Institution of Surveyors of Kenya (ISK), and the United Nations Centre for Human Settlements (Habitat).

The organizers received support and help from the main sponsors United Nations Environmental Program (UNEP), GEOMAPS, the Institution of Quantity Surveyors of Kenya (IQSK), the co-sponsors Metrocosmo Valuers ltd, University of Nairobi, Intergraph Mapping and GIS Solutions and Swede Survey and a number of companies and institutions. In addition the United Nations Economic Commission for Africa (UNECA) and United Nations Food and Agriculture Organization (FAO) were active participants.

The outcome of the Nairobi conference is a set of recommendations, and on a publication: *The Nairobi Statement on Spatial Information for Sustainable Development.*

5. 3 Other Activities

5.3.1 The Newsletter

Since 1986 Commission 3 has had a Newsletter that has been distributed to more than 500 addresses twice a year, the last 7 years in co-operation with Commission 7. In Seoul we made the decision to move this speciality from paper to an electronic version. In the future the information will be made available for all interested via the Commission homepage.

5.3.2 The United Nations

In 1999 and 2001 the chairman represented FIG at meetings in the Committee Developing Information (CODI), organized by the United Nations Economic Commission for Africa. At the last meeting Commission 3 was invited to present a paper on "Spatial Data Infrastructure, Developing Trends and Challenges".
In January 2001 the president of FIG was invited to participate in The 7 Cartographic Conference for the Americas as well as to present a paper with the title "Spatial Information Management in the 21st Century". The chairman of Commission 3 in cooperation with the vice-chairman of Commission wrote the background material for the presentation.

Working group 3 and UN-Habitat are co-operating on the subject of how Land Information Management can contribute to sustainable development of cities.
The results will be published in spring 2002 under the title: *Land Information Management for Sustainable Development of Cities – Best Practice Guidelines.*

In spring 2001 the vice-chair Gerhard Muggenhuber participated in a Conference of the Turkish National Assembly. He gave a presentation on "Organisation Model of Surveying Associations, Surveying Markets and Standards in Surveying in EC"

6. FUTURE ACTIVITIES

Even though Spatial Data Infrastructure is a very essential topic it is only a limited part of issues related to Spatial Information Management.

The accelerating technological development gives the users possibilities for access to information and services unforeseeable a few years ago. Even though the implementation time is very dependent on local conditions we will see implementations as well in developed as in developing countries. The actual developing trends will be illustrated with a few examples.

6.1 Major technological developments

The new technologies imply new methods for data capture in digital form. *Remote sensing* will give us cheaper data. *Real time positioning* will revolutionise the traditional fieldwork, etc. The data will be used in public and private administration as well as in business.

The major influence on GPS Surveying in coming years will be the real time kinematic technique (RTK). Networks of permanent stations supporting real time and post processed GPS surveying will be increasingly important parts of the *Spatial Data Infrastructure*.

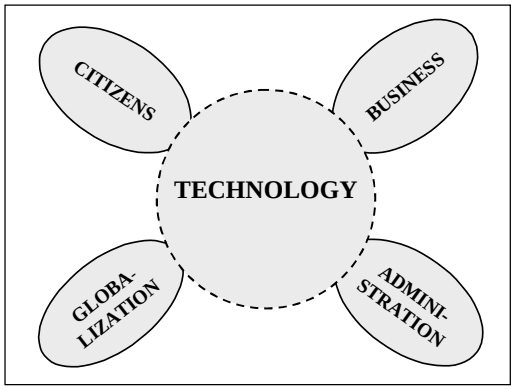
Personal navigation is another hot issue. By means of a mobile phone or a minimized GPS receiver it is possible locate a person, a vehicle etc. in a few meter range. With online access to information with geographic references it is possible to offer individualized information, to establish different services like road pricing, route planning etc, so called Location Based Services.

With the *Internet* the world has been narrowed. Many have already been accustomed to use the Internet as the communication network for self-management, self-service, providing of information and making business. With the coming *hand-held devices* information will be available independent of space and time. The Internet has great influence on development of organizational and business structures.

In line with introduction of *broadband technologies* we will see a number of new services. The different service-providers will create and offer *information* based on data from different sources created *on the fly*.

6.2 Examples on different developments

A few examples on what the potential technological developments will offer to citizens, public administration, business and the ongoing activities within globalization will be mentioned.



Citizens look for experience and adventure. They will expect that all information independent of where it is stored will be available at their fingertips present as well as historical versions 24 hours a day. Some day self-administration and self-service will be taken for granted. E-government and e-commerce becomes a reality.

Therefore it is urgent and necessary to combine the information systems with actual and updated knowledge. In a near future it will be possible for the citizen to update information stored in the different databases via personalized portals.Spatial data or information stored in traditional paper maps is static. Each map sheet represents a snapshot of selected objects at a given time, and "the owner" has an exclusive right to the map. In contrast a digital map or better a collection of spatial and spatial related data is dynamic with the time parameter as a part of the individual data collection.

In "the digital world" we have different owners of spatial data, many different users and an unknown number of applications. In this context the traditional hierarchical marked do not exist. We will experience a marked organized as a network with many to many relations.

The users, as well public as private, groups or individuals, will take it for granted that it is possible to combine data from different sources. To handle this situation the *geo information business* has to be reorganized. We will see new business units based on *partnership and strategic alliances*. Some of these business units will be global. *Internet and E-commerce* is some of the catalysts in this process.

The geographic based information systems will influence the way that *the public administration* is organized. With access to all data and knowledge it will become possible to supply the politicians and the citizens with the same information as the case officers and it becomes possible to decentralize decision competence. Combining data from different sources, even sources from different levels in the administrative hierarchy make it possible to break down traditional bureaucratic barriers. Spatial information will become a catalyst in reengineering of many administrations. Spatial Information is a prerequisite for E-government.

Systems like this demands common references, common "keys", between different data sets, seamless databases, common standards etc.

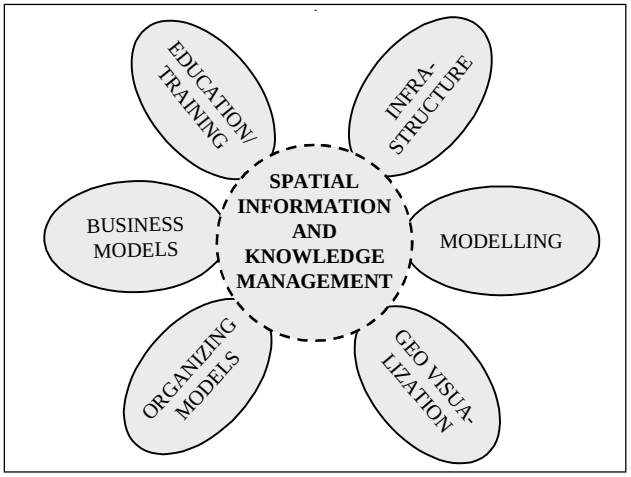
There is a general trend towards being *Global*. Agenda 21 and The Habitat II Global Plan of Action address the need for information, development of appropriate databases and exchange of information as conditions for creating the basis for sustainable development in all regions of the world. One reason for this is that the global society faces great problems concerning

urbanisation and the influence of urbanisation on coastal zones and environmental conditions overall.

As mentioned in the preceding it will become necessary to include knowledge or access to knowledge in the future spatial information systems to make the systems usable for ordinary users. The time has come to speak about "*Spatial Information and Knowledge Management*".

6.3 Actual and relevant fields of activity.

There are a several actual and relevant fields of activity. To support a holistic development of spatial data and information you need to concentrate on a few but very essential activities.



Development and implementation of a *National Spatial Data Infrastructure (NSDI)* will continue to be a key-activity in the years to come. Within NSDI *data modelling* is a fundamental topic. To be able to combine data from different sources you have to agree on common methods and standards for *data modelling*. In addition it is necessary on cross-institutional level or better on national level to start to discuss and decide on the *semantics* in spatial data.

The term *modelling* comprises several very different areas important for handling and presentation of spatial data and information. Presentation of data from different sources requires decisions on how to select and how to manipulate data. In this context *model generalization and cartographic generalization* has to be developed to a degree that it becomes possible to carry out the procedures "on the fly".

Traditionally spatial data and information has been *visualized* on paper. In line with the increased access to the Internet it has been obvious that visualization of spatial data and information on a screen is very different from visualization on a map. It is partly due to the size of the screen, the presentation of colours, the possible minimum size of objects on the screen and similar differences. There is a strong need for examples on and standards for visualization of spatial information, *geo-visualization*, on traditional maps and on screens including the small screens on hand-held devices.
Because many new users only have limited or no experience in use and interpretation of spatial based information it is necessary and urgent to develop *alternative possibilities* for the presentation and interpretations of spatial information, including integration of knowledge.

As soon as it is possible to have simultaneous access to different sources with spatial data and if possible even knowledge it is time for reengineering the way we arrange duties, workflow and decision making process inside the individual organisation and across boarders between different *organisation* including boarders between private and public administration.
At the same time it is a part of the *organisational framework* to co-operate on the implementation of as well a National Spatial Data Infrastructure as possible co-operation on regional and even local level.

As illustrated previously in this paper the marked for maps and spatial data and information undergo major changes at the moment, with Internet and E-commerce as *business drivers*.

To day the producer specifies the content and the quality of the available product. To morrow we will see quite new products specified by the customers dedicated to specific use. Normally the products will consist of data and information from different sources eventually as results of modelling processes or results from customer defined analyses done by a service provider.

Changing from a situation where the national mapping agencies almost had a monopoly to a marked with a widely distributed supply chain demands new *business models*, new prizing algorithms, clarified rules for copyright, standardized product specifications and access to Meta-data and it demands *partnership and strategic alliances* between the possible players in the spatial information arena.

The traditional employee with a medium or high-level *education* in geo-related issues does have a comprehensive knowledge on IT and informatics, cartography, photogrammetry and surveying.

At the same time there is a need for employees with new qualifications such as management, standards, data models, meta data, access to data, infrastructure architecture, intellectual property right, copyright, prizing of data and organizational developments. Beside there is a need for knowledge on analysis, modelling, visualization, visual communication etc.

The new technology offers completely new possibilities for *training and education*. Distance learning and distance training are becoming important strategic issues in developing countries and countries in transition because *training and education* on site will minimise implementation times. Besides it will be possible to be less dependent on key persons because it will not be costly to involve more employees in the training and education.

SUMMARY

A commission in the FIG structure is not able to have it is own research and development activities. In stead a commission can initiate and support research and development at universities, in developing organisations and private companies, and the commission can disseminate information and knowledge to FIG, the delegates, the member associations, to UN to the World Bank, to international aid-organizations etc.

Commission 3 tries to live up to this. We collect information on the ongoing developments and developing trends in the different member countries through the national delegates and other involved in the commission network, from presentations during FIG working weeks and the annual meetings, from best practise studies, and from monitoring the developments in different countries and regions.

On background of a continuous monitoring of trends and the FIG strategic plans formulated by the Council and adopted by the General Assembly the commission can come up with a working plan for an inter-congress period (four years). The working plan comprises sub-working plans for working groups, plans for annual meeting, communication plans etc.

After a period (1998-2002) with very much focus on National Spatial Data Infrastructure it is time for going deeper into some of the other elements within the concept of Spatial Information Management: e-government and e-commerce, digital administration, modelling, geo-visualisation, organizing models, business models and education and training.

The incoming chairmanship and the active delegates of Commission 3 have to decide on the content of the work plan for the period 2002-2006.

And last but not least the chairmanship constantly has to position the Commission in a way that makes the Commission a strong strategic adviser on ongoing developments within Spatial Information and Knowledge Management for the FIG Council, the other FIG commissions, the member associations, the Unit Nations, the World Bank, the Aid Agencies etc.

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