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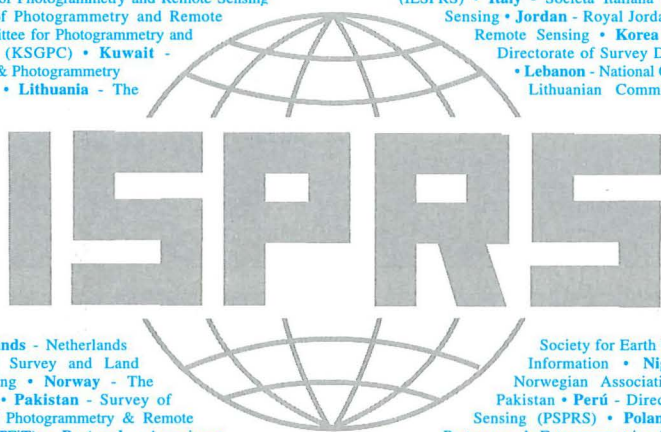
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COVER: The image is taken of a series of lakes between the Great Sandy Desert and the Gibson Desert in northern Western Australia at approximately latitude S22° 26' and longitude E123° 34'. The largest (salt) lake in the image is Lake Dora. The bright streaks across the image are sand dunes. (Satellite imagery supplied courtesy of the Australian Centre for Remote Sensing, Australian Surveying and Land Information Group, Department of Industry, Science & Tourism. ©Commonwealth of Australia).

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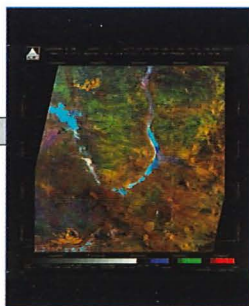
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EDITORIAL



Dear Colleagues,

Two years ago during the Congress in Vienna The Netherlands Society of Earth Observation and Geo Informatics was elected to organize the XIXth Congress of ISPRS in Amsterdam in the year 2000. I had the honour of being appointed Congress Director. Midway in time between Vienna and Amsterdam I should like to give you an update on the progress with the organization.

With approval of the ISPRS Council we have planned a more compact Congress than the previous ones: only one week, from 17 - 23 July, 2000. Tutorials, workshops and technical tours will be organized during the days before the Congress. Exhibitions and Congress will take place at the same time, therefore we expect

optimal communication and exchange for everyone.

We are in close contact with the Technical Commission Presidents and the Working Group Chairmen to assure a consistent and transparent procedure for the planning of the technical and poster sessions and for the selection of papers to be presented. Our present schedule allows for 72 technical sessions of 90 minutes each as well as 30 poster sessions. At least 1000 papers can be presented, similar to the previous congresses, and even more if we include the papers to be presented during the workshops. We propose to limit the number of parallel technical sessions to four, as was the case in Vienna. Also from the Vienna experience we will adopt the brief oral introductions to the poster sessions. In this way there should be no limitation for any colleague wanting to present a paper at this turn of the millennium-, and as we expect trend-setting event.



Impression of the International Congress Centre RAI in Amsterdam.

To set a trend, it helps if one knows where to go. It is clear to everyone that our profession has seen many changes in recent years, which have had a major impact on academia, industry and the way our outputs contribute to Society and the human environment at large. Some key terminologies have changed with the advent of new names like "geomatics", "geo-informatics".

Therefore the ISPRS Council is developing a Vision on the future of our Society, for which proposals will be circulated during the coming months. At the opening session of the Congress we are reserving a substantial time slot for a panel discussion on the future role of our Society, with the participation of representatives from science, industry, policy makers, as well as other users of our scientific results. We are keen to receive proposals for outstanding individuals, who could be nominated for this panel on the mission of our Society: the advancement of knowledge, research, development and education in photogrammetry, remote sensing and spatial information systems and their applications, for the social, economic and physical well-being of humankind.

Meanwhile the Council has identified several challenges to be met such as: the encouragement and facilitation of research and development, the advancement of knowledge by scientific networks, cooperation with other international organizations and scientific societies, inter-disciplinary integration for value enhancement, facilitation of education, applications, and the recognition of the role of photogrammetry, remote sensing and spatial information sciences. ISPRS should like to be regarded as "the international spatial information and imaging society" or something similar. We are now looking for the proper phrasing.

When bidding for the Congress in 1996, the Netherlands chose as the Congress theme for the year 2000: "Geo-Information for All". After visiting the Symposium of Commission V which deals with "Close-Range Techniques and Machine Vision" I realize that with the choice of our theme we may have overlooked a very dynamic and fast growing group of people in our Society, which is not really concerned with the "geo"-oriented applications. They had a very successful Symposium with 300 participants, many of them from exciting adjacent fields such as computer animation and the medical sector. We certainly do not want to exclude them from our Congress, despite our Theme. On the contrary, we could have been more comprehensive if the theme had been formulated for instance as "Spatial information (from images) for all". Our apologies for this oversight.

With the choice of our Congress theme "geo-information for all" we want to encourage special attention to the management of the complex transitional processes associated with achieving sustainable development in the

next century, from global to local levels. Several aspects are already being highlighted during the Technical Commission Symposia this year, which will probably lead to interesting follow up sessions at the Congress. It is our challenge to generate and deliver timely, comprehensive and cost-effective geo-spatial information from images, that is accessible to the full range of users, and will have a beneficial impact on all levels of Society world-wide.

The choice of the Congress theme was also inspired by the concern for the application of our sciences in the developing countries and the countries in transition in Central and Eastern Europe. In the year 2000 the International Institute for Aerospace Survey and Earth Sciences (ITC) celebrates its 50th anniversary. Having trained and educated more than 13,000 professionals, most of them from the developing countries, ITC expects many of its alumni to participate in the Congress as well as in some of its own commemorative events, such as refresher courses, special sessions during Congress and maybe some seminars for executives of key production organizations.

We will use the World Wide Web (<http://www/itc.nl/-isprs>) and the ISPRS "Highlights" to keep all members up to date on the organization of the Congress. On page 23 of this issue more information is given on the XIX ISPRS Congress.

I should like to thank Mauricio Araya for giving good exposure to the Congress in the previous editions of "Highlights" edited by him and wish Johan Boesjes and his GITC very much success and satisfaction with the production of Highlights during the coming years.

Finally I look very much forward to meeting many of my ISPRS colleagues personally during the seven Technical Commission Symposia which I will attend in preparation of the Congress. At present about 20 people in The Netherlands are enthusiastically organizing the technical and social events for Amsterdam 2000, including a special programme for the partners, to make sure that the XIX ISPRS Congress will become a great success, scientifically as well as for the strengthening of the friendship between the participants.

Yours sincerely,

Klaas Jan Beek
ISPRS Congress Director





PUBLISHER'S NOTE



INTERNATIONAL GEOMATICS PUBLISHER FOR ISPRS HIGHLIGHTS

By Johan Boesjes (President GITC bv)

From this edition ISPRS Highlights has a new publisher. GITC bv is the name behind GIM International, Hydro INTERNATIONAL, Professional Surveyor, Surveying World and other titles which globally serve the geomatics sector. With offices and associated companies based in the US, the UK and Italy and head office in the Netherlands, GITC is the world's leading publisher of magazines serving surveyors and other professionals working within geomatics. Now ISPRS Highlights joins their portfolio. Johan Boesjes, President of GITC, explains how GITC in the period of ten years has grown from a single bi-monthly journal to a multi-title publishing house.

GITC was founded in 1987 by Kees Westerhuis, a former practising surveyor, who saw a gap in information supply and exchange within international surveying and related industries. He bravely decided to launch a magazine to be distributed world wide to inform his fellow professionals on markets, products and technologies. His idea resulted in the sample issue of Geodetical Info Magazine (GIM) in March 1997. The sample edition was introduced at the ACSM show in Baltimore, USA, the same year and was received very well.

Continuous improvement

The success in Baltimore was the start of GIM International which at that time was GITC's only product. Since then both the contents and the distribution of GIM International have shown considerable world wide growth. GIM International's continuous improvement has been determined by the high criteria set by GITC in terms of the reliability. Today, GIM International appears in 107 countries and the monthly circulation is 9,500 copies. From the start GIM International has focused on both technical and management aspects of the industries and the provision of information on the international market-place. It serves the world wide geomatics community with a magazine which considers the acquisition, processing, presentation and management of geo-referenced spatial data as its key issues. The original concept of the founder has given manufacturers, distributors, professionals in the field, end users and individual readers the unique opportunity to communicate through GIM International world wide.

Publishing extends

In 1992 GITC reached an agreement with The Royal Institute of Chartered Surveyors (RICS) on a joint publication called Surveying World (SW). This journal serves RICS members in the UK and Commonwealth but has, in addition, a large number of independent readers too. Since November 1995 this widely respected professional journal has been produced in association with PV Publications and Editor Stephen Booth who also edits Engineering Surveying Showcase.

Stateside expansion

Since January 1995 GITC has fully owned a subsidiary company in the USA called Professional Surveyors Publishing Co Ltd. The company publishes Professional Surveyor magazine (PS) which has the largest circulation in its field in the US, going to almost 60,000 surveyors and is published eight times a year. GITC deliberately chose to leave management and production facilities in the US office at Frederick, Maryland as it considers local markets are best served by locally based professionals.

Latest Publications

GITC started publishing Hydro INTERNATIONAL in 1997, a magazine devoted to hydrographic surveying and already a well-respected information source in the hydrographic world. In the same year GITC reached an agreement with Maggioli Editore Publishers in Italy on a joint publication called GEOmedia, a geomatics newsletter for the Italian market.

Independent and flexible

GITC believes that it is particularly important in this profession to maintain an independent position as this is the only way to guarantee unbiased and respected publications. For the future, GITC will further expand its role as an information intermediary through the publication of magazines and the provision of consultancy services, serving the geomatics industry.

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ANNUAL REPORT 1997 TECHNICAL COMMISSIONS 1996-2000



NOTE OF THE EDITOR-IN-CHIEF: In this issue the annual reports of the TC IV and TC VII are published. The reports of TC I, TC V and TC VI have been published in volume 3 number 1; the reports of TC II and TC III have been published in volume 3 number 2.

TECHNICAL COMMISSION IV: MAPPING AND GEOGRAPHIC INFORMATION SYSTEMS

President: Dieter Fritsch (Germany)

Technical Secretary: Monika Sester (Germany)

Administrative Secretary: Markus Englich (Germany)

Terms of reference

The following Terms of Reference (ToR) were approved during the Vienna Congress and by ISPRS Council:

- Analogue and digital mapping procedures and products
- Revision of topographic maps and map databases
- Data acquisition, data processing, analysis of data and visual representation in GIS
- Application of GIS to land related record management (e.g. multipurpose cadastre and utility mapping) and decision making tasks
- Radar and planetary mapping
- Digital terrain models
- Conceptual and logical spatial data modeling for storage and retrieval in spatial databases

These terms of reference set the rules for the scientific work of Technical Commission IV until the Amsterdam Congress. But as can be seen later, discussions were made whether these ToRs form the real parentheses for new ambitious visions within Geographical Information Systems. It seems clear, already at this reporting date, that they must totally be redefined. A request will be made by the TC President to ISPRS Council in due time.

All information about Technical Commission IV can be accessed online on the Web viewing the homepage <http://www.ifp.uni-stuttgart.de/comm4>

State of science and technology of Commission IV topics

1997 was a very active year as far as contributions of the 6 Working Groups and 2 Intercommission Working Groups are concerned. The overall goal that ISPRS Technical Commission IV serves as a platform for GIS science and technology could be fulfilled, and was validated

by 3 successful workshops in Autumn 1997: the Hong Kong, Stuttgart and Hannover workshop.

In the following progress reports from the WG chairmen are delivered which highlight their efforts being active and a driving force for scientific development. These reports clearly state that Technical Commission IV is in good shape.

State of Science and Technology of IC WG IV/III/1: GIS Fundamentals and Spatial Databases

Chairperson : Martien Molenaar

Co-Chairperson : YC Lee

The main highlight of 1997 was the International Workshop on "Dynamic and Multi-Dimensional GIS", organized as a Joint Workshop with the other ISPRS WGs II.1, IV.1 and IV.3 from 25-26 August 1997 at the Department of Land Surveying and Geo-Informatics of Hong Kong's Polytechnic University. More than 40 scientists participated coming from Asia, Europe, and Northern America.

Some topics under discussion at the workshop will be highlighted in more detail:

The dynamic GIS progress goes slow because many data revision processes are handled in kinematic mode, what means, data epochs are collected, updated, and compared with each other. There should be more research in dynamic modeling to investigate efficient implementation procedures for spatio-temporal data structures. As far as the dynamics of fuzzy objects is concerned, there is a trend to use probabilistic approaches for uncertainty integration.

Uncertainty remains a further subject to be investigated

ed in more detail. Up to now mainly three different approaches are used: the error propagation method with its clear definition of underlying statistics, the use of Bayes statistics, and fuzzy modeling. There is general agreement that uncertainty is rigorously to integrate, from the storage and retrieval of spatial data to the data analysis (e.g. polygon overlay) and data visualization.

A very detailed approach for matching of spatial data of different sources seems to be the relational matching procedure. Herewith, common nodes, edges and faces of at least two vectorial data sets can be detected what is important for data revision processes. Further work will show, how the to date very time consuming algorithmization can be improved.

The extension of 2D-GIS geometry to 2.5D and real 3D is still under investigation. The Hong Kong workshop has shown, that gaps must be overcome especially in topological modeling and 3D analysis.

Up to now, several levels of spatial data are provided to overcome the scale problem. Ideally, this should be avoided, if efficient data aggregation algorithms are used. Unfortunately, the generalization work carried out over the last two decades did not result in clear visions of data aggregation. Hence, further work is to be prepared which starts at a more general object definition than classical cartographic investigations of the past. Also here, the next two years will show, whether or not this problem can be solved.

As also offered by the GIS and database industry Geo-SQL is an efficient toolkit for data retrieval. It seems reasonable that the proposals made by academia can directly influence product development. Here, the GIS community shall concentrate much more in near future on small steps for the improvement of the GIS products.

Planned activities in 1998

The Working Group will compile the sessions for the Technical Commission IV symposium in September and also hold a business meeting in Stuttgart.

State of Science and Technology of IC WG IV/III/2: Integration of Image Analysis and GIS

Chairperson : Emanuel Baltsavias

Co-Chairperson : Michael Hahn

Secretary : Dirk Stallmann

The objective of the WG was to focus on the interrelated topics of Image Analysis and GIS.

On the one side of this forward-looking area there is the aspect that image analysis provides one of the most efficient tools for GIS data collection using a variety of image data. On the other hand the potential of existing GIS data sets for image analysis is recognized for some time, but work on how to exploit this information within image analysis has just started recently. In between, there is a lot of unsolved problems, e.g. the matching of GIS objects with various image representations, or the use of GIS models, data or procedures for extraction of objects from

images. Interest is also in themes which are oriented towards the needs of GIS users, for example, the task of extracting the third dimension for 2D databases, and particularly for important objects like buildings or roads. These activities often relate to a transition from a cartographic to a topographic (or landscape) model.

1. The WG sent out a questionnaire with its first circular letter to ask its ca. 90 members about their research interests and activities. After analyzing the responses the following could be concluded:

Many members were interested in 3-D and 2-D object and feature extraction from aerial and to a lesser extent satellite imagery but without making use of or establishing any relation to a priori known information (although few mentioned model- and knowledge-based approaches). The objects mentioned most frequently include buildings, roads and urban regions in general. Another big group is interested in the integration of GIS and Remote Sensing. Again in most cases the term integration remained vague. Some use GIS information to help classification of images, while the images themselves are used to generate information for GIS (thematic layers, extracted features). A third, quite heterogeneous, group is interested more in GIS aspects, like GIS database maintenance and consistency, spatial data modeling, uncertainty of objects and operations, image databases, content-based retrieval, automated data abstraction and generalization, 3-D modeling and 3-D GIS. The last major group is focusing on one of the main topics of our WG and make explicit use of GIS/map information and image analysis (use of maps for road extraction, knowledge-based feature extraction from scanned maps, automatic change detection using images and vector maps, automatic registration of imagery using knowledge-based interpretation and GIS, use of images and vector maps to improve the 2-D and extract 3-D information). Some mentioned the use of image analysis for map generation, update and change detection. Finally very few mentioned sensor and data integration, 3-D visualization as well as extraction of DTMs and image matching. From the above it is obvious that the steps towards integration of image analysis and GIS are still relatively small.

2. The conclusions of the Joint ISPRS Commission III/IV Workshop "3D Reconstruction and Modeling of Topographic Objects" (see below) seem to verify what has been stated above. We include here the points more relevant to our WG, as were stated in a workshop report prepared by Dr. Theo Moons, Katholieke Universiteit Leuven.

DSMs generated by laser scanners are used for building reconstruction. The quality of laser scanner DSMs is superior to those derived by image matching, but the geometric accuracy of break-lines at height discontinuities is limited. Therefore, most papers used 2D GIS information as an initialization for building detection. Reconstruction is then performed by selecting and matching a building model to the data. Whereas the other speakers essentially used 2D GIS for segmentation, N. Haala and his co-authors also exploit the ground plan of the buildings in the

GIS to initialize a 3D building shape, which is then adjusted to the DSM data in an hypothesis-and-test scheme; thus obtaining segmentation and reconstruction at the same time.

Representatives of three national mapping agencies, the French Institute National Geographic, the British Ordnance Survey and the Swiss Federal Office of Topography, presented requirements and plans of these organizations. The present situation shows an ongoing shift from pure map production to the generation of real 3D GIS data catalogues which are typically much larger than the objects depicted in standard maps. The main driving forces behind this market are the services supplying community and the national defence organizations and their industries.

All three agencies are therefore looking for automatic or at least interactive help in data collection using digital photogrammetry and image processing. Particular focus of attention here is the update of existing DTMs, accurate building extraction and high precision road extraction. To this end, both automatic and interactive tools are needed. Automatic procedures should reliably capture the easy 70-80%, leaving the remaining part to be done by interactive local extraction with little operator assistance, but with different tools like filters, building catalogues, etc.

The complexity of the problems being tackled is increasing. As an example, whereas a few years ago building reconstruction aimed at the extraction of relatively simple building shapes from suburban areas, most of the presentations in the workshop were concerned with the reconstruction of urban scenes. As a consequence, it has become clear that, although many algorithms certainly have been improved, the solution of the envisaged problems cannot be obtained by one method alone. The necessity of using and integrating different types of data originating from different sensors and/or obtained by different algorithms is generally accepted and called for. However, there is no clear concept on how this should be realized. As has been remarked before, most of the talks dealing with the use of different sensors essentially concentrated on registration; whereas most presentations using different data types basically exploit one data source to guide the analysis of the other. A real challenge for the future is the design of systems in which different sensors, data types and algorithms cooperate to reach a common goal. It remains an open question which "tools" to include and how to let them cooperate. It can be said that for most tools it is well understood how they operate and perform, but an investigation of their mutual complementary or amplifying behavior is at a beginning stage.

Among the topographic objects under investigation, the attention has almost completely moved towards buildings. One also observes an increased usage of range/height data (especially, laser scanning) for their extraction. Most approaches here first try to identify built-up regions in the DSM, which are then analyzed for building extraction and reconstruction. Several authors introduced 2D GIS information for the segmentation of the DSM. The results are prom-

ising, and further breakthroughs in this direction are to be expected. In the more traditional image-based approach, a tendency to use multiple views is seen, but the actual reasoning and modeling is performed in object space. On the other hand, color is considered to be an important cue, but only few authors actually use it. Models are still the major tool for building reconstruction.

Another important topic is that of automation versus user interaction. The workshop showed an increase in the number of semi-automatic methods. Moreover, there was a general consensus that full automation will not be feasible in the near future. As mentioned before, the national mapping agencies ask for automatic procedures that reliably capture the easy 70-80%, leaving the remaining part to be done semi-automatically with little user interaction. However, at this moment it is not clear how and at which levels human interaction can best be brought in. The semi-automatic methods presented at the workshop ranged from real interactive to almost complete automation. Also a wide variety was observed in both the required interaction as well as the stage in the process at which this interaction is needed. A way out of this problem may be a closer contact between the three partners involved: researchers, product designers and end users. At this moment, a gap is experienced in the information flow between the three parties. The formulation of more specific aims and requirements could alleviate this problem. For the automatic part of the procedure, on the other hand, in order to be useful, it should be so reliable that additional verification by the operator is superfluous. This asks for an assessment of the efficiency of methods and the quality of the results.

Again, only few quantitative performance analysis were presented at the workshop. Moreover, a lack of good and clear methodologies is experienced here. A final remark is that, at this moment, quite a lot of 3D data is becoming available for different types of applications. Therefore, it might be useful to incorporate the existing information when developing new systems or methods. This is already partially being done by using DTMs and DSMs and GIS for building reconstruction. But another issue, which will become more important in the near future, is the (automatic) update of the existing 3D models. An important subtask here will be the detection of changes. However, very few activities are noted on this topic.

Accomplishments of the WG in 1997

The following accomplishments of the WG in 1997 can be reported: participation in the Joint ISPRS Commission III/IV Workshop "3D Reconstruction and Modeling of Topographic Objects", Stuttgart, Germany, 17-19 September, 1997. The meeting was co-organized with WG III/4 "Image Understanding/Object Recognition" and WG IV/2 "Digital Terrain Models, Orthoimages and 3D GIS", had good quality papers and ca. 70 participants. A detailed report on the workshop has been submitted for publication to the ISPRS Highlights. The papers were published in the ISPRS Archives. Note:

The surplus of the Workshop income of about US\$ 3,000,- was donated to ISPRS for the Best Young Author Awards for the Congress in 2000.

The communication problem was overcome by the establishment of a WWW site for the working group at http://www.ifp.uni-stuttgart.de/comm4/wg4_32.html including WG news, WG-related WWW pages, calendar of events and WG members with links to their Homepages; moreover 3 WG newsletters were mailed, mainly by email.

Planned activities in 1998

The following meetings should happen in near future:

- Sessions during the ISPRS Commission III Symposium in Columbus, Ohio, USA, July 6-10, 1998
- Sessions during the ISPRS Commission IV Symposium in Stuttgart, Germany, September and also a business meeting.

State of Science and Technology of WG IV/1: Database Design and Spatial Data Access

Chairperson : Lutz Pluemer

Co-Chairperson : Max Egenhofer

The Working Group is active within the ISO Technical Committee 2.11 by the active participation of the Co-Chairman. It is important to note, that ISPRS has detailed knowledge especially within TC IV making reasonable contribution to geodata standardization. Furthermore, the OpenGIS Consortium (OGC) is seen as an important driving force for geodata and geoprocess homogenization.

Scientifically, the WG is following the two different streams of computer science to adapt object oriented modeling with existing databases. From a product point of view, it seems worthwhile to extend relational DB systems with an object oriented hull. This strategy comes very shortly to new products offering the advantage of object oriented techniques without losing all the practical experience of RDBMS. The redesign of DBs for total object oriented techniques and also data structures, as already on the market by some pilot software, is a midterm approach.

Planned activities in 1998

The working group is present during the Commission IV symposium in Stuttgart and will compile at least two sessions. A business meeting should also be organized during the symposium.

State of Science and Technology of WG IV/2: Digital Terrain Models, Orthoimages and 3D GIS

Chairperson : Roy Welch

Co-Chairperson : Klaus Tempfli

Secretary : Marguerite Remillard

In 1997, the efforts and activities of ISPRS WG IV/2, "Digital Terrain Models, Orthoimages and 3D GIS" were centered on preparing for and conducting the Joint ISPRS

Commission III/IV Workshop entitled, "3D Reconstruction and Modeling of Topographic Objects: Integration of Multiple Information Sources and Image Understanding" held 17-19 September, 1997 at the Institute for Photogrammetry in Stuttgart, Germany. The working group also organized its existing member list based on past participation in the previous 1992-1996 term WG IV/4, "Digital Elevation Models (DEMs) and Digital Orthoimages for Mapping/GIS Applications" into a database for facilitating electronic mail (e-mail) communication. An e-mail newsletter was sent in early February by Co-Chairman Klaus Tempfli to WG IV/2 members and others soliciting participation in the Joint ISPRS Commission III/IV Workshop. On April 9, 1997, a meeting of Chair, Co-Chair and Secretary of WG IV/2 was held during the American Society for Photogrammetry and Remote Sensing (ASPRS) Annual Meeting held in Seattle, Washington, USA, related to soliciting interest in the Joint Workshop, establishing the members list and planning future working group activities.

Accomplishments of the WG in 1997

Dr. Tempfli was heavily involved in the planning and implementation of the September workshop that was jointly organized by WG III/4, "Image Understanding/Object Recognition", WG IV/2 and Intercommission WG IV/III 2, "Integration of Image Analysis and GIS". Nine Technical Sessions were conducted during the workshop with a total of 29 papers presented by scientists representing 15 countries. WG IV/2 contributed several papers to the Joint Workshop including the opening Invited Paper by Professor Friedrich Ackermann from the University of Stuttgart entitled, "Digital Terrain Models - New Techniques, Demands and Concepts". A second WG IV/2 Invited Paper entitled "Interfacing Multimedia with GIS for Database Visualization" and authored by Roy Welch and Marguerite Remillard was presented by Dr. Remillard Papers at the workshop. Papers for these presentations and others were published in the Proceedings of the Joint Workshop (Vol 32, Part 3-4W2, 208 pages) edited by E.P. Baltsavias, W. Eckstein, E. Gulch, M. Hahn, D. Stallman, K. Tempfli and R. Welch.

Planned activities in 1998

Future WG IV/2 activities include holding a business meeting at the ASPRS Annual meeting to be held March 30 to April 4, 1998 in Tampa, Florida, USA and attending the Commission IV business meeting planned for April 6-8, 1998 in Stuttgart, Germany. Leading up to these meetings, efforts will be made to solicit abstracts from WG IV/2 for the 1998 Commission IV Symposium.

State of Science and Technology of WG IV/3: Temporal aspects and data revision

Chairperson : Jun Chen

Co-Chairperson : Fabio Crosilla

It is known that the usefulness of any spatial database can diminish rapidly if maintenance is neglected. To keep

these digital databases current, efficient and effective update techniques as well as institutional procedures should be set up. In fact, while many mapping and resource agencies are concentrating their resources primarily in developing spatial databases, more attention have been devoted to the real-time updating and versioning of digital spatial databases. Some technical and institutional issues related to the real-time updating and versioning of spatial database had been discussed in the Workshop held in Hong Kong and some other technical meetings, such as use of new remote sensed data (e.g., MOMS-02 data) for updating database, integration of photogrammetry tools with Arc/Info, landuse change monitoring and sustainable land development modeling using remote sensing and GIS, relational matching strategies for integration of spatial data from different sources, maintenance of multiple representation databases for topological data, algorithms and practical realizations for automated change detection and feature extraction.

Maintaining the spatially referenced data with temporal dimensions and make them accessible to users is another key issue in designing and implementing GIS projects. Such temporal GISs are also required to be able of analyzing changes to spatial information over time. The following issues had been examined by the members of the WG or some other conferences or publications: concepts and methods for describing and representing spatio-temporal topology, spatio-temporal data structures and access methods, temporal object algebra to support spatio-temporal data modeling, dynamics of fuzzy objects, dynamic modeling of spatial process and geo-referenced systems in temporal GIS, dynamic visioning and history preserving during map updating with Voronoi approach, propagation of updates in multi-scale geographic databases by analysis of geographic changes, progressive and adaptive recursion approach to GIS-based spatio-temporal analysis.

The usual polygon-based GIS data structures are insufficient in supporting dynamic local modification of spatial databases and interactive simulation of real process. Kinematics & dynamic spatial data structures have been examined and developed for 'real time' updating and simulation purposes, including new concepts and methods of GIS data modeling with Voronoi approach, nearest neighborhood analysis with generalized Voronoi diagram, new approaches for range searching in large spatial databases.

Accomplishments of WG IV/3 during 1997

1. An invitation letter had been sent via both mail and email to the persons working in the area of interests of the GI. The objectives and planned activities until 2000 of the working group had also been sent to them. Twenty were selected as the individual members of the WG. They come mainly from England, France, Germany, China, Russia, Hong Kong, Japan, Australia, Netherlands and Canada.

2. A workshop on Dynamic and Multi-Dimensional GIS had been organized in Hong Kong in Aug. 1997, jointly

by this working group (WG. IV/3 -Temporal Aspects and Database Maintenance) and IC WG.IV/III.1 (GIS Fundamentals and Spatial Databases), WG II/1 (System Integration), WG IV/1 (Database Design and Spatial data access) and IGU Study Group on Geographical Information Sciences. More than forty participants attended the workshop and 19 papers were presented in the 7 technical sessions during two days. An edited book will be published after the workshop.

3. Collection of the publications of the members of the working group regarding to the topics of WG.IV/3 is under way. This will serve firstly as a basis for exchanging ideas, experience and information among members of the WG.

Planned Activities in 1998

- Moderating one or two technical sessions related to the ToR of the WG. for Comm. IV Symposium of ISPRS in Stuttgart, Germany, Sept 7-10, 1998 ;
- Organizing a business meeting during the Symposium;
- Surveying, reviewing and documenting the status of research and applications of 'temporal aspects and topological database maintenance'.

State of Science and Technology of WG IV/4: Mapping using high resolution satellite imagery

Chairperson : Gottfried Konecny

Co-Chairperson : Donald L. Light

Accomplishments of the WG in 1997

A very successful workshop was organized at the University of Hannover, on 29 Sept.-2. Oct. 1997. About 70 participants from all over the world contributed to this workshop. This joint workshop with the heading "Sensors and Mapping from Space" could make clear the state-of-the art of remote sensing using space-born and aerial platforms. Organized by the WG I/1 "Sensor Parameter Standardization and Calibration", WG I/3 "Sensors and Platforms for Topographic Survey" and WG IV/4 "Mapping Using High Resolution Satellite Imagery", the interested participants obtained first hand information on the undergoing projects. Unfortunately, satellites of the high res satellite program of EARTHWATCH and SpaceImaging were not yet launched and therefore no results could be given. Therefore, discussions concentrated on the use of MOMS02 and IRS-1C for topographic mapping. Also interferometric SAR is a very interesting alternative to optical imagery. It remains exciting for the next couple of month to see whether the 1m high res satellites really compete with the fascinating Shuttle INSAR mission of 1999, when the whole land masses of our planet will be mapped by a radar DTM.

The contributions of the joint workshop were published in proceedings issued towards the end of 1997 being Vol. 17 of the series of the Institute for Photogrammetry and Engineering Surveys of Hannover University.

Planned Meetings in 1998

The working Group compiles the incoming abstracts of the TC IV symposium for the preparation of the technical sessions and poster papers during the TC business meeting 6-7 April 1998. It will organize a business meeting during the Stuttgart symposium.

State of Science and Technology of WG IV/5: Extraterrestrial mapping

Chairperson : Jan-Peter Muller

Co-Chairperson : Randy Kirk

Secretary : Karl Mitchell

The WG established a Web-page <http://www.ge.ucl.ac.uk/isprs-etm> with details on members of the WG, terms of reference, hot links to all relevant Web-sites of interest to ETM activities and a couple of examples of image maps which were the product of WG member activities (Olympus Mons from USGS and the Mars Pathfinder landing site area from Dr Tom Duxbury at JPL).

The WG held no meetings in 1997 due to the crowded schedule of ISPRS meetings in the Autumn/Fall of 1997.

Planned Activities in 1998

The WG plans to hold its first workshop 16-17 April 1998 at University College London, UK on "Mapping of Mars" which will review the results from Mars Pathfinder, Mars Global Surveyor and Viking Orbiter. The workshop will be held just prior to the European Geophysical Society meeting in Nice and will include a tutorial on "The SPICE Toolkit for planetary mapping metadata" given by its inventor, Dr Chuck Acton of JPL. 6 paper titles have been received covering the full spectrum of ETM activities and further ones have been invited.

State of Science and Technology WG IV/6: Global databases supporting environmental monitoring

Chairperson : Ryutaro Tateishi

Co-Chairperson : David Hastings

The State of science and technology can be found viewing the World Wide Web Home Page

<http://www.ngdc.noaa.gov/seg/tools/gis/isprs46.html> also by viewing the Virtual Workshop on (Environmental) Data Issues <http://www.ngdc.noaa.gov/seg/HyperNews/get/virtual.html>

Furthermore, the WG conducted a symposium and workshop at the Asian Conference on Remote Sensing, and pursued collaboration with such organizations as other ISPRS Working Groups, and parts of the Committee on Earth Observation Satellites. We also began planning our workshop, tentatively scheduled for September 1999.

Accomplishments of the WG during 1997

1. The working group developed its own World Wide

Website. The initial HomePage (<http://www.ngdc.noaa.gov/seg/tools/gis/isprs46.html>) restated the Terms of Reference of the WG, and listed the officers and their postal and email addresses, phone and fax numbers. The main linked pages can be accessed online or requested from the chairmen.

As the Terms of Reference are likely to remain unchanged over our 4-year life cycle, we have reorganized the Website at the end of the year, to place the activities first. These pages can also be accessed online or requested from the chairmen.

2. Organized and held a symposium on Asian Databases at the 18th Asian Conference on Remote Sensing, Kuala Lumpur, Malaysia, 20-24 October 1997. Papers on Asian Databases presented at the Conference (not all at our symposium, though they were all invited by ourselves for the Conference), were:

- Tateishi: Land Cover Dataset
- Hastings et al.: Topographic Data
- Elvidge and Honda: Stable Lights from DMSP
- Gutman and Hastings: A new AVHRR-derived Climatology

3. Organized and held a workshop on Global Databases Supporting Environmental Monitoring, also at the same Asian Conference on Remote Sensing. That workshop reviewed the current status of databases covering the world, Asia, or substantial parts of Asia. That workshop helped to mature the development of our list of global data sets, which we plan to begin posting on the World Wide Web in 1998.

4. Helped enhance a Website dedicated to discussion of GIS as a scientific tool. This website, originally designed to serve as a single-page „CyberInstitute Short-Course in GIS,“ is located at <http://www.ngdc.noaa.gov/seg/tools/gis/referenc.html>.

Since many GIS are presented as scientific tools, even if they are largely based around a more modest mapping objective, this site provides an alternative to that approach by showing what scientific issues exist when freed from the „mapping“ filter. The current version of this page can also be accessed online.

5. Started the Virtual Workshop on Data Issues, dedicated to enhancing discussions on many topics related to more rigorous development of digital environmental data. The Virtual Workshop began by linking to materials developed for the CyberInstitute Short-Course in GIS (see #3 immediately above). However, presentations to components of the Committee on Earth Observation Satellites and the International Conference/Workshops on Integrating GIS and Environmental Modeling has brought statements of interest in adding materials to the Virtual Workshop. The Virtual Workshop is actually a product of discussions at the GIS and Environmental Modeling Workshops, but those discussions were not implemented until this Working Group decided to implement them.

Eventually, we hope that this site will help be a focus for tackling scientific, technical and "diplomatic" obstacles to development, acceptance, and use of environmental data sets developed from remote sensing and in-situ investigations.

6. Written an article for ISPRS Highlights inviting all interested parties to join and help shape the Virtual Workshop. We hope that others will participate in Virtual Workshop discussions, and also convene their own Virtual Sessions in the Workshop.

7. Begun plans for a Physical Workshop on Environmental Data Development. We intend this to build on the Virtual Workshop just mentioned. We also hope to have the results of the Physical Workshop feed enhancements to the Virtual Workshop, and also provide papers for the ISPRS Congress in Amsterdam. Tentative plans place the Physical Workshop in Honolulu, or in the Vancouver/Seattle area, about September 1999.

8. Begun the design of a Website listing and describing known global or large-regional environmental datasets and databases. We hope to have the first versions of this Website developed during 1998, discussed from the Virtual Workshop and also linked from our WG's Home Page.

9. Begun planning our participation in the 1998 Conference of Commission IV, in Stuttgart.

10. Pursued cooperation with the following organizations:

- Committee on Earth Observation Satellites, Working Group on Information Systems and Services. At CEOS/WGISS' subgroups meeting in Stresa, Italy, on 22-26 September 1997, David Hastings made presentations on the Virtual Workshop on Data Issues to WGISS' Data Subgroup, Data Interoperability Subgroup, Archives Subgroup, Task Team on Global Mapping, Global Land One-kilometer Base Elevation (GLOBE) Task Team, and to the subgroups plenary meeting. Several people were intrigued with the concept, and thought that (1) the Virtual Workshop might be able to serve some of their needs, and (2) that they might be able to help shape the development of the Virtual Workshop on a cooperative basis. Recent follow-up to this initiative was made by Brian Thomas of the British National Space Corporation. He had been tasked to treat several discussion points, on a variety of environmental data from satellite platforms, on the World Wide Web. He submitted a draft document, to ascertain its possible compatibility with the Virtual Workshop. The response was positive, and joint efforts are underway.
- ISPRS Working Group I/2 and II/3, through their joint workshop "From Producer to User", held 7-9 October 1997 in Boulder, Colorado. Davis Hastings made a

presentation of the Virtual Workshop, emphasizing the likely future importance of Web-based communication between data users and the designers, producers, and distributors of such data. A paper is in the proceedings of that workshop.

Some people at this workshop are active in CEOS. Discussions continued on synergy between ISPRS and CEOS data interests, using the Virtual Workshop as a possible vehicle.

- The Asian Association of Remote Sensing, at the 18th Asian Conference on Remote Sensing, held 20-24 October in Kuala Lumpur, Malaysia. At the 17th ACRS, in Colombo, Sri Lanka (November 1996). We offered to hold a special session on Asian databases, and to hold a workshop on global databases. These were held. Again, the Virtual Workshop was also presented to ACRS participants.

In addition, our proposal to develop a Web-based list (and possible paper publication) on sources of global and continental databases was discussed. Our working list was enhanced by this discussion.

- The initial discussions on the Virtual Workshop actually occurred at the 3rd International Conference/Workshop on Integrating GIS with Environmental Modeling, held in Santa Fe, New Mexico in January 1996. Brendan Mackey (Australian National University), Bradley Parks (University of Colorado and the Initiator of this series of conferences), and David Hastings were instigators of the Virtual Workshop concept. However, that concept languished until ISPRS WG IV/6 adopted a version of it. Indeed, the ISPRS joint workshop of WGs I/2 and II/3 set us a deadline for starting an initial version of the Virtual Workshop.

The 4th Int'l Conference/Workshop on GIS and Modeling will be in Banff, Alberta, in May 1999. Initial plans have Bradley Parks representing the Virtual Workshop at that meeting. This would be a timely precursor to our WG IV/6 workshop, tentatively scheduled for September 1999.

- Additional initiatives continue. Ryutaro Tateishi emailed a letter to ISPRS WG Chairpeople inviting them to explore our Home Page, and cooperate in a global database referral service.

Symposium Preparations

The midterm symposium will take place from 7-10 September 1998 at the University of Stuttgart under the heading "GIS - Between Visions and Applications". The first announcement was printed towards end of October and distributed worldwide using the address list of the ISPRS Vienna Congress. More than 3000 copies could therefore reach participants of all over the world - this efficient circulation was proven by the high number of incoming abstracts. The invitation by the TC president sounds as follows:

"You are cordially invited to participate in the International Symposium and Exhibition of Technical

Commission IV, International Society for Photogrammetry and Remote Sensing (ISPRS)

GIS-BETWEEN VISIONS AND APPLICATIONS

September 7-10, 1998

Stuttgart Germany

Mapping and Geographic Information Systems (GIS) have become twins in the recent past. The future belongs to digital mapping techniques integrated as geometric component of GIS. Combining GIS geometry and thematic the real power develops for a large number of applications: land information management, environmental protection, topographic mapping, telecommunication, urban planning, infrastructure optimization, car traffic navigation, facility management, etc. Besides solving mapping problems of our planet Earth other planets shall be mapped during manned and unmanned space flights to the Moon, Mars and others.

Computerized mapping has become a major issue of photogrammetry and remote sensing as it helps not only to improve our methodology and to keep the profession aligned with technological achievements – the feedback loop between existing GIS databases and automated feature extraction from imagery is still at its beginning. Therefore it is a real challenge to integrate modern mapping techniques of photogrammetry and remote sensing with GIS technology. This will offer new visions for GIS: highly automated feature location and extraction, fully integrated digital terrain models, three-dimensional urban visualization, permanent up-to-date high resolution satellite imagery, to name only few. The midterm future belongs to GIS not only from a professional point of view, but also to keep serious interest in data management, data analysis and data visualization.

During 1st presidency of Technical Commission IV the Federal Republic of Germany aims at data fusion off all kinds, that means to combine photogrammetry, remote sensing and GIS. You can contribute to this process by delivering a paper and by participating the midterm symposium.

The following symposium timetable was worked out

Deadline for extended abstracts:	Feb. 28, 1998
Notification of acceptance:	April 30, 1998
Deadline for final manuscripts:	June 15, 1998
Deadline for Young Authors Award	
Paper (full paper required)	May 15, 1998

The TC IV Secretariat decided to award excellent papers of Young Authors (not older than 35 years) with **DM 2.000,-**. Funds will be available for honoring 5 young authors.

Planned Meetings in 1998

In order to compile the final program of the midterm symposium a business meeting will take place in Stuttgart, 6-7 April 1998. Within the 2-days meeting all chairmen and co-chairmen should decide on the incoming abstracts to prepare the technical and poster sessions. A second business meeting is organized right after the symposium on 10 September 1998.

Finally, it can be stated that 1997 was a successful year for Technical Commission IV. The information flow between the TC secretariat and all WG officers is intact and works fine. The MGM (Mapping and GIS Monthly) is a good media for informing the responsible scientists on actual and important news.

TECHNICAL COMMISSION VII: RESOURCES AND ENVIRONMENTAL MONITORING

President: Gabor Remetey-Fülöpp (Hungary)

Secretary: Peter Winkler (Hungary)

Secretary: Frank Hegyi (Canada)

STATE OF SCIENCE AND TECHNOLOGY OF COMMISSION VII TOPICS

Some of the most significant results and developments in 1997 can be summarized as follows:

- An increased emphasis was given to hyperspectral and radar technologies in the study of physical measurements and signatures.
- Radar backscatter modelling from built environments, and the integration of radar and optical data was examined both by WG VII/1 in modelling WG VII/6 pilot project.
- Inventory for land use and cover changes, crop monitoring and yield forecasting, technology assessments for creating self-adaptive vegetation models, integrative approach to regional investigations of land resources and development issues, analysing the societal impact of improved agricultural information system are research subjects to be further investigated.
- A study group on "agriculture statistics and crop forecast" is anticipated to be established at the mid term Symposium under the umbrella of WG VII/2 -

Application of Remote Sensing and GIS for Sustainable Development.

- Urbanisation, HABITAT II - By the launch of the high spatial resolution satellite systems (IRS-1D etc) the research agenda of the remote sensing based urban applications have to be reshaped with a view to its rapid integration into operational monitoring of urban areas and urban GIS and use as a data source in civil engineering (WG VII/3)
- Global Monitoring Efforts have been made by ISPRS Commission VII to involve representatives of organisations and institutions such as UN COPUOS/OOSA, INPE, ESA, EC DG JRC, UNEP GRID, FAO, NOAA, NASA GSFC with special emphasis on subsequent follow-up activities related to Rio, including Agenda 21. In this field, the Santa Barbara Statement and developments such as the 2nd GSDI conference means progress toward the establishment of a global geospatial data infrastructure. The Earth observation and georeferencing/GI technology plays a fundamental role in the terrestrial ecosystem modeling by provision of the state-of-the-art solutions for integration of remote sensing, object database technology, genetic networking systems, visualization and computational systems (in WG VII/5 Global Monitoring). For example, as part of the US Global Change Research Programme, NASA's Mission to Planet Earth (MTPE) activities will be increased significantly by starting a 15-year series of consistent, high-quality global observation using over 20 different kind of advanced, satellite remote sensing instruments in frame of the Earth Observing System, partly in international cooperation with Japan, United Kingdom, Canada, France etc. The main target areas of the MTPE research are as follows: Studying global climate change, radiation, clouds and atmospheric water, the ocean, the troposphere: the greenhouse gases, land cover and water cycle, polar ice sheets and sea level, the stratosphere: ozone chemistry as well as volcanoes.
- The integration of remote sensing and GIS techniques offers unprecedented improvement in efficiency, effectiveness and user friendliness. The scientific investigation, systematic Earth observation and data management using global information system will help not only the better scientific understanding of the natural processes and phenomena, but will allow also better decisions. This in turn opens up new horizons in further commercialisation of geospatial information, enabling us to solve problems related to the environment and sustainable development on local (precision farming), regional (integrated rural development) and global level (Agenda 21). Focusing on resource and environment monitoring, the application-oriented ISPRS Commission VII scientific community is dealing with these issues intensively.
- Noticing the potential economic importance, the European Commission has realised: Earth observation in particular, is rapidly emerging as a major tool for resource management and environmental monitoring

in its document The European Community and Space Challenges, Opportunities and New Actions. Accordingly, the EC Joint Research Centre plays an active role in ISPRS Commission VII activities.

ACCOMPLISHMENTS OF COMMISSION VII DURING 1997

Relevant workshops and seminars in 1997

Earth Observation and the Environment: Benefits for Central and Eastern European Countries. Under the Co-chairmanship of Hubert Curien, President of EURISY and Karoly Lotz, Minister responsible for Space Affairs in Hungary, a 3-day Colloquium was held at the Hungarian Academy of Sciences, Budapest, May 15-16, 1997. Keynote addresses on the Earth Observation and the Environment was given by Guy Duchossois of ESA and Adam Linsenbarth, IGIK, Poland. The following session topics have been discussed: Natural Resources Management and the Environment (Chaired and introduced by the ISPRS Commission VII President); Natural and Technological Risks and the Environment (Chaired by Guy Duchossois, European Space Agency); Agriculture and the Environment (Chaired by Vanda Perdigao, EC JRC SAI); Cartography and the Environment (Chaired and introduced by Gottfried Konecny, University of Hannover/EARSel); Round Table Discussion (Chaired by Herbert Curien, President of EURISY) with representatives of the UN OOSA(Petr Lala), EC DG XII(Michel Paillon), FAO RSC(Carlo Travaglia), Hungarian Ministry of Transport, Telecom and Water Management(Kalman Kovacs), National Commission of Informatics, Romania(Angela Ionita).

The event was co-organised by the Hungarian Space Office and the Institute of Geodesy, Cartography and Remote Sensing (FOMI), Hungary. Over 80 participants from more than 20 countries attended the Colloquium. The round table discussion underlined the importance of the basic research, standards, technological development and IT infrastructure, know-how transfer, information access and data services, partnership, co-operation and networking as well as education and training. As far as the perspectives are concerned, considerable improvement has been achieved by real time acquisition, synergism of multiplatform and multisensor technologies, the integrated use of Remote Sensing and GIS by the multipurpose databases and the advanced modeling of environmental processes.

The 1997 Open Meeting of the Human Dimension of Global Environmental Change Research Community was held in Laxenburg, Austria, June 12-14, 1997. The purpose of the meeting was to bring together the growing human dimensions research community to promote exchanges of information on current research, teaching and outreach, to encourage networking in investigations and integrated assessments related to environmental security, population dimensions of regional environmen-

tal changes, consumption as a cause of environmental degradation, interactions between environmental regimes, deforestation and regrowth in the Brazilian Amazon etc. Supported by Sergio Camacho of the UN OOSA and hosted by the International Institute for Applied Systems Analysis, the meeting had a special session devoted to remote sensing and GIS applications with research in global monitoring and in large/global dataset managements respectively, with active participation of ISPRS Secretary General John Trinder, Shintaro Goto, Mark Imhoff, Stanley Morain, Ryutaro Tateishi and others. The event was also an action of the co-operation between ISPRS WG VII/5 and WG IV/4.

An Inter-commission ISPRS Workshop was prepared on GIS, Airborne Remote Sensing and Geospatial Data Clearinghouse scheduled for February 19-20, 1998 with Commission III with direct involvement of President Toni Shenk, WG III/3 Co-chair Beata Csatho (Ohio State University, Columbus) and Secretary Erzsebet Merenyi (Arizona University, Tucson).

The participants of the second world conference on "Global Spatial Data Infrastructure" were invited by the Governor of North Carolina hosted by the oldest public university in the U.S. located in Chapel Hill. The closed shop event was organised by DDGI, AI, ILI, FIG Commission III, and EUROGI. ISPRS Commission VII was also represented. The GSDI Conference participants found among others, that it is important that all international groups working toward the development of the GSDI participate in the future processes of its evolution and that they communicate, coordinate and collaborate to the fullest extent applicable. These groups include (but are not limited to) FIG, ICA, IHO, ISPRS, ISO, ISCGM, OGC and NATO DGIWG. GSDI found also that GSDI is of vital importance to implementation of Agenda 21 of the Rio Summit and to the multi-national environmental conventions, and should be placed as central support for decision making before the meeting of the UN Commission on Sustainable Development in 2001. Due to the fact that in the global spatial data infrastructure, the majority of aerospace spectrally sensed data acquired are based on remote sensing and a significant part of the data are using or based on photogrammetry and/or remote sensing ground segment technology, ISPRS pro-active presence in the GSDI processes are important.

About 100 participants attended the 4th International Symposium on Spectral Sensing Research (ISSSR) in San Diego between 14-19 December 1997. ISPRS Commission VII was represented by Karl Staenz (also member of the ISSSR Scientific Organising Committee), Hermann Kux of INPE, Istvan Kadar of MH TEHI, Hungary and by the Commission president. Tutorials focused on the remote sensing perspective of the Internet, as well as on the hyperspectral imagery exploitation. Workshops discussed the commercial systems (Orbimage, Space Imaging etc) and the ground truthing procedures and protocols. The confer-

ence had the following session topics: data acquisition, features in hyperspectral data, modeling and simulation, information extraction, terrestrial/littoral feature extraction, information on Internet. ISPRS WG VII/1 Chairman Karl Staenz's personal impressions on the instrumentation, data analysis techniques, applications scientific and application programmes have been already published by ISPRS Highlights. In a formal talk, ISPRS Commission VII representatives Karl Staenz and the President, as well as the ISSSR management led by USATEL director W.Roper, Betty Mandel and John Swistak has been agreed to a closer cooperation for the future. It is unfortunate that the real commercialisation era in remote sensing has been delayed by the loss of the 3-meter resolution EarlyBird 1 satellite late December 1997.

The preparation of the ISPRS Commission VII mid-term Symposium

The preparation of ECO BP 98, the Symposium of the ISPRS Commission VII (Budapest, 1-4 September 1998) is underway. Supported by the cohesive power of the activities of the Commission's seven thematic Working Groups, the theme: Resource and Environment Monitoring - Local, Regional and Global attracted about 200 scientists from nearly 40 countries to present their results in application oriented research and technology development of remote sensing. The major goal of the ISPRS Commission VII's mid-term symposium is to reflect on the state of the art of the exploitation of the research and technological development in remote sensing applications with special emphasis on environment and resource monitoring. A special feature of the Symposium is its interdisciplinary approach. The Symposium will address a variety of subjects according to the topics of the Commission's Working Groups. Moreover, special sessions will be devoted to demonstrating the activities of the scientific network of the European Association of Remote Sensing Laboratories (EARSeL). Under the auspices of the UN Office of Outer Space Affairs, the objectives of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, expected results and the way in which the scientific community can utilise them, will be discussed. For topics such as local, regional and global spatial data infrastructure and related interoperability issues, a special session is foreseen under the theme "Geo-information to All" of the ISPRS Congress 2000. The agencies and the private sector representatives are invited to attend the Technical Exhibition.

Invited Advisory Board members of the Commission VII will be serving as rapporteurs: Sergio Camacho (OOSA, United Nations, Vienna, Austria), Simonetta Cheli (ESA, Paris, France), Thelma Krug (INPE, San Jose dos Campos, Brazil), Ake Rosenqvist (JRC SAI, Ispra, Italy) and Charles T. Wooldridge (NOAA, Washington, USA). Unfortunately, IAB member Roberto Pereira da Cunha, former President of ISPRS Commission VII between 1992-1996 died of cancer in November 1997.

Dissemination of Commission VII related information on the Internet webpages of the Commission VII are maintained by M. Goodenough and Paul Pilon in Victoria, Canada. Mirrored webpages can be accessed also at the Budapest Technical University mastered by Sandor Mihaly. It contains regularly updated news on Commission VII activities with in-depth information related to the forthcoming mid-term Symposium. The 1st and 2nd Announcement of the Symposium were disseminated worldwide at international meetings (eg. CERCO, EARSeL, UN ECE MOLA, FAO, HDGC, EUROGI), conferences (ISSSR, GSDI) and exhibitions (JEC-GI).

WG VII/1 - FUNDAMENTAL PHYSICS AND MODELLING

Chairperson : Dr. Gerald Guyot

Co-Chairperson : Dr. Karl Staenz

Secretary : Dr. Jan G.P.W. Clevers

Secretary : Dr. Phil Teillet

Accomplishments of ISPRS WG VII/1 during 1997

The 7th International Symposium on Physical Measurements and Signatures in Remote Sensing took place in Courchevel from 7 to 11 April 1997. It was organized by the French Space Agency (CNES) and the Joint Research Centre (JRC/SAI) of the European Commission under the auspice of ISPRS, with the support of:

- NASA: National Aeronautics and Space Administration
- CNRS: Centre National de la Recherche Scientifique
- INRA: Institut National de la Recherche Agronomique
- DLR: Deutsche Forschungsanstalt für Luft- und Raumfahrt
- ESA: European Space Agency
- NERC: Natural Environment Research Council

The Symposium was also sponsored by the following scientific societies:

- European Association of Remote Sensing Laboratories (EARSeL)
- Association Québécoise de Teledetection (AQT)
- Canadian Remote Sensing Society (CRSS)
- The Remote Sensing Society (RSS)
- Société Française de Photogrammétrie et de Teledetection (SFPT)

This symposium was a continuation of the series of 6 symposia organised since 1981 by the Working Group VII/1. It focused on the following topics: analysis of the relationships between the specific properties of a target (plant canopies, soils, rocks, water bodies, snow, ice) and its spectral characteristics in different spectral domains (from ultraviolet to microwaves), and determination of the factors affecting the spectral response of an object (atmospheric effects), measuring techniques, development of interpretation models. Such research activities are essential for any

studies related to remote sensing and is of interest for any specialist involved in large range of applications by physicists, agronomists, foresters, geologists, hydrologists, oceanologists, meteorologists. Among these applications special attention will be paid to the use of remote sensing for ecosystem monitoring at different scales. The Symposium also included an exhibition of radiometric and related ground measurement equipment eg. available on the market and prototypes developed by research laboratories. A display of scientific books was also provided. The success of these symposia was reflected by the gradual growth of the number of submitted papers, (more than 40 % of the papers were rejected for the last symposium held in Val d'Isère), while the number of participants increased from 220 to 316 (represented 24 countries). This Symposium has become during the past years one of the major international scientific meeting in the domain of the research in remote sensing and it provides a valuable overview of current research on earth resources and environmental monitoring. However, the increasing audience was seen as limiting one of the specific characteristics of the first meetings, that is, to facilitate exchanges and discussions among participants. Therefore, it has been decided to limit the number of participants to about 200, presumably, leading to a more severe selection of the submitted papers. The presentations highlighted the following points relative to the whole spectral range covered by remote sensing instruments (short wavelengths, thermal infrared, microwaves):

- Physical modelling for data simulation and sensitivity studies
- Retrieval/inversion methods
- Data pre-processing
- Physical modelling
- Bio- geo-physical and chemical variable estimation use of remote sensing data
- Satellite data assimilation
- Impact assessment of environmental change by remote sensing
- Mission objectives for new instruments
- Applications

About 220 abstracts were received and selected by the International Scientific Committee. The number of participants was around 240. Publication: Abstracts of the 7th International Symposium on Physical Measurements and Signatures in Remote Sensing, 7-11 April 1997, Courchevel (France), G. Guyot Ed. CNES Toulouse (France), 434 pp.

WG VII/2: APPLICATION OF REMOTE SENSING AND GIS FOR SUSTAINABLE DEVELOPMENT

Chairperson : Dr. Dasika P. Rao

Co-Chairperson : Dr. Vernon Shingroy

Secretary : Dr. S.K. Subramanian

Accomplishments of ISPRS WG VII/2 during 1997

An International Workshop on Applications of Remote

Sensing and GIS for Sustainable Development was organised by WG Chairman D.Rao in November 24-25, 1997, Hyderabad, India, sponsored by the Indian Space Research Organisation, Department of Space, Government of India. The Workshop was attended by Commission I President G.Joseph (SAC, Ahmedabad) and Commission VII Secretary P.Winkler (FOMI RSC, Budapest).

Background to the topics of the WG VII/2 Workshop, The Rio Declaration 1992, emphasized amongst many important actions, that Remote Sensing and GIS have a prominent role in promoting efforts for sustainable development. The agricultural production in the developing countries is presently not able to meet the needs of the growing population. This is because the potential advantages of Science and Technology are not fully exploited. There is an urgent need to evolve methods to improve production by making optimal use of available land and water resources through sustainable development. If the development of rural areas has to sustain a growing economy and ensure ecological balance, an integrated and holistic approach is required to make optimal use of land and water resources. The satellite remote sensing applications for agriculture, soil, water and land management have ample scope to prepare an integrated plan for an action program for achieving the sustainable development of land and water resources.

Keeping in mind the aspirations of the India, an operational exercise was carried out in India in a major mission project called Integrated Mission for Sustainable Development (IMSD) where resources information is generated using remote sensing and ancillary sources including ground verification. The information layers are subsequently integrated through GIS to derive locale specific activities in consultation with the people and their aspirations through Participatory Level Appraisal. This experiment has yielded very encouraging results. The data from Indian Remote Sensing Satellite series including the latest state-of-art technology satellites IRS 1C/1D which have 5.8 m resolution camera, 23.5 m multispectral camera and 188 m wide field camera with a revisit period of 5 days have provided valuable information at operational scale in this Project. This approach needs to be further refined taking into account the need to identify indicators for sustainability. The approach to improve the environmental conditions, monitoring of such improvements through remote sensing and the impact of the implementation activities on the social fabric at the grass roots level will have a far reaching effect on the utility and acceptability of remote sensing and GIS techniques.

Scope of the Workshop

- Development of concepts for Sustainable Development using Remote Sensing and GIS techniques.
- Development of concepts for Sustainability Indicators.

- Promotion of applications in environmental and natural resource management.
- Monitoring and assessment of environmental hazards and disasters.
- Monitoring environmental changes including socio-economic factors.

Subjects discussed

Remote Sensing, GIS and Sustainable Development, Water Resources Management for Sustainable Development, Coastal Zone Management for Sustainable Development, Land Resources for Sustainable Development, Agricultural Management for Sustainable Development, Forestry, Environment and Rural Development in Sustainable Development

Participation

The Workshop was attended by 125 experts of 8 countries. Exhibition was not planned initially. However, at the insistence of a few companies, developments in hardware and software for the use of satellite data, IRS-1C/1D data products, and work done by a Provincial Remote Sensing Centre in the fields of sustainable development were exhibited.

Six Technical Sessions were held during the two-day workshop. As part of the social event Indian Classical Dance was arranged on 24th November, 1997

Substantial outcomes of the Workshop are as follow:

1. There is a need for more training and awareness programmes for users to effectively take advantage of the remote sensing and GIS techniques.
2. There is a need to work towards activities aimed at making the Sustainable Development process more effective. Dissemination of remote sensing and GIS technology up to end-user level is a critical need. Presently, it is not adequate. Algorithms and procedures/methodologies developed should be made available more openly to all the users.
3. Functional relationships between CO₂ concentrations, photosynthesis and productivity levels need to be understood more thoroughly i.e., the studies related to the effect of green house gases on total biomass production needs to be carried out.
4. Under IMSD substantial work has been done by Department of Space, Government of India with the utilisation of Remote Sensing and GIS in Natural Resources Management and dissemination of this information to the end users. This can serve as an example for other developing countries working in these areas.
5. Detailed scientific investigations in evolving procedures for estimating carrying capacity of the land need to be carried out.
6. Involvement of private entrepreneurs should be encouraged.

Problem areas

1. Technology is available but the policy to use it effectively is a limitation.

2. It is a matter of concern that although the use of remote sensing and GIS in sustainable development has been demonstrated, the efforts are inadequate to make it a sustainable proposition.
3. While technology has been demonstrated for its use in perspective/regional planning, its utility for on-farm management has not been well appreciated. This is particularly necessary since the sustainable development can only be realised with the farmers' participation. Development of integrated crop yield models using remote sensing as well as soil, water related parameters is necessary.
4. Synergy between Remote Sensing/GIS and socio-economic aspects have not been well understood. Mechanisms for integration of these two parameters has to be developed.
5. Dissemination of remote sensing technology in the local language for better understanding and acceptability needs to be done on a large scale.
6. Duplicity in the efforts in the generation of Remote Sensing Information/Thematic Maps should be avoided.
7. Lack of proper career opportunity for professionals of remote sensing and GIS is also an area of concern.

Outlook on future

1. Building up awareness about the benefits of technology needs to be strongly pursued.
2. With availability of higher spatial and spectral resolution data particularly from IRS-1C/1D, new avenues are opened now to work towards sustainability more effectively.
3. Work on water management at farm level like irrigation scheduling can be attempted.
4. For infrastructural planning the technology needs to be used for providing necessary vital information. This is particularly necessary since sustainable development can only be realised with the farmers' participation.
5. Evapo-transpiration modelling studies of crops may be undertaken.

Information on the contact address for acquiring the proceedings: Only the abstracts volume has been published. The proceedings of the full papers presented in the workshop will be published in due course of time. For more information: Dr.Subramanian, Fax: +91-40-277210

Follow-on activities planned

May 1998 - Short Course on Environmental Modelling in GIS under the aegis of ITC (Enschede, The Netherlands).

September 1998 ECO-BP 98 International Symposium of the ISPRS Commission VII, Budapest, 1998

February 1999 - International Workshop on Integrated Remote Sensing and GIS for Sustainable Rural Development. Venue: Hyderabad or Bangalore, India.

WG VII/3: THEMATIC APPLICATIONS OF HIGH SPATIAL RESOLUTION SATELLITE IMAGERY

Chairperson : Prof. Bruce Forster

Co-Chairperson : Dr. Tina K. Cary

Accomplishments of the ISPRS WG VII/3 in 1997

The major activity of the WG VII/3, "Thematic Applications of High Spatial Resolution Satellite Imagery", was the organisation and conduct of a special session on high spatial resolution data at the Asian Remote Sensing Conference, held in Kuala Lumpur, Malaysia, October 1997. A similar session will be conducted at the Australasian Remote sensing Conference, to be held in Sydney, July 1998, and planning is advanced for a workshop to be held in North America in 1999.

The special session had the following program and was attended by approximately 50 persons. The agenda was as follows:

- Introduction, Professor Bruce Forster
- "Current and Future High Spatial Resolution Satellites." Speaker: Professor Shunji Murai.
- "Earth Observation Programme - Indian Scenario" Speaker: Representative of the Indian Space Research Organisation.
- "Future SPOT High Resolution Satellite Systems." Speaker: Mr Yves Bechacq, Spot Asia.
- "Comparative Analysis of the Resolution of Air Photo and Satellite Digital Images." Speaker: Professor Bruce Forster
- "Space Imaging Satellite Systems and their Applications." Speaker: Susan Sinclair, Managing Director, Worldwide Distribution, Space Imaging EOSAT.
- "Earthwatch Satellite Systems and their Applications." Speaker: Representative of Earthwatch Incorporated (John Douglas)
- Potential Market for High Spatial Resolution Data in the Asian Region." Speaker: Professor Bruce Forster
- The Session closed with Open Forum.

Proposed Future Working Group Program

The advent of high spatial resolution remote sensing image data from space, means that the fields of feature extraction from digitised air photos as undertaken by photogrammetrists, and that of image classification as carried out by remote sensing specialists, must increasingly be seen as the one activity, extraction of information from images. Both groups can learn from one another, and it is hoped that the Budapest conference in September 1998 can assist in this process.

WG VII/4: COMPUTER ASSISTED IMAGE INTERPRETATION AND ANALYSIS

Chairperson : Prof. Dr. Barbara Koch

Co-Chairperson : Dr. Alois Sieber

Accomplishments of the ISPRS WG VII/3 in 1997

The discussion during the WG VII/3 Workshop Sensor fusion and advanced classification algorithms was focused mainly on the sensor fusion topic. After the DLR presentation entitled "Overview of DLR-forest projects and future perspectives" delivered by Wolfgang Steinborn, the following topics were discussed:

- Sensor Fusion (chaired by Christine Pohl, WEU, Satellite Centre, Spain)
- "Operational issues of multisensor data fusion for visual image exploitation" Werner Schneider, University of Vienna, Austria
- "Image information fusion in remote sensing: towards a framework and a consistent terminology" Roland Fritz, FeLis, University of Freiburg, Germany
- "Practical Application of Multisensor Data Fusion for Forest Inventory Mapping" Mathias Schardt, Joanneum Research, Austria
- "Combining Satellite data and auxiliary GIS data" Advanced Classification Algorithms and Procedures (chaired by Mats Nilsson, SLU, Sweden)
- "Evaluation of the kNN method for combining NFI sample plot data and satellite data" Matthias Dees, FeLis, University of Freiburg, Germany
- Integrating satellite and GIS data into a large scale sample based forest inventory - the classical sample based approach" Klaus Steinnocher, Department of Environmental Planning, Austria
- "Feature based image fusion " Alois J. Sieber, JRC, Italy "Needs for data fusion in the area of landmine survey and detection" Silvana Dellepiane, University of Genova, Italy and Gianni Vernazza, University of Cagliari, Italy
- "Model regularization in remote-sensing image analysis" Tobias W. Kellenberger, RSL, Switzerland

Evaluation of the Workshop

The discussion showed that all participants agreed that sensor/data fusion will be one of the important topics within the next years. According to the amount of earth observation satellites already in orbit and the future satellite program, the requirement to fuse the information from different satellites will gain increasing relevance. It was agreed that until now the remote sensing society is missing a standardization of definitions in the field of data fusion. For example, what kind of data are included in the topic 'data fusion'; outline of the benefits of sensor and data fusion techniques; outline of examples for educational purpose. It was pointed out that there is still a gap between developer of fusion algorithms and users. In order to improve the contact there should be more joint meetings between developer of fusion algorithms and users. New algorithms from the developer community should be implemented in standard software and be available in the public domain. Only if the algorithms are provided to the large group of users will they be used and verified. The algorithms must be transparent to the users to estimate the reliability of the results. Representatives from the algorithm developer side con-

firmed that feedback from the user is important to improve the algorithms and adjust them to demands of the users.

The final proposal of the working group meeting was:

- There is a need for the working group to address the topic data fusion also in future
- The approach for the working group to the topic should be from a scientific user stand point, complementary to the algorithm developer groups.

The next meeting should be a joint meeting between the EARSeL data fusion group and ISPRS WG VII/4 . A next meeting is planned for the middle of 98. All participants agreed that the meeting was very successful.

WG VII/5: GLOBAL MONITORING

Chairperson : Dr. Shintaro Goto
Co-Chairperson : Dr. Mark Imhoff
Secretary : Dr. Ake Rosenqvist

Accomplishments of ISPRS WG VII/5 During 1997

- Organized the session "Current, Waves and Nearshore Processes" in 4th International Conference on Remote Sensing for marine and Coastal Environments, Orlando, USA, 17-19 March 1997.
- Organized the "Research Gr. on RS and GIS for the Oil Spill Disaster" after the Nakhodka oil spill accidents in JSPRS and held two workshops, in Japan.
- Held the International Workshop on " Remote Sensing and GIS in support of HDP (Human Dimensions Program)", IIASA, Laxenburg, Austria, in 13 June 1997. (Attendance: 25 participants from 10 countries.)

The contents of the HDP workshop and the session were as follow:

- 1) Examples of the use of RS and GIS in conjunction with socio-economical models for global environmental change were showed.
- 2) The sensors were classified from the application point of view for the global monitoring, especially on the LUCC (Land Use Cover Change), and showed the direction of the use RS data for HDP.
- 3) The use of nighttime DMSP satellite data was demonstrated for detecting the urbanization of agricultural areas.
- 4) Land cover mapping and monitoring of the whole Asia and the present status of development Global Data Base were given.

The results of the workshop

- 1) RS and GIS is effective for analyzing global environmental change.
- 2) Because RS and GIS is being used more on HDP, the presentation of data in a GIS may have to be modified to account for human factors. For example, if socio-economists want to know the driving force on LUCC,

they must deal with many spatio-temporal LUCC(Land Use Cover/Change) data. In such cases, GIS will be the efficient tool for this purpose.

- 3) To include human factors in GIS, RS, GIS and HDP scientist must cooperate with each other.

Future Proposed Working Group Program

Organize the session "Oil Spill Disaster on Nearshore Region" in 5th International Conference on Remote Sensing for Marine and Coastal Environments, San Diego, USA, Oct, 1998.

WG VII/6: Radar Applications

Chairperson : Prof. Dr. Tony Milne

Co-Chairperson : Dr. Jurg Lichtenegger

Accomplishments of ISPRS WG VII/6 during 1997

The usefulness of radar in mapping land use/land cover and in assessing environmental conditions depends on the optimisation of wavelength, polarisation and incidence angle combinations available within each of the sensor systems. Much of the research involving single band satellite data has been reported in recent conferences (Canadian Space Agency GER, Ottawa, May 1997, ERS-1 Florence Symposium April 1997) and is the result of the work of Principal Investigators associated with these particular assessment programs. The evaluation of multi-wavelength, multi-polarised radar imagery acquired from the SIR-C has also recently been published. Much of the work of this Working Group in Radar Applications has been involved with promoting radar technology and applications within the ASEAN region, thereby complementing the activities of ESA, (ERS 1/2), the Canadian Space Agency (GLOBESAR and RADAR-SAT) and NASDA CJERS-1 program, and has involved the Pacific Rim Deployment NASA airborne radar system (AIRSAR).

A Science and Applications Workshop was held in Pasadena, 24-28 March 1997, which brought together over 60 participants from the USA, Australia, New Zealand and several southeast Asian countries. The focus of the workshop was the evaluation of AIRSAR data acquired during the Pacific Rim (PACRIM) Mission, October-December 1996 when some 126 sites throughout the Asia-Australia region were flown. The first two days of the meeting were taken up with the fundamentals of radar, AIRSAR standard data products, ordering procedures and data processing and analysis. The remainder of the workshop was concerned with reports on the objectives and planning for the various scientific applications of the data over the next two years.

A three day follow-up PACRIM Applications Workshop was held at the Malaysian Centre for Remote Sensing, Kuala Lumpur, 11-13 August 1997, in which delegates broke into six application groups namely, geology, vegetation, marine applications, interferometry and topography, regional analysis, and agriculture. These applica-

tion groups were led by US and Australian investigators and sought to achieve an overview of the radar potential for the relative discipline area. Regional scientists also evaluated research objectives for individual projects and determined what was feasible from the available data. Each group then outlined an optimal approach to data analysis, identified processing requirements, determined what field information was required and undertook hands on image processing to demonstrate various processing applications. Further radar applications workshops will be held in Bangkok, Thailand 4-6 March 1998 and Manila, Philippines, 27-29 April 1998.

Future Work Program and Actions

A PACRIM Significant Results Workshop will be held in Sydney, Australia, 26-28 July 1998 in association with the 9th Australasian Remote Sensing and Photogrammetric Conference (www.geog.unsw.edu.au/arspc98).

WG VII/7: Non-Renewable Resources and Geotechnical Applications

Chairperson : Dr. Tsehaie Woldai

Co-Chairperson : Dr. James V. Taranik

Accomplishments of ISPRS WG VII/6 during 1997

A Scientific Workshop as joint action of the European Commission's European Scientific Research Network and ISPRS Working Group VII/7 was held in the Netherlands on the 17 and 18th of February 1997.

Co-organized by J. L. van Genderen and T. Woldai, the sixth and final synergy of Remotely Sensed Data Network Workshop under the title of Synergy of Remotely Sensed Data took place at the Auditorium of the International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede. The following scientific papers were presented under the chairmanship of Dr T. Woldai:

- Forest Area Mapping Based on Optical and Radar Data (B. Koch/ T. Kremmers, Institute of Forestry, University of Freiburg. Presented by F. Horlacher)
- Analysis of Wavelet-Compressed ERS-PRI Imagery of Tropical Guyana (B. Triebfuerst, C. Schneider, IPG, Freiburg/ R. Verhoeven, Wageningen Radar Surveys)
- Synergy of Remotely Sensed Data - Network Contributions by the Department of Physical Geography of the University of Freiburg (H. Gossmann, C. Schneider, H. Saurer)
- Knowledge-Based Interpretation of Remotely Sensed Data (K. Pazad, H.-J. Birkner, University of Hannover)
- Compression of NOAA-AVHRR Data with a Wavelet Transform (C. Schneider, B. Triebfuerst, IPG, University of Freiburg/A. R. S. Marcal, R. A. Vaughan, University of Dundee)
- Forestry Information from Microwave and Optical Remote Sensing ; The JRC Geophysical Processor (GPROC) (T. Tares, JRC)

- Synergy in Remote Sensing - What is in a Pixel? (A. P. Cracknell, University of Dundee. Presented by C. Cassells, ITC)
- Image Fusion Activities at the Western European Union (D. Munro, WEU Satellite Centre)

Under the Chairmanship of Prof. J.L. van Genderen, ITC the following topics were highlighted:

- Geometric Aspects of Multisensor Image Fusion for Topographic Map Updating in the Humid Tropics (C. Pohl, Western European Union Satellite Centre)
- Laboratory Modelling of Underground Coal Fires (C. Cassells, ITC)
- Quality Assessment of Interferometric Data (R. Gens, ITC)
- Investigations on Synergy and Complimentarity of Multispectral and Anisotropy Information from MOMS-02/D2 Mode 3 Data for Land Use Classification in the Sinaloa District of Mexico (T. Schneider, Dept. of Land Use Planning, University of Munich)
- Geometrics Aspects of Multisensor Image Fusion for Topographic Map Updating in the Humid Tropics (C. Pohl, Western European Union Satellite Centre)
- Laboratory Modelling of underground Coal Fires (C. Casselles, ITC).

Besides, the network members spent considerable time in reviewing the past three years collaboration, proposing improvement for Synergy II and planning further bilateral and multilateral research cooperation between network members now that Synergy I research network

has completed its tasks. This final workshop was co-hosted by the International Society of Photogrammetry and Remote Sensing (ISPRS), Commission VII, Working Group VII on Non Renewable Resources and Geotechnical applications.

Future Work Program for the year 1998-1999

A Conference on the application of remotely sensed data and GIS in environmental and natural resources assessment is planned in Abidjan, Ivory Coast for March, 1998. One of the principal organizer, such as the March 1996 Conference in Harare, is the African Association of Remote Sensing of the Environment (AARSE) in which the WG Chairperson is the Secretary General. The last conference in Harare attracted more than 350 remote sensing and GIS expert from all over the world with more than 20 international companies and organizations displaying their hardware and software. A total of 10 Organizations including the ITC have already pledged to give their full support to the Abidjan conference. As non-renewable resources is one of the main theme in plan, the Chairman would like to see the involvement of ISPRS-WG VII/7 in this conference.

A workshop and a seminar are also planned for the end 1998 (in South Africa) and the beginning of 1999 (venue still unknown). However, they are still at a preliminary stage and the main theme of these workshop and seminar have still to be discussed. Main emphasis of the workshop and seminar will be on Environmental Impact Assessment of Mining.



CONGRESS ISPRS 2000

**XIXth CONGRESS OF THE INTERNATIONAL SOCIETY FOR
PHOTOGRAMMETRY AND REMOTE SENSING (ISPRS)
GEO-INFORMATION FOR ALL***Amsterdam, The Netherlands**16-23 July 2000***1. Introduction**

The Netherlands' Society for Earth Observation and Geo-informatics (NSEOG) is proud to host the XIXth Congress of the International Society for Photogrammetry and Remote Sensing (ISPRS) in Amsterdam, The Netherlands, coinciding with the 50th anniversary of the International Institute for Aerospace Survey and Earth Sciences (ITC). The Congress will emphasize the contribution of photogrammetry, remote sensing and spatial information systems in the generation of reliable geoinformation to manage the complex transitional processes that are associated with achieving sustainable development. These processes include food security, poverty reduction, social and economic equity, and the need for environmental protection. The consequent effects of global change if adequate measures are not taken to protect the environment is also becoming a critical issue. In line with this, the motto of the Congress is:

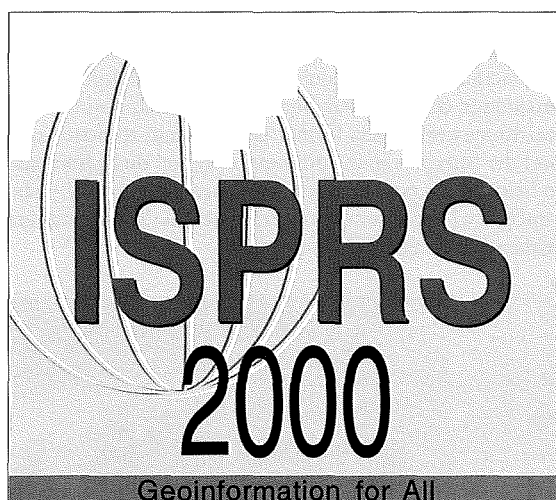
"Geo-information for All"

Representatives from the ISPRS scientific community, associated industry partners, as well as policy and decision makers associated with the delivery of information on the earth and its environment, will discuss the challenges on how geoinformation sciences and technology can deliver timely, comprehensive and cost-effective contributions that are accessible to management, policy makers and decision support, and will have a beneficial impact to all levels of society world- wide. Special interdisciplinary sessions will be programmed on the Congress theme of Geoinformation for All. Regular Technical Sessions will be organized under the auspices of the ISPRS Technical Commissions and Working Groups.

2. The Congress**2.1 The theme of the congress**

The theme of the congress has been chosen to express that the acquisition, processing, dissemination and use of geo-information is no longer a playground monopolised

by scientists and specialists. The importance of these activities for society should be manifest and this congress should make an effort of proving this. Therefore the ISPRS council and the congress organisers hope that this theme will be elaborated in the special sessions and technical sessions of the congress and in some of the workshops that will be organised before the congress. All congress participants are therefor invited to contribute to this



The logo of the Congress.

effort, the ISPRS officials and especially the commission presidents and their working group chairmen should play a central role in this respect. Several interpretations of the congress theme can be made, these may be helpful for triggering initiatives:

Geo-information for the benefit of all: emphasis is on the role of geo-information for understanding large scale and global processes like climatic change, land use development, urban growth, land degradation etc.

Geo-information available for all: this refers to policies for data dissemination, cost aspects, legal regulations, earth-observation programs.

Geo-information accessible for all: technologic aspects of

data dissemination and users access to geo-data, the role and development of the Web, technology of federated and distributed data bases, geo-information infrastructure, interoperability, global databases, data mining.

Geo-information useful for all: data should not only be available and accessible, but it should also be offered so that it can be used in a large variety of applications; that means that it should be offered in the right formats, data definitions should be clear and relevant for users, data quality should be expressed so that fitness for use can be evaluated.

Geo-information producible by all: the research and development activities of the ISPRS community resulted in methods, techniques and technology that gave tools in the hands of end users, so that they can extract their own information from raw data and develop geo-databases for their own applications. This development is still going on, the expertise invested in developing geo-information handling technology results in tools that no longer depends exclusively on technological experts for information production, but rather on high level knowledge of the different application fields and their integration.

Geo-information understandable for all: the fundamental concepts of spatial data modelling are better understood through the joint research efforts of experts from many disciplines, such as the application disciplines, image processing, photogrammetry and geodesy, computer science, etc. Through the last two decades a theoretical framework developed through which the different approaches for spatial modelling, data acquisition and spatial information production can be understood and compared. This theoretical framework needs further development to better support the activities in the different mapping disciplines and to help the users to understand the semantics, quality and structure of geo-information and educational programs are required to transfer this knowledge.



Canals of Amsterdam.

2.2 Technical programme

The Congress and Exhibition will be organized at the Amsterdam RAI International Exhibition and Congress Centre in Amsterdam. Venue dates for the Congress are Sunday 16 July until Sunday 23 July 2000. The core of the Congress will consist of six days comprising three blocks of 1,5 hours each with four parallel Technical Sessions and one block of 1,5 hours Poster Sessions. The main body of the Congress will be preceded by tutorials and followed by in-depth workshops.

Tutorials & Workshops	Friday 14 July and Saturday 15 July 2000
Congress	Sunday 16 July - Sunday 23 July 2000

A major component of the Congress will be the commercial and scientific exhibition that will provide participants with insight into up-to-date developments in photogrammetry and remote sensing. The main topics of the Congress are organized by the seven Technical Commissions and their forty four Working Groups.

2.3 International Exhibition

The three types of exhibition (Commercial Exhibition, Member Exhibition and Scientific Exhibition) will be the centre of interest during the Congress. Exhibitors will provide Congress attendees with an insight into the latest products and services, inventions, and developments. The work achieved over the last four years by thousands of specialists from all over the world in the fields of geographic information systems, mapping, photogrammetry, remote sensing, data processing, surveying, imaging, image processing, machine vision, computer graphics, and many applications, will be displayed as attractive examples to provide you with new ideas for application in your own country. Set aside ample time to take advantage of this unique opportunity to examine the finest technology, training and services available today in these fields.

2.4 Technical tours

Technical tours to several companies and research institutes in The Netherlands and neighbouring countries will be organized.

2.5 Social Programme

Several social events will be organized for delegates and their partners during the Congress, ensuring delightful evenings.

2.6 Local organizing committee

Members of the organizing committee for the 19th ISPRS Congress and Exhibition are:
Klaas-Jan Beek, Congress Director, ITC
Martien Molenaar, Scientific Programme, ITC
Freek van der Meer, Secretary, ITC
Saskia Tempelman, Secretariat, ITC
Rob Neleman, Treasurer, Cadastre

Gerard Nieuwenhuis, Member, DLO-SC
Johan Boesjes, Member, GITC
Nico Bunnik, Member, BCRS
Hilke Haberman, PCO, HOC
Jan Timmerman, Member
Ceess IJsendoorn, Member

The scientific committee for the local organizing committee consists of:

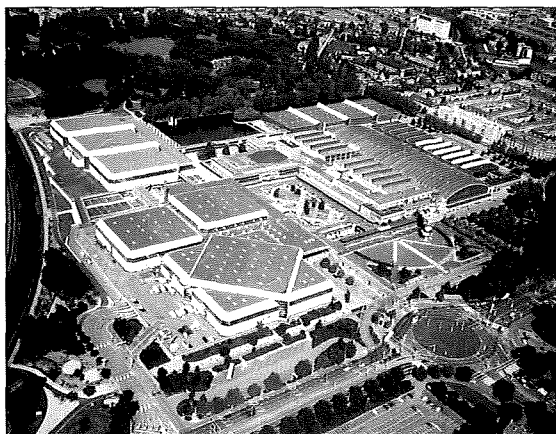
M. Molenaar, Chairman
K.J. Beek, Congress Director
J.C. Venema, Liaison officer to Commission I
L. Janssen, Liaison officer to Commission II
G. Vosselman, Liaison officer to Commission III
M. Molenaar, Liaison officer to Commission IV
F. van de Heuvel, Liaison officer to Commission V
J. Timmerman Liaison officer to Commission VI
J. Clevers, Liaison officer to Commission VII

3. The Location

The 19th ISPRS Congress and Exhibition will be held in the Amsterdam RAI International Exhibition and Congress Center which is situated in one of Amsterdam's green and leafy suburbs, only 3 kilometer from the historic city center and 10 kilometers from Amsterdam Schiphol Airport. Over 1000 international meetings lasting anywhere from three days to several weeks have been successfully organized in Amsterdam RAI during the past 30 years. Annually the RAI welcomes over 2.5 million visitors to its exhibitions, trade fairs and congresses and hosts an average of 50 major international congresses and numerous smaller meetings and events. The RAI has 22 conference halls and meeting rooms with a seating capacity of 16 up to 1.750 persons surrounded by spacious lounges, located under one roof. A total of 11 multipurpose exhibition halls of 990m² up to 18.000m² will be the floor for a technical exhibition. The RAI has its own harbor from which boat trips through Amsterdam's ring of canals can be made. To ensure the best possible preparation and smooth running of the 19th ISPRS Congress, a professional congress organizer, Holland Organizing Center (HOC), is involved. HOC was founded in 1958 and with a permanent staff of 20 handles 25-30 meetings per year.

Amsterdam, the capital of The Netherlands and location for the ISPRS 2000 Congress, was once the world capital for the production of maps and globes. Its richness in culture, theatres, museums and restaurants draws huge numbers of visitors from all over the world. The Netherlands is also the gateway to other tourist attractions in Europe. Amsterdam, with its 700 000 inhabitants is a city with a highly individual atmosphere created by its beautiful symmetrical rings of canals with over 1000 bridges, its sense of energy and purpose, and its cultural treasures. The 1987 Cultural Capital of Europe has 42 museums including the "Rijksmuseum", the Van Gogh museum, the Municipal ("Stedelijk") museum and the recently opened "newMetropolis" Science and Technology Centre. It also is home to the famous Royal Concertgebouw Orchestra, the Dutch National Ballet and

the Dutch Opera. Schiphol Amsterdam international airport is a modern airport which has direct scheduled flights to 220 cities in 94 countries by 85 airlines. The RAI Congress Centre has its own railway station providing a direct (8 minute) service to the airport every 15 minutes.



Impressions of the RAI.

All hotels in the city centre can be reached by train, tram, bus or metro in less than 20 minutes while several hotels are located within walking distance from the RAI. Rooms will be available at various price ranges, while rooms in university residences will also be available at reasonable rates.

4. Important dates

Call for papers and Second Announcement	January 1999
Exhibition call brochure	March 1999
Deadline for abstracts	September 1999
Deadline for manuscripts	March 2000
Preliminary programme	April 2000
Final programme	July 2000

5. Advertising the congress

To ensure a wide diffusion of information on the congress and to maintain up-to-date information a website for the congress is set-up. The URL is: <http://www.itc.nl/~isprs/>

On this website not only do we provide information about the congress, but we also provide all documentation in formats that can be downloaded and read by the interested participants. Furthermore the secretariat can be reached at a special e-mail address: isprs@itc.nl. In January 1998 the 'first announcement' was printed in 40.000 copies. These will be mailed to institutes and individuals on our mailing lists consisting of 3.000 entities. Furthermore copies will be enclosed in various international journals and newsletters on the topics of interest to the congress. Also the ISPRS Council members and commission presidents will receive a set of sample copies for further distribution. Finally copies will be distributed at all ISPRS meetings scheduled for 1998 and at several other related scientific meetings.

TECHNICAL COMMISSION I SYMPOSIUM: EARTH OBSERVATION SYSTEM FOR SUSTAINABLE DEVELOPMENT

Bangalore, India, Feb 25-27, 1998

Inaugural Address by Dr K. Kasturirangan, Chairman, Indian Space Research Organisation, Bangalore

Dr. Lawrence Fritz, President, International Society for Photogrammetry and Remote Sensing; Dr. George Joseph, President, ISPRS, Technical Commission I and Director, Space Applications Centre; Dr. DP Rao, President, Indian Society of Remote Sensing and Director, NRSA; Mr. V Jayaraman, Secretary, ISPRS Technical Commission I and Organising Secretary of the Symposium; distinguished delegates to the Symposium, media persons, Ladies and Gentlemen,

At the outset let me welcome you all to this Symposium on Earth Observation System for Sustainable Development jointly organised by the International Society for Photogrammetry and Remote Sensing, Technical Commission I and the Indian Society of Remote Sensing. While you are busy with this important Symposium and its Technical Sessions, I am sure you will be able to find some time to go around this beautiful garden city of Bangalore. Bangalore which was earlier known to be the 'Pensioners' Paradise' has lately been identified as 'Silicon Valley of India'. The population in Bangalore has increased from a modest 1.5 million in early 70's, to around 5 million now, exercising greater pressure on ecology, environment and infrastructure facilities in the city. It is typically the situation we are facing globally with increasing population causing undue interference with the ecology and environment, calling for a sustainable development planning globally.

There has been increasing awareness globally for the need to mount intense national and international efforts to achieve a sustainable common future for all humanity. It was just 40 years back that the first satellite 'Sputnik' was put into orbit and since then the impact, space has made on humanity, coupled with great scientific innovations and spin-offs arising out of space technology has been tremendous. These 40 years have also seen quantum leap in information technology and biotechnology. The advent of micro chips carrying large quantum of data through the information super highway has kindled the imagination of everybody. Together, these technological developments have provided sufficient scientific tools for transforming even stagnant societies into vibrant ones.

Looking at the major issues confronting the Planet Earth, it is well recognised that the current global environmental crises such as global warming, El Nino/Southern Oscillation (ENSO) etc., have got their roots in the local

problems of deforestation, land use conflicts, soil erosion etc. Hence, the interlinkage between the global processes and local actions need to be understood clearly. In fact, it is what is being contemplated in the Mission To Planet Earth (MTPE) Programme, recently renamed as Earth Science Enterprise, wherein global understanding is stressed in order to act rationally at local level.

It is herein that any sustainable development strategy calls for a better understanding of the interactions between land, atmosphere, oceans and their interlocking water, nutrient and biogeochemical cycles and energy flows, which all form part of the Earth system. It is essential for accurate estimate of the carrying capacity of the planet Earth and its resilience, under many stresses placed upon it by the anthropogenic activities. Earth Observation (EO) satellites, by virtue of their unique capability of providing repetitive, dynamic and global coverage at high spectral, spatial, radiometric and temporal resolutions, offer immense opportunities to establish the interlinkages of local phenomenon to its global dimension and vice versa.

Thus, EO satellites provide data, while appropriately modelled lead to needed information, to support the sustainable development activities. Currently there are around 45 missions operating and in the next 15 years, it is expected that there would be 70 more missions with around 230 sensors, providing measurements of many critical parameters to study the Earth's environment. These missions along with other contemporary missions are likely to make quantum jump in our understanding the earth system as a whole. Many of these new instruments will have higher spatial, spectral and radiometric information, besides improved temporal coverage. It is reported that out of the 200 and above instruments planned in the next 15 years, more than 80 will be new, providing measurements of many parameters of interest to those studying the earth's environment. These instruments include imaging multi-spectral radiometers in the visible, IR and microwave regions, atmospheric sounders, cloud profiles and rain radar, earth radiation budget radiometers, polarimetric radiometers, imaging radars, Lidars, polarimetric and interferometric multi-frequency SAR, radar altimeters, scatterometers etc. The strength of any EO system, for global observations, lies in its planned synergy and simultaneity of measurements spread over a long time as has been widely recognised by MTPE/Earth Science Enterprise programme. As such, a significant degree of coordination

in mission planning and data provision is required among the various space agencies, planning these different sensors. It is here that Committee on Earth Observation Satellites (CEOS) has been playing a stellar role in unifying various space agencies in planning their future mission through the Integrated Global Observing Strategy (IGOS). It is being jointly defined with other key players such as the Global Ocean Observing System (GOOS), Global Terrestrial Observing System (GTOS) and Global Climate Observing System (GCOS). I am happy to note that there is a special session devoted to CEOS in this Symposium and I am sure you will hear more about IGOS.

Future Earth observation missions such as NASA-EOS, ESA-ENVISAT, Japanese ADEOS, TRMM and IRS-CLIMATESAT are unique experiments towards resolving the various scientific uncertainties associated with the dynamics of radiative fluxes in hydrological and bio-geochemical cycles. Viewing Earth as an integrated system, these missions would also address the core issues identified under International Geosphere Biosphere Programme (IGBP), with causes and effects that transcend national boundaries. The global measurements, observations and synthesis need a stronger interface and liaison between the scientists all over the world to realise the inherent potential of these missions especially to impart the concept of sustainability in various developmental efforts worldwide.

On the other hand, with extremely high resolution payloads, EO satellites offer immense potential to facilitate the finer level diagnostic analysis towards ensuring the i) sectoral harmonisation by resolving land use conflicts, ii) improved rural development activities, such as precision farming, development of land and water resource management at microlevel and support of local environment impact studies and iii) three dimensional structural design, modelling and analysis for geo-engineering and infrastructure development projects. Planned high-resolution missions both in the private and public domain emphasise the significance the space agencies attach to these missions. Various EO platforms carry sensors, providing information on a diverse range of geophysical parameters and phenomena, which is of value in varied disciplines. For example, besides the land and water resource studies, these sensors address areas such as atmospheric chemistry, atmospheric physics, ocean biology, climate studies, solid earth studies, etc. Meteorology is the yet another established discipline for application of EO data and dedicated meteorological satellites, with enhanced capabilities, provide continuous coverage of the globe for many years. While the global research community uses the EO data for various scientific studies, most of the developing countries find value in the unique perspectives provided by the satellite earth observation in natural resources and environment management. Use of satellite remote sensing data in many operational land and water based applications, including agriculture, resource management, exploration, mapping and planning, and disaster management has been

reported by many countries in the last two decades. While it is encouraging to note that many EO missions are being planned in the coming years, it also throws up various challenges to the EO community. With ever increasing earth observation missions with varied specifications, the issue of handling and appropriately integrating multi-sensor, multi-platform data to derive geophysical parameters precisely and address the radiance transfer phenomena more efficiently, has become more critical. The varied nature of the sensors in terms of their spatial, spectral, radiometric, and temporal resolutions with varied accuracies and scales, calls for establishing inter-sensor calibration and validation to establish the sensitivity of measurements and identify the limitations and source errors. Development of appropriate data fusion techniques, algorithm development, modelling and other standardisation procedures are also equally important to concurrently use the data sets from these varied instruments.

With increases in computational power and merging of technologies, such as digital photogrammetry, GIS, GPS, Artificial Intelligence, neural network etc., the future perspectives for EO applications look more challenging with opportunities for enhancing the applications in various gap and thrust areas, hitherto not attempted. It is also true that various pre-processing and image analysis techniques will undergo many paradigm changes due to the advent of these new sensors. For example, the high-resolution sensor data handling will move away from the currently prevalent statistical classifiers to object oriented analysis. More and more neural methods and models, traditionally employed for shape and character recognition, will become part and parcel of the normal image analysis, thus calling for closer co-ordination between the researchers, algorithm developers, the application scientists and ultimately the user community at large.

While talking to you about the global EO programmes and the imperatives, I would like to briefly tell about our own Indian Earth Observation Programme. As you are aware, the Earth Observation programme in India is 'application driven' and is effectively managed through the National Natural Resources Management System (NNRMS) supported by its various Standing Committees, headed by the concerned Secretary in the user ministries. You are also aware of the Indian Remote Sensing Satellite programme. It was exactly ten years back, IRS-IA was launched and since then India has launched successfully many remote sensing satellites including the latest IRS-ID using our own indigenously developed PSLV vehicle. In the coming years, India has plans to launch application specific IRS missions such as, Oceansat, Cartosat and Resourcesat, providing enhanced EO capabilities. You may be aware that India has made use of EO data operationally in many applications, such as crop acreage estimation, mapping of potential ground water zones, forest mapping, wasteland mapping, landuse / land cover mapping etc. Particularly, I should mention here the unique remote sensing application project, namely the Integrated Mission

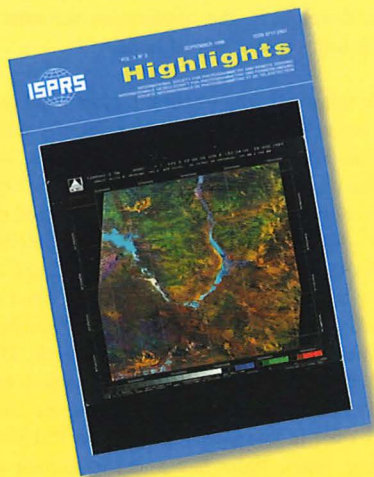
for Sustainable Development (IMSD) wherein the satellite remote sensing data is appropriately integrated with the collateral information from the field to arrive at locale specific action plans on a watershed basis for sustainable development at micro level. A host of activities, namely appropriate soil conservation measures, afforestation, construction of water harvesting structures, horticultural plantations etc., were taken up involving the local authorities in many parts of the country. The initial results of IMSD implementation have been quite encouraging. It has been reported in a few watersheds, significant rise in ground water table in the downstream of watersheds due to the measures taken up under IMSD. With improved high resolution satellites in the coming years such as Cartosat, it is expected that the locale specific actions even at cadastral level will get further boost. India realises that these efforts, integrating the high technology EO inputs into the local developmental plans, are real pathways to impart sustainability in any developing country.

I am happy to note that the International Society for Photogrammetry and Remote Sensing (ISPRS), which is

mainly responsible to initiate and co-ordinate research in photogrammetry and remote sensing studies globally through its various Technical Commissions and Working Groups, has chosen an appropriate theme for this Symposium. Earth Observation programmes are inherently global in nature and its success essentially depends on international co-operation, a theme closer to ISPRS.

I am sure that this forum, comprising of many eminent personalities in remote sensing, photogrammetry and GIS fields, will, in the coming three days, discuss various aspects related to the Earth Observation Platforms and Sensors and their utilisation in various sustainable developmental activities. From the Technical Programme of the Symposium, I note many interesting papers from eminent personalities, covering various aspects of EO platforms and sensors. I am sure, this forum will come up with specific suggestions and recommendations which could take the EO applications further towards realising the goals of sustainable development.

I wish the Symposium all success.



Highlight your Business!

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ISPRS Seeks Donors to Support Project Proposals



The International Society for Photogrammetry and Remote Sensing is seeking donors to financially support worthy projects which have been submitted by members. The proposals have been submitted through ISPRS Commissions for Council approval. Proposals must be for projects which will support international cooperation and should be aimed at serving the broad interests of Society. At this time, ISPRS proposes to undertake four projects which are aimed at providing information and education on the availability, use and application of modern imaging technologies to address sustainable development, especially as relates to the needs of developing countries.

The projects include the use of voluntary cooperation within the existing ISPRS framework of over 114 Societies, Organizations and Institutions located in 101 nations to identify educational opportunities, facilitate the education process and provide training and education forums specifically tailored to inform and help developing countries and regions. These ISPRS member organizations represent the global scientific and technologic leadership in the geo-spatial information sciences, especially spatial information derived from remote imaging.

The educational value of using remotely sensed imagery is that it provides an excellent basis for detecting, identifying, assessing, monitoring and annotating changes and activities in a locale. It has potential for innumerable applications because it provides a permanent record of 'what, when and where' data, which when analyzed can provide insights into the 'who, how, and why' information. As a result, education in this science and technology offers the most economical means for a developing country, region or locale to precisely evaluate the size, location and status of its natural and human resources so that it may efficiently and harmoniously plan and manage its development. Applications include environmental siting and monitoring; city and urban planning; disaster assessment; commodity monitoring; demographics; habitat protection; security; compliance monitoring; facilities placement; heritage site preservation; mapping and charting; utilities and transportation routing; activity and news reporting, etc., etc.

Financial support is requested of donors to enable the following educational projects:

- 1 International Educational Opportunities Program (US\$30,000)
- 2 Data Base of International Educational Facilities (US\$9,000)

- 3 Dissemination of Information Publication - ISPRS Highlights (US\$35,000)
- 4 Distance Learning using Multimedia CD-ROM & WWW (US\$10,000)

ISPRS Members are encouraged to propose additional projects for donor support by submitting proposals to ISPRS Commission Presidents in a form similar to those listed herein.

The results of all projects will be made available at no cost and distributed to all member organizations of the 101 nation International Society for Photogrammetry and Remote Sensing and to other interested organizations upon request. This distribution will be through the quarterly publication, ISPRS Highlights, and on the ISPRS Home Page (<http://www.geod.ethz.ch/isprs>).

Donors and interested parties are asked to please contact Secretary General John Trinder or me directly for contributing to these ISPRS activities.

Lawrence W. Fritz
ISPRS President

1. International Educational Opportunities Program

Background

ISPRS is recognized by the UN ECOSOC as the non-governmental organization which represents the imaging sciences, technologies and disciplines of photogrammetry, remote sensing and geo-spatial information systems (GIS). At the XVIII ISPRS Congress in Vienna, July 1996, the 99 nation ISPRS General Assembly approved a resolution for the creation of a task force to facilitate and promote grants, fellowships, scholarships, tutorials, workshops and similar educational opportunities in photogrammetry, remote sensing and GIS, especially for individuals and organizations in the developing regions. This activity has been developed into the ISPRS Educational Opportunities Program. It is an effort led by a task force which integrates the knowledge base of the 112 member organizations of ISPRS to implement educational opportunity projects on a regional basis. This initiative recognizes that ISPRS membership can serve a valuable facilitating role for donor organizations by identifying appropriate international training facilities, evaluating training modules and coursework, evaluating potential candidates, and promoting educational opportunities in these regions. A pilot project to be implemented in Brazil in 1998, through the Centre for Space Science and Technology

Development for Latin America and Caribe established at the National Institute for Space Research (INPE), has been defined and is underway. Meetings of the task force with ISPRS member organizations and candidate training centers around the world are scheduled to clarify fundamental roles and to stress the importance of the engagement and support of all parties in the educational process.

Project Objectives

- To qualify specialists from developing countries in remote sensing, photogrammetry and/or GIS research and techniques, for survey and monitoring of natural resources;
- To promote the use of remote sensing and GIS techniques for surveying, planning and management of natural resources in developing countries;
- To enable training participants to familiarize themselves with remote sensing and GIS techniques applicable to their respective fields of expertise and specific situations in their homeland;
- To organize and extract information from remotely sensed data for planning and decision making; and
- To demonstrate the increasing contribution of remote sensing, photogrammetry and GIS techniques in the analysis of environmental impacts, and to suggest measures to prevent the side effects of these impacts.

Project Proposal and Approach

It is proposed that the following tasks be conducted:

- An assessment of the existing training opportunities in photogrammetry, remote sensing and spatial information systems worldwide;
- Contact the existing training centers in the above fields for information on opportunities, courses, calendar, programs, grants, fellowships, scholarships, etc.
- Conduct meetings of the task force with ISPRS member organizations and candidate training centers to clarify fundamental roles and to facilitate the interaction between ISPRS member organizations within the region influenced by the training center.
- Dissemination of training opportunities to all ISPRS member organizations within their region of influence.
- Pre-selection of training opportunity candidates by close coordination of the task force with the ISPRS member organizations and submission of the proposals to the regional training center.

Project Management

ISPRS 2nd Vice President and Chairman of the Educational Opportunities Program, Eng. Marcio Nogueira Barbosa and the ISPRS Task Force members. The Task Force membership has representatives from ISPRS Council, ISPRS Commission VI (on Education and Communication) and from all continents.

Financial Requirements

Meetings support US\$ 30,000

2. Creation of a Data Base of International Educational Facilities in Photogrammetry, Remote Sensing, GIS and Geomatics

Background

Increasing international cooperation in the areas of photogrammetry, remote sensing, GIS and Geomatics has resulted in increased mobility of students, academics and professionals. This has exposed a lack of information on educational institutions, especially in third world countries, and makes it necessary to establish a database on education in order to facilitate the assessment of students and graduates for

- transfer between institutions
- transfer into postgraduate programs
- recruitment for professional positions and provide
- potential students with a choice of institutions available for education
- graduates with opportunities for post graduate research
- educators with opportunities for exchange of individuals, joined courses, distribution of teaching facilities over regions
- researchers with a possibility for joined research projects and communication on research issues

Project proposal and approach

It is proposed that :

- an investigation be made into the most appropriate format and content (type of degrees, syllabus, names of staff, etc.) of an educational data base with access through the Internet;
- a search for already existing information on the net (e.g., FIG educational data base) is carried out;
- existing information is updated and new information is obtained where necessary;
- the data base be established with access through the ISPRS Home Page and promoted via ISPRS Highlights and other relevant publications; and
- the data base, once established, be maintained through auspices of ISPRS.

Objective

The creation of an up-to-date readily accessible educational data base on the Internet with links to educational institutions and facilities for information exchange.

Project team

Prof. Heinz Ruether, Head of Department of Geomatics, University of Cape Town, Treasurer ISPRS, chair of ASES (Association of Survey Educators in Southern Africa)

Staff and postgraduate students of the Department of Geomatics, University of Cape Town

Financial Requirements

Collection of data	US\$ 4,000
Establishment of a home page	US\$ 3,000
Maintenance per annum	US\$ 2,000

3. Dissemination of Information Publication - ISPRS Highlights

Background

The availability of current information about scientific and technologic developments and related activities is essential for supporting advancements in developing countries and regions. Since October 1996, the 114 Member Organizations, seven Technical Commissions, 45 Working Groups and officers of ISPRS have been providing and sharing this information on a global basis through a new quarterly publication "ISPRS Highlights". In less than one year, this 32 to 96 page color publication has proven to be a new and invaluable source of information to developing regions of the world. It is published and express mail shipped. Multiple copies are provided free to all ISPRS Member Organizations and relevant interested organizations/individuals in 101 nations (over one-half of which are developing nations). The production plan for this publication was for total financing by advertisement and donor revenue. However, this has proven to be difficult to manage as ISPRS is an all-volunteer Society with no paid staff. ISPRS is convinced that the news, scientific and technologic information, opportunities for technology transfer and exposure to international advancements provided by this publication should be free to all interested parties, especially for those in developing countries.

Project Proposal and Approach

In as much as more than 50% of the membership of ISPRS is comprised of developing countries and regions of the world, and because the publication costs including postage represent a significant burden to an all-volunteer international Society, it is proposed that:

- ISPRS continue the preparation of ISPRS Highlights.
- Funding be provided in an amount not to exceed US\$35,000 annually to support the free distribution of ISPRS Highlights to all ISPRS Member Organizations and interested relevant parties.
- Distribution continue to be by express mail due to the timeliness of the information conveyed (e.g. educational opportunities, etc.) and due to the vagaries of international mail systems.
- Recognition of donor support for ISPRS Highlights to be prominently displayed.
- ISPRS continue to seek donors to subsidize production and distribution expenses.

Objective

The continuation of a current publication devoted to the free dissemination of timely information about scientific and technologic developments and related activities, such as educational opportunities, in photogrammetry, remote sensing, geo-spatial information (GIS) and relevant imaging systems, especially for developing countries and regions.

Project Management

ISPRS Secretary General, Prof. Dr. John Trinder, Head

of School of Geomatic Engineering, University of New South Wales, Sydney NSW 2052, Australia

Financial Requirements

Mailing expenses (4 mailings per year) US\$35,000
All disbursements are to be for mailing and shipping costs only.

Beneficiaries

More than 3,200 individuals worldwide from ISPRS Member Organizations and in other interested organizations.

4. Computer-assisted Distance Learning using Multi-media CD-ROM and WWW

Background

Using new media for education and lifelong learning is an important issue especially for those scientists, experts, and practitioners who cannot participate in congresses, symposia, tutorials, etc. because of limited financial funding. In order to offer also for that group most recent training material in photogrammetry and remote sensing, it is highly recommended to prepare self-training facilities what can be used anywhere around the world, particularly in third-world countries.

The Institute for Photogrammetry (ifp), University of Stuttgart, prepares every two years tutorials as so-called pre-events to the Photogrammetric Week conference. These tutorials are very successful, not only as far as the number of students is concerned, but mostly from the educational perspective because the most recent research and applications are presented. The 1997 tutorial concentrated on GPS and INS in Photogrammetry. About 75 students primarily from developed countries, participated in the tutorial and they were very enthusiastic on having learned modern details in a very short time.

All material of this tutorial is digitally available. As such, it is readily available to be used as the basis for a multimedia CD-ROM as self-teaching facility. The ifp Web Server could assist this CD-ROM to answer questions arising when using the CD-ROM as distance learning media.

Project Objective

Production of a CD-ROM containing educational software linking text, graphics, digital video, and digital audio on the 1997 tutorial topic: GPS and INS in Photogrammetry for computer-assisted distance learning, especially for use in developing countries.

Project Proposal and Approach

It is proposed that the tutorial "GPS/INS" be produced on a CD-ROM which contains the following multi-media concepts:

- Color graphics of the over 150 overhead viewgraphs presented in the tutorial, with Synchronized recorded voice of the tutorial lecturers, with

- Digital color video of the lecturers superimposed with the graphics, all simultaneously.

In addition, a World-Wide-Web site is to be established for interactive Internet support for questions by remote students, as well as for making further teaching materials available. The package will be promoted through ISPRS publications and Member Organizations.

Project Team

The project team are collaborators of the Institute for Photogrammetry, University of Stuttgart, around the head

of the institute, Prof. Dr. Dieter Fritsch. He is currently president of ISPRS Technical Commission IV "Mapping and GIS".

Financial Requirements

The following costs are estimated:

- Hardware (digital video camcorder, CD-ROM production facilities)	US\$ 5,500
- Software, processing effort	US\$ 3,500
- 50 CD-ROMS (initial output package for distribution)	US\$ 1,000
Total project costs:	US\$ 10,000

ISPRS HIGHLIGHTS ADVERTISEMENT PRICES					
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Payments should be arranged with ISPRS Treasurer: **Prof. Dr. Heinz Rüther**, Dept. of Surveying & Geodetic Eng., Univ. of Cape Town, Rondebosch 7700 SOUTH AFRICA.
Tel: +27-21-650-3573, Fax: +27-21-650-3572.
E-mail: Rüther@EngFac.UCT.ac.za

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INTERORGANISATIONAL ACTIVITIES



SPECIAL WORKING GROUP MEETING OF EXPERTS AND DELEGATES OF THE UNITED NATIONS REGIONAL CARTOGRAPHIC CONFERENCES

*March 25-27 1998
Aguascalientes, Mexico*

*by Lawrence W. Fritz
ISPRS President*

This meeting was initiated as a result of Resolution #2. of the 6th United Nations Regional Cartographic Conference for the Americas which convened in New York City 2-6 June 1997 (see ISPRS Highlights, July 97). Resolution #2, "Establishment of a working group of delegates and experts to define the mission and focus of the 7th UN Regional Cartographic Conference for the Americas" contained the following three recommendations:

1. Recommends the convening, under the guidance of the Secretary-General and within available resources, of a special working group of delegates and experts from all United Nations regional cartographic conferences and the member States of the Economic Commission for Europe within 12 months to re-engineer the operation of the regional conferences to ensure that they are relevant to regional and global needs and address issues of importance to local, national and international users of spatial data and land-related information in the twenty-first century, and to refine the provisional agenda for the Seventh United Nations Regional Cartographic Conference for the Americas;
2. Further recommends that the special working group:
 - a) Develop a generic template for member States to use in reporting the status of surveying, mapping, charting, cadastral and GIS activities, together with relevant national indicators, and request all member States to utilize the template in making their country report to the United Nations regional cartographic conferences;
 - b) Investigate the timing of United Nations regional cartographic conferences to ensure that the conferences in Africa, Asia and the Pacific and the Americas are followed by intervals of approximately 12 months, those in turn to be followed by an interregional United Nations cartographic conference at which global experiences are shared and the resolutions of the regional conferences are brought together to provide a global

perspective in policy- and decision-making for all member States and the United Nations;

c) To report to the Economic and Social Council within 18 months on the preferred structure;

3. Also recommends that the generous offer of the Government of Mexico to host the special working group of delegates and experts should be pursued.

The meeting was hosted by the National Institute of Statistics, Geography and Informatics (INEGI) and chaired by INEGI President, Dr. Carlos M. Jarque. (INEGI is the Mexican government organization responsible for all mapping, cadastre, statistics and census. INEGI has over 37,000 employees which cover all aspects of data collection to document printing.) The Special Working Group (SWG) included 22 delegates and experts representing 12 countries, six specialized organizations and the Director of the UN Statistics Division. See Attachment.

After a round table introduction by the participants, the meeting began with a review of the Resolution #2. mandate by Dr. Jarque. He then introduced Hermann Habermann who reviewed the status of the reorganization of the United Nations secretariat. On 1 January 1998 all cartographic functions of the UN Department for Development Support and Management Services (DDSMS) were disbanded and transferred to the Statistics Division without additional funding. Ms. Beatrice Labonne, the previous Director of the Division in DDSMS responsible for cartographic activities was reassigned. The remaining staff member, Dr. Hans Stabe, has indicated his resignation as of the end of 1998. Habermann noted that as Director of the Statistics Division he had opted for the UN cartographic activities as they complement the GIS projects of the Division. Unfortunately, he noted that the current staff position and resources will be retained, but no additional resources are available in the Statistics Division to address cartographic issues. Given this scenario, the

experts and delegates were alerted to the additional importance of this meeting.

Next presentations including recommendations were made by the regions which convene Regional Cartographic Conferences (RCC's): Americas by Ms. Guadalupe Lopez of Mexico, Asia and the Pacific by Peter Holland, Europe by Jarmo Ratia, Africa by Mario Palma for Alh. Mn Yahaya (Surveyor General of Nigeria and Chair of the 9th UN RCC for Africa), and USA by Gene Thorley. The report and very articulate letter by Yahaya indicated that the RCC for Africa has been abolished by the Economic Commission for Africa to the dismay and disregard of the needs of the African Region. His letter included a plea to the SWG to encourage reinstatement of the RCC for Africa. This was the first awareness of this termination to the majority of the SWG participants, who throughout the meeting indicated their concern and desire for its retention. Most of the reports presented at the meeting were distributed and ISPRS can obtain copies for its Members upon request.

The presentations included two explicit proposals by Mexico and USA to address Resolution #2.

- The USA proposal laid out an approach for the "Coordination and Communication of Global Spatial Data Infrastructure (GSDI) Activities" wherein the UN RCC's would be reorganized to provide both a regional and interregional forum for all sectors, government, academia and industry, on policy development options related to cartography, GIS technology and spatial data infrastructures in support of sustained economic growth for sustainable development and environmental management. It proposed establishment of Permanent Committees on GIS Infrastructure in major regions of the world; an annual rotating UN Regional Conference & GSDI Conference; and the establishment of a GSDI Coordinating Committee. The PC for GSI and the GSDI CC would not be official entities of the UN, but rather associated with the rotating UN GSDI Conferences.
- The Mexican proposal called for a United Nations World Geographic Information Commission (GIC) to be established where all the regions of the world could meet with the international geographic agencies. It recommended that the RCC's continue to exist as part of the GIC, whose primary role would be to support the actions of the UN/Economic & Social Council (ECOSOC), in a way which is conducive to the sustainable development of the countries, multilateral cooperation and technical assistance. Regional Conferences would identify, coordinate and report on specific regional projects and coordinate with global projects under the coordination of the GIC. The GIC would convene every two years and the RCC's every four years.

In the ensuing discussions, SWG participants expressed concern about: the viability of cartograph-

ic/spatial information activities being housed in the UN Statistics Division; the increasing need for involvement of the industrial sector; the need for UN resolutions to go to the science ministers of countries; the need for viable, open participation in the RCC's; how best to address global issues in a regional context; the need to raise awareness of geo-spatial benefits and issues to all levels of decision making; the frequency and content of RCC's; the risks involved with UN functional commissions vs. other more political UN commissions; and more. Several concerns were only marginally discussed. These included: the potential role for UN leadership in the GSDI; the role of NGO's; how many regions should convene RCC's; the value of Permanent Committees for GIS Infrastructure; the Global Map project; coordination of ad hoc GSDI fora; and similar efforts for greater public awareness by other organizations; and more.

After much discussion and debate a small group was assigned to prepare a draft resolution (Jarque, Habermann, Palma, Holland, Beek). The draft proposal called for the creation of a UN Geographic Information Commission. Further discussion and information from Habermann, regarding what wording and approach would be considered as acceptable to ECOSOC, led to the Resolutions as set forth below. Although not all participants were convinced that the final Resolutions encompass all the needs of the geo-spatial/cartographic community, most will agree that if approved by ECOSOC and implemented in good faith by the UN Regional Commissions, the outcome will be an improvement over the present situation. Whether the outcome of this meeting fully addresses the recommendations of UN Resolution #2. is left to the reader to decide.

Resolutions

The Special Working Group of Experts and Delegates from member countries of the UN Regional Cartographic Conferences for Africa, the Americas, Asia and the Pacific and the Economic Commission for Europe,

Acknowledging the need for a world forum in which the member states of the UN could discuss and share information and establish policies for the development and use of geographic information and cartographic activities,

Bearing in mind the process of globalization in all fields of human endeavor,

Recognizing the importance of geographic information for many of the activities that the United Nations and within the organization, ECOSOC, undertake for the fulfillment of the UN Charter,

Further recognizing the need for effective ways of organizing international efforts and cooperation concerning geographic information, with the participation of the key stakeholders in the field.

1. Resolves to issue a statement supporting:
 - The creation at the United Nations of a Geographic Information Commission,
 - That the objectives of the Commission should include fostering the development of geographic information activities and infrastructure at the world, regional, country and local levels; identifying and raising awareness about priority issues in geographic information; developing methodologies and promoting standards in this field; supporting the work of the UN organs and agencies in particular the resolutions of the World Summits; coordinating the geographic information activities of the UN specialized agencies and supporting technological development in this area.
 - That this Commission should meet every two years according to United Nations regulations with representatives from all regions of the world, with its first meeting to be held as early in the year 2000 as possible.
 - That the United Nations should provide the necessary infrastructure to support this endeavor.
- That the UN Regional Cartographic Conferences should be maintained and invigorated. Each regional conference should determine the frequency of its meetings and decide upon the establishment of a permanent committee providing continuity between the conferences. Conferences in each region should be held at least every three years. These conferences should address the identification and coordination of regional projects, and they should also consider both the regional implications of global issues and suggestions for global issues that arise out of regional concerns. Country reports, while important, should be tabled as information items. Regional Conferences should be supported by the UN Regional Commissions.
2. The Special Working Group further resolves to submit these agreements to ECOSOC/UN for their discussion as to the feasibility of their implementation by the United Nations.

COUNTRIES: 12 SPECIALIZED ORGANIZATIONS: 7 PARTICIPANTS: 23

COUNTRY (No)	INSTITUTION	REPRESENTATIVE	POSITION
Australia (1)	Australian Surveying & Land Information Group (AUSLIG) www.auslig.gov.au	Peter Holland peterholland@auslig.gov.au	General Manager
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Colombia (1)	Institute Geográfico Agustín Codazzi (IGAC) www.igac.gov.co	Santiago Borrero Mutis sborrero@igac.gov.co	Director General
El Salvador (2)	Instituto Geográfico Nacional (IGN)/ Centro Nacional de Registros www.cnr.gob.sv	Roberto López Meyer Lawrence Velásquez Payés cnrinf@es.com.sv	Director General Executive Sub-Director
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COUNTRY (No)	INSTITUTION	REPRESENTATIVE	POSITION
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	National Imagery and Mapping Agency (NIMA) www.nima.mil	Robert H. Hughes hughesr@nima.mil	Chief, Americas Department
CERCO/ EUROGI (1) (Europe)	The National Mapping Agencies of Europe (CERCO) (www.ign.fr/cerco/cerco) European Umbrella Organisation for Geographical Information (EUROGI) (www.neonet.nl/eurogi)	Jarmo Ratia jarmo.ratia@nls.fi (Finland)	CERCO President & EUROGI Excom & Director General of National Land Survey of Finland
ICA (1)	International Cartographic Association (ICA) www.abdn.ac.uk/geo350/index	Michael Wood m.wood@abdn.ac.uk (United Kingdom)	ICA President
ISO (1)	International Organization for Standarization (ISO) www.iso.ch	Henry Tom Htom@us.oracle.com (USA)	ISO/TC 211 Geographic Infor- mation/Geomatics
ISPRS (1)	International Society for Photogrammetry and Remote Sensing (ISPRS) www.geod.ethz.ch/isprs	Lawrence W. Fritz Lawrence.W.Fritz@LMCo.com (USA)	ISPRS President
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BOOK REVIEW



ERROR PROPAGATION IN ENVIRONMENTAL MODELLING WITH GIS

Gerard B.M. Heuvelink (London, Taylor & Francis, 1998) [pp. 127],

Price £49.95 (hardback), ISBN 0-7484-0743-X (hardback), ISBN 0-7484-0744-8 (paperback).

This book is the first in a new series of 'Research Monographs in Geographical Information Science' to be published by Taylor & Francis. Edited by Peter Fisher and Jonathan Raper, the series aims to provide a refereed outlet for research works that are substantially longer than those normally accepted for journal publication. The series proposes to include not only single and multiple author monographs (perhaps based on PhD theses) but also collections of thematic papers.

As Michael Goodchild, of the University of California at Santa Barbara, notes in the preface, error propagation in GIS may seem to be a minor topic to the uninitiated but it is now proving to be of significance to GIS users who realise not only that there will always be some degree of uncertainty present in attempting to digitally represent the real world, but also that in the past they may often have falsely attributed far greater accuracy to visual representations of geographic data than were rightly deserved. As already happens in the traditional measurement sciences of surveying, geodesy and photogrammetry, the modelling of errors in GIS and a knowledge of how they propagate is proving to be of critical importance in assessing the integrity and validity of our geographic information outputs. In the relatively new area of GIS this topic was virtually unknown 15 years ago, but as researchers from other fields such as environmental science have come to use these systems for their everyday work, their continual scientific questioning of 'how good is the information?' has forced the spatial information research agenda to more fully embrace the issues of accuracy, error propagation and data quality in general.

The research presented here marks a decade of work by Gerard Heuvelink of the University of Amsterdam, and while it is substantially based upon his PhD thesis of the early 1990s the monograph has been updated to reflect the very latest research activities by both himself and other internationally-regarded scientists. The opening chapter introduces the research problem and begins with a discussion of the object and field approaches to representing geographic phenomena. Of particular to environmental scientists are the latter, in which the real world is repre-

sented by continuous fields of attribute data such as elevations, depths to bedrock and soil pollution concentrations. In other words, within fields there exists a value at all locations for the phenomena concerned (for example, it would be meaningless for a point on the Earth's surface not to have an elevation. However, as often happens we do not always possess continuous data for the area of interest to us and so, particularly in the case of environmental science, we must estimate the missing values for unknown areas. Apart from error in the actual data collected, the interpolation itself leads to further error, which in turn may be compounded by the many hundreds of computational and process models that can be applied to produce an output result.

Accordingly, Heuvelink's research is primarily concerned with attribute error and its subsequent propagation through GIS operations and spatial modelling to produce secondary quantities. For example, elevation data in the form of a Digital Elevation Model (DEM) may be processed to derive maps of slope gradient and aspect, which in turn can be combined with maps of soil type, fertility and moisture to give crop suitability maps for a region. Not only are geometric algorithms employed in the process but also empirical models - all of which contribute in one way or another to the level of error associated with the final quantitative output. Heuvelink's work has been driven by the fact that as an applied mathematician he possessed a natural desire to understand what confidence levels could be placed on such outputs, and how error at all stages in such a diverse range of procedures could be modelled from input to output. His approach to the problem is contained in the remaining chapters and is primarily based on geostatistics and stochastic simulation methods.

Chapter 2 is by its natural theoretical and provides the necessary statistical foundation for the basic model of attribute error developed by the author and its relationship to three fundamental models of spatial variation observed in natural phenomena, viz.: (1) discrete variation (such as found in soil, geological and vegetation maps where the variability between polygons is likely to be much greater than the variability within polygons); (2)

continuous variation (where variation is a function of distance between point locations and may or may not be directional); and (3) mixed variation (which is a combination of the two previous models). Attributes that satisfy the continuous and mixed variation models can be mapped using geostatistical interpolation, or kriging, and a concise but rigorous discussion on the subject is presented by the author at this point. The next chapter puts theory into practice and investigates the interpolation of water table point data for a polder area in The Netherlands. Each of the spatial variation models was used to test their relative effectiveness and maps were also produced to quantify the prediction error associated with the interpolation process in each case.

Chapter 4 investigates the theory of error propagation during local GIS processing operations, in which output map values are computed according to a given model depending on the values from one or more input maps at the same location or from nearby locations within a specified window. Four error propagation techniques are examined: the First and Second order Taylor methods; Rosenbluth's method; and Monte Carlo simulation. Chapter 5 examines several case studies which demonstrate how the error propagation theory is applied in practice. The first investigates the determination of soil pollution levels (due to the presence of heavy metals as a result of historic mining activity), which serve as input to a population health risk model. While two of the error propagation methods were able to yield the mean and standard deviation of the potential daily lead ingestion values throughout the study region, Monte Carlo simulation had the advantage of providing more useful probabilistic information about the output maps. The second study involves an error assessment of alternative algorithms for calculating slope gradient and aspect in a DEM. Commercial software often provides several different algorithms for carrying out these fundamental tasks and, while the code is usually not released due to commercial reasons, Monte Carlo simulation can prove useful in quantifying the variation in output due to elevation errors in the input DEM.

The next study involved error assessment of a land evaluation model used to calculate potential crop yields. Through the use of error propagation, the research demonstrated the ability to determine which potential error sources make the greatest contribution to the output map, which in turn permits an assessment to be made of the benefits that will accrue as a result of extra (and sometimes quite costly) field and/or laboratory data sampling being undertaken before the extra sampling is actually performed. The final study involves error analysis of a simple, but very common, routine for determining soil suitability for agricultural purposes. In the traditional Boolean approach used in GIS, soils are either suitable or unsuitable according to the particular model used, but this says nothing about the location of 'threshold' regions nor does it take into account the error involved in the actual soil sampling process itself. In this case a compar-

ison was made between the Boolean approach to the problem and the continuous classification method mentioned earlier. The findings showed that the rigid Boolean classification approach may well give unsatisfactory results and can raise the risk of making incorrect decisions.

Chapter 6 examines error propagation in the case of global operations (such as when DEMs and cost surfaces are employed for viewshed, watershed and optimal path tasks) in which the computed result at a given position depends on input values that are remote from that location. Often distributed, dynamic models are employed, such as in the case of determining catchment outlet flow which is affected by soil infiltration capacities throughout the entire catchment. To analyse the output error the author once more applied Monte Carlo simulation (with the inclusion this time of a spatial auto-correlation parameter) to perturb the input surface and hence derive a family of different, but equally probable, outputs for the task at hand. In Chapter 7 the author discusses the issues to be addressed in adding error propagation functionality to GIS, and describes the development of an error propagation software tool (ADAM) that was constructed during the research and used to run many of the applications cited in the book. While this latter work has been reported elsewhere in the literature and will not be dealt with further here, the author's conclusions surrounding the addition of error propagation tools to GIS are worth reporting. They are: (1) the error propagation tool should not replace the GIS; (2) the tool should be flexible; (3) the user interface should be efficient and allow for exploratory use of the tool; and (4) the tool should employ efficient computational routines to minimise the numerical load on the system.

In the closing chapter, the author addresses the key research issues raised at the beginning of the research and in doing so ably summarises the different models of spatial variation; which error propagation techniques are best suited to local and global processes; the advantages and disadvantages of each of the error propagation methods used; how each of the processes performs when applied to practical problems; how model errors might be incorporated in an error propagation analysis; and how the relative contributions of different error sources can be evaluated. In summary, Heuvelink's work makes an excellent contribution to the current body of knowledge on error propagation in GIS. The book is extremely well-written and researched, and I believe would be mandatory reading for researchers working in this field. The publishers are to be commended for their vision in initiating this research monograph series, and it marks a certain coming-of-age of spatial information science within the research community.

Gary J. Hunter, Department of Geomatics, University of Melbourne

15 June 1998



ISPRS EVENTS CALENDAR

1 September 1998 Version






Note: ISPRS Sponsored Events Are Highlighted

For monthly updates-visit the ISPRS HomePage www.geod.ethz.ch/isprs

Send Updates to: J. Heckman Fax: +1-610-354-6255

Email: Joanne.Heckman@LMCo.com

P = Telephone F = Facsimile E = E-mail tbr = to be resolved WG = Working Group

 1 9 9 8 			
DATE	EVENT	SITE	CONTACT
31 Aug- 2 Sep 98	Rural Advanced Technology & Transportation Systems 1998 International Conference www.cde.psu.edu/c&I/RATTS98	University Park, USA	Debbie Noyes P: +1-814-863-5120 E: ConferenceInfo@cde.psu.edu
tbr Sep 98	11 th World Clean Air Congress & Environmental Exposition "Interface between Developing and Developed Countries"	Durban, SOUTH AFRICA	Mrs. Ammie Wissing P&F: +27-12-460-170
1-4 Sep 98 Confirmed by Council	ISPRS Commission VII Symposium on "Resource and Environmental Monitoring" www.hegyi.com/isprsc7 	Budapest, HUNGARY	Dr. Gabor Remetey-Fulopp President ISPRS Commission VII P: +36-1-212-0056/F: 1-156-6581 E: gabor.remetey@f-m.x400gw.itb.hu
3-6 Sep 98	EUGISES '98 "GIS Education: A European Perspective"	Soesterberg, NETHERLANDS	Fred Toppen P: +31-30-25-33-887/F: 25-23-699 E: f.toppen@frw.ruu.nl
7-10 Sep 98	UN/ESA Symposium on "Economic Benefits of Using Space Technology Applications in Developing Countries"	Graz, AUSTRIA	UN/OOSA - N. Jasentuliyana P: +43-1-211-31-4951/F: 213-45-5830
7-10 Sep 98 Confirmed by Council	ISPRS Commission IV Symposium on "GIS - between Visions and Applications" www.ifp.uni-stuttgart.de/comm4/comm4_index.html 	Stuttgart, GERMANY	Prof. Dieter Fritsch (President Com IV) P: +49-711-121-3386/F: 121-3297 E: Dieter.Fritsch@ifp.uni-stuttgart.de
7-11 Sep 98	Early Warning Systems for the Reduction of Natural Disasters www.gfz-potsdam.de/ewc98/	Potsdam, GERMANY	GFZ Secretariat of LOC-EWC98 P: +49-331-288-1523/F: 288-1504 E: dwc98@gfz-potsdam.de
8-12 Sep 98	BIOS Europe 98 "European Biomedical Optics Week" www.spie.org/info/ebo/home.html	Stockholm, SWEDEN	BIOS Europe '98 P: +32-2-743-1573/F: 743-1550 E: didier@associationhq.com
9-11 Sep 98	24 th Annual Conference & Exhibition of the RSS "Developing International Connections" www.gre.ac.uk/~rss98	Chatham, UK	P: +44-181-331-9803/F: 331-9805 E: rss98@gre.ac.uk
11-13 Sep 98 Confirmed by Council	Joint Meeting - Council and Technical Commission Presidents 	Hirsau, GERMANY	Prof. J. Trinder (Secretary General) P +61-29-385-5308/F: 313-7493 E: j.trinder@unsw.edu.au
11-18 Sep 98 Confirmed by Council	IX Brazilian Remote Sensing Symposium with on the 13th Sep an ISPRS Working Group VI/1 Seminar on: "Education in Photogrammetry, Remote Sensing & GIS" 	Santos, BRAZIL	IX SBSR 98, INPE P: +55-12-345-6067/F: 345-6460 E: sbsr@itid.inpe.br Dr. Tania M. Sausen (Chair WG VI/1) P: +55-12-345-6862/F: 345-6870 E: tania@itid.inpe.br

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DATE	EVENT	SITE	CONTACT
14-17 Sep 98	1 st International Asia-Pacific Symposium on "Remote Sensing: Atmospheric, Environmental, and Space" www.spie.org/info/ae/	Beijing, CHINA	COEMA Secretariat P: +86-10-436-2211x490/F: 436 3226 E: coema@public2.bta.net.cn
15-18 Sep 98	Institute of Navigation GPS-98 Meeting & Exhibits	Nashville, USA	ION, Jennifer Murphy-Smith P: +1-703-683-7101/F: 683-7177 E: jmurphy@ion.org
21-23 Sep 98	The Executive Conference for Integrated Information Systems Conferencia Ejecutiva de Sistemas Integrados de Informacion www.cesii.com	Miami, USA	Cesii P: +1-303-604-2644/F: 494-4787 E: cesii@cesii.com
21-25 Sep 98	European Symposium on "Remote Sensing V"	Barcelona, SPAIN	SPIE E: pw98@spie.org
21-25 Sep 98	UN/OOSA Regional Meeting for Africa - UNISPACE III	Tunis, TUNISIA	Dr. A.A. Abiodun P: +43-1-211-31-4270/F: 213-45-5830 E: aabiodun@unov.un.or.at
21-25 Sep 98	Working Group Meetings & 7th Plenary Meeting of ISO/TC 211	Beijing, CHINA	ISO/TC 211 Secretariat P: + 47-22-59-67-16/F: 59-67-29 E: Bornhild.Saeteroy@nts.no
23-25 Sep 98	Intergeo '98 www.intergeo.de	Wiesbaden, GERMANY	P: +49-611-360-9988/F: 360-9977 E: intergeo98@metronet.de
25 Sep- 1 Oct 98	CAD CAM	Kortrijk, BELGIUM	CV De Hallen P: +32-56-204-000/F: 217-930
28-30 Sep 98	7 th Annual GIS for the Oil & Gas Industry Conference & Exhibition	Houston, USA	GITA P: +1-303-337-0513/F: 337-1001 E: amfmintl@aol.com
28 Sep- 1 Oct 98	Oceans 1998	Nice, FRANCE	Thomson Marconi Sonar P: +33-492-96-44-69/F: 96-39-25 E: g.bienvenue@ieee.org
30 Sep- 2 Oct 98	4 th Annual GIS Asia Pacific Conference & Exhibition	Bangkok, THAILAND	Stephen McFarland P: +65-4220-126/F: 65-323-4725 E: stephenm@pearson-pro.com.sg
tbr Oct 98	UN/OOSA Pre - UNISPACE III Regional Conference for Latin America and the Caribbean	Santiago, CHILE	Dr. A.A. Abiodun P: +43-1-211-31-4270/F: 213-45-5830 E: aabiodun@unov.un.or.at
1-2 Oct 98	GIS Tools for Effective Planning (GISDECO) www.up.ac.za/academic/gis/gisdeco.htm	Pretoria, SOUTH AFRICA	Dr. Pieter van Teeffelen E: gisdeco@frw.ruu.nl
4-7 Oct 98	ICIP 1998 International Conference on Image Processing http://mri.beckman.uiuc.edu/ICIP98/	Chicago, USA	Billene Mercer P: +1-409-693-6000/F: 693-6600 E: mercerc@conf-mgmt.com
4-9 Oct 98	"Sensing the World Around Us"	Baltimore, USA	Optical Society of America P: +1-202-223-8130



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DATE	EVENT	SITE	CONTACT
4-10 Oct 98	2 nd Regional Conference of the African Association of Remote Sensing of the Environment "Lessons of Experience and the Way Forward"	Abidjan, COTE D'IVOIRE	Conference Secretariat P: +225-22-35-30/F: 22-23-29 E: cigise@cntig.cntig.ci
5-7 Oct 98	5 th International Conference on Remote Sensing for Marine and Coastal Environments www.erim.-int.com/CONF/marine/MARINE.html	San Diego, USA	ERIM Marine Conferences P: +1-313-994-1200x3234/F: 994-5123 E: wallman@erim.org
5-9 Oct 98	IAG '98 Section II Symposium "Towards an Integrated Global Geodetic Observing System" http://dgfi2.dgfi.badw-muenchen.de/~iggos/	Munich, GERMANY	Prof. Dr. Reinhard Rummel P: +49-89-23031-107/F: 23031-240 E: mailer@dgfi.badw-muenchen.de
6-7 Oct 98	EO for GIS and Mapping - Street and Field Scale www.ceo.org/eventsop.html	Ispira, ITALY	Katri Isotalo P: +39-332-786286/F: 332-785461 E: katri.isotalo@jrc.it
6-8 Oct 98	1 st EARSeL Workshop on Imaging Spectroscopy	Zurich, SWITZERLAND	P: +33-1-45-5-673-60/F: 45-56-73-61 E: EARSEL@METEO.FR
13-15 Oct 98	Application Development Research Opportunity Final Symposium www.radsat.space.gc.ca/ENG/ADRO/Symposium/menu.html	Montreal, CANADA	Ken Link P: +1-450-926-4441/F: 926-4973 E: Ken.link@space.gc.ca
14-16 Oct 98	AIPR '98 "Advances in Computer Assisted Recognition"	Washington, DC USA	SPIE E: pw98@spie.org
15-16 Oct 98	5 th EOS (European Earth Observation System) Meeting: Data Access - from Archive to Real Time www.ceo.org/eventsop.html	Edinburgh, UK	Martin Shelley, BNSC P: +44-171-215-0780/F: 215-0804 E: Martin_Shelley@bnscc-hq.ccmil.compuserve.com
16-18 Oct 98	1 st International Health Geographics Conference	Baltimore, USA	P: +1-410-659-6149/F: 659-6266 E: okhan@jhucpp.org
20-21 Oct 98	EO for Resource Management - Regional and National Scale www.ceo.org/eventsop.html	Ispira, ITALY	Katri Isotalo P: +39-332-786286/F: 332-785461 E: katri.isotalo@jrc.it
20-23 Oct 98	SIBGRAP'98 1998 International Symposium on Computer Graphics, Image Processing and Vision	Rio de Janeiro, BRAZIL	Prof. Luciano da Fontoura Costa F: +55-162-71-3616 E: luciano@ultra3000.ifsc.sc.usp.br
20-24 Oct 98	"20th Asian Remote Sensing Conference" Asian Association of Remote Sensing (AARS)	Manila, PHILIPPINES	Prof. Shunji Mural F: +81-3-3479-2762 E: chiwa@shunji.iis.utokyo.ac.jp
21-23 Oct 98	Retrieval of Bio- & Geo-physical Parameters from SAR data for Land Applications www.estec.esa.nl/CONFANNOUN/98c07/	Noordwijk, NETHERLANDS	M. Borgeaud P: +31-71-565-4830/F: 565-4999 E: maurice@xe.estec.esa.nl
21-23 Oct 98	"ISMIP'98" International Symposium on Multispectral Image Processing http://prai.hust.edu.cn/ismip'98/	Wuhan, CHINA	Prof. Mingyue Ding P: +86-27-754-3476/F: 754-5438 E: myding@server20.hust.edu.cn

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DATE	EVENT	SITE	CONTACT
23-28 Oct 98	"1 st International Workshop on Computer Vision, Pattern Recognition and Image Processing" (CVPRIP'98) in 1998 Joint Conference On Information Sciences http://ubn.cs.usu.edu/Conferences/CVPRIP/	Research Triangle Park, USA	Paul P. Wang P: +1-919-660-5271/F: 660-5293 E: ppw@ee.duke.edu
26-29 Oct 98	Data Management & Modelling Using Remote Sensing & GIS for Tropical Forest Land Inventory	Jakarta, INDONESIA	Dr. Yves Laumonier P&F: +62-21-572-0211 E: fimp@dephut.cbn.net.id
28-31 Oct 98	IASTED International Conferences: a) Signal and Image Processing (SIP'98) b) 10 th International Conference on Parallel and Distributed Computing and Systems (PDCS'98) c) Software Engineering (SE'98) www.iasted.com	Las Vegas, USA	IASTED Secretariat, SIP'98 P: +1-714-778-3230/F: 714-778-5463 E: iasted@iasted.com
29 Oct-1 Nov 98	1 st International Conference on GIS Education - GISED '98	Ypsilanti, USA	John M. Morgan III P: +1-830-2964/F: 830-3888 E: jmorgan@towson.edu
1-6 Nov 98	Photonics East and Electronic Imaging International Exhibition	Boston, USA	SPIE P: +1-360-676-3290/F: 360-647-1445
8-12 Nov 98	GIS/LIS '98 (10-12 Nov), Workshops (8-9 Nov) Annual Conference and Exposition www.gislis.org/	Fort Worth, USA	ASPRS P: +1-301-493-0290/F: 493-0208 E: asprs@asprs.org
8-13 Nov 98	39th Australian Surveying Congress	Launceston, AUSTRALIA	P: +61-3-6340-2786
10 Nov 98	EO for Worldwide Monitoring - European to Global Scale www.ceo.org/eventsop.html	Ispira, ITALY	Katri Isotalo P: +39-332-786286/F: 332-785461 E: katri.isotalo@jrc.it
10-12 Nov 98	12 th CEOS Plenary "Changing Face of the Earth: An EO Treatise"	Bangalore, INDIA	Mukund Rao, ISRO P: +91-80-333-4358/F: 333-4229
11-13 Nov 98	GCOS/GOOS/CLIVAR Tropical Atmosphere Ocean (TAO) Array Implementation Panel, Seventh Meeting	Abidjan, COTE D'IVOIRE	Global Climate Observing System P: +41-22-730-8275/F: 22-740-1439 E: gcossjpo@gateway.wmo.ch
12-13 Nov 98	1 st National Remote Sensing Conference "Present and Potential Applications of Remote Sensing Technology in Zambia"	Lusaka, ZAMBIA	Paul Zambezi P: +260-1-252092/F: 252951 or 252089 E: dstmstvt@zamnet.zm
14-19 Nov 98	9th International Symposium on "Recent Crustal Movements"	Luxor, EGYPT	Prof.: Ali Tealeb F: +20-2-782683 E: gad @ Frcu.eun.eg
23-27 Nov 98	Information Access Conference www.w3c2.com.au/aurisa/aurisa98/confr.htm	Perth, AUSTRALIA	AURISA 98 conference F: +61-2-6257-3256 E: aurisa@ozemail.com.au
29 Nov-4 Dec 98	15 th Symposium on rural Livelihoods, Empowerment and the Environment (AFSRE in Africa)	Pretoria, SOUTH AFRICA	AFSR-E Symposium '98 P: +27-11-442-6111/F: 442-5927 E: cpjhb@jhb.lia.net

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DATE	EVENT	SITE	CONTACT
13-16 Dec 98 Confirmed by Council	Spatial Information Science and Technology (SIST '98) "Integration of RS, GPS and GIS and Its Applications in Sustainable Development" ISPRS	Wuhan, CHINA	Prof. Li Deren P: +86-27-788-1292/F: 786-5973 E: fao@wtusm.edu.cn
14-16 Dec 98	2 nd International Conference on Parallel & Distributed Computing & Networks www.iasted.com/	Brisbane, AUSTRALIA	Hong Shen, PDCN'98 Program Chair P: +1-714-778-3230/F: 714-778-5463 E: iasted@iasted.com
ISPRS 1 9 9 9 ISPRS			
DATE	EVENT	SITE	CONTACT
5-7 Jan 99	HYDRO 99 Information Management	Plymouth, UK	P: +44-1752-232410/F: 232406 E: hydro99@plymouth.ac.uk
23-29 Jan 99 Confirmed by Council "Note update"	Videometrics VI - Workshop of ISPRS WG V/3 & V/SIG on Animation (Videometrics VI is part of SPIE Photonics West) "Scene Modeling for Visualization and Virtual Reality" www.iitsg.nrc.ca/~elhakim/videomVI.html ISPRS	San Jose, USA	Dr. Sabry El-Hakim (Chair WG V/3) P: +1-613-991-6381/F: 613-952-0215 E: elhakim@iit.nrc.ca Dr. Armin Gruen (Chair V/SIWG) P: +41-1-633-3038/F: 633-1101 E: agruen@geod.ethz.ch
1-5 Feb 99 Confirmed by Council	Workshop of ISPRS Working Group VI/3 ISPRS	Cape Town, SOUTH AFRICA	Prof. Luigi Mussio (Chair WG VI/3) P: +39-2-2399-6501/F: 2399-6530 E: luigi@ipmtf2.topo.polimi.it
21-26 Feb 99 "NEW"	Medical Imaging www.spie.org/info/mi/	San Diego, USA	SPIE P: +1-360-676-3290/F: 647-1445
23-26 Feb 99 "NEW"	IUFRO International Symposium on Long-Term Observations & Research in Forestry	Catie, COSTA RICA	Christoph Klein P: +506-556-6431/F: 556-7954 E: longterm@catie.ac.cr
Date tbr Mar-May 99 "Note update" approval pending	ISPRS Commission VI Symposium - "Education and Communications" ISPRS	Bandung, Java, INDONESIA	Dr. Teuku Lukman Aziz President ISPRS Commission VI P: +62-22-250-1116/F: 250-1116 E: lukmanaz@indo.net.id
1-3 Mar 99 "Note update"	13 th International Conference and Workshops on Applied Geologic Remote Sensing "Practical Solutions for Real-World Problems" www.erim-int.com/CONF/GRS.html	Vancouver, CANADA	ERIM Geologic Conferences P: +1-313-994-1200x3234/F: 994-5123 E: wallman@erim-int.com
7-9 April 99 "NEW" Confirmed by Council	ISPRS Working Group II/6 Workshop on: "3D Geospatial Data Production: Meeting Application Requirements" www.cs.cmu.edu/~MAPSLab/isprs.html ISPRS	Paris, FRANCE	Dr. David McKeown (Chair WG II/6) P: +1-412-268-2626/F: 412-681-5576 E: dmm@cs.cmu.edu Dr. Olivier Jamet (Co-Chair WG II/6) P: +33-143-988-069/F: 143-988-581 E: jamet@houat.ign.fr
12-16 Apr 99 "NEW"	2 nd IAA Symposium on "Small Satellites for Earth Observation"	Berlin, GERMANY	Bernd Kirchner P: +49-30-67055-545/F: 67055-532 E: iaa.symp@dlr.de
21-23 Apr 99 Confirmed by Council "Note update"	ISPRS Working Group II/1 Workshop on: "Mobile Mapping Technology" http://shoreline.eng.ohio-state.edu/ron/wg2-1/index.html ISPRS	Bangkok, THAILAND	Dr. Rongzong Li (Chair WG II/1) P: +1-614-292-6946/F: 292-2957 E: li.282@osu.edu

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DATE	EVENT	SITE	CONTACT
3-6 May 99	International Intergraph Graphic User Group (IGUG) Conference 1999	Huntsville, USA	P: +1-201-943-5552/F: 943-0046 E: 74441.744@compuserve.com
17-21 May 99 "NEW"	Annual Conference of the American Society for Photogrammetry & Remote Sensing www.asprs-portland99.com	Portland, USA	Nancy Tubbs P: +1-301-493-0290/F: 493-0208
18-21 May 99	"Geotechnica '99" International Trade Fair for the Geosciences and GeoTechnology	Cologne, GERMANY	KolnMesse P: +49-221-821-0/F: 821-25-74
31 May-2 Jun 99 "NEW"	1999 EARSeL Symposium	Valladolid, SPAIN	P: +33-1-45-5-673-60/F: 45-56-73-61 E: EARSEL@METEO.FR
1-3 Jun 99 "Note update"	IUFRO Remote Sensing & Forest Monitoring Conference http://giswitch.sggw.waw.pl/rogow99/	Rowgow, POLAND	Arkadiusz Nowicki P: +48-22-490482/F: 22-491-375 E: rogow99@giswitch.sggw.waw.pl
3-4 Jun 99 "NEW" Confirmed by Council	Joint ISPRS/EARSeL Workshop on "Data Fusion" by ISPRS Working Groups III/5, IC IV/III.2, VII/4 and an EARSeL Working Group	Valladolid, SPAIN	Dr. DeLiang Wang (Chair WG III/5) P: +1-614-292-6827/F: 292-2911 E: dwang@cis.ohio-state.edu Dr. E Baltsavias (Chair IC WG IV/III.2) P: +41-1-633-3042/F: 633-1101 E: manos@geod.ethz.ch Prof. Barbara Koch (Chair WG VII/4) P: +49-761-203-3694/F: 203-3701 E: ferninfo@ruf.uni-freiburg.de
21-24 Jun 99	4 th International Airborne Remote Sensing Conference and Exhibition www.erim.org/CONF/conf.html	Ottawa, CANADA	ERIM Airborne Conferences P: +1-313-994-1200x3234/F: 994-5123 E: wallman@erim.org
23-25 Jun 99	IEEE Computer Society Conference on "Computer Vision & Pattern Recognition" www.cs.colostate.edu/~cvpr99	Fort Collins, USA	Bruce Draper E: draper@cs.colostate.edu
26 Jun-1 Jul 99 "NEW"	ICSU & UNESCO "World Science Conference"	Budapest, HUNGARY	P: +33-1-4525-0329/F: 1-4288-9431 E: icsu@lmcp.jussieu.fr
19-30 Jul 99	"UNISPACE III" Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space	Vienna, AUSTRIA	OOSA P: +43-1-21345-4945/F: 21345-5830 E: OOSA@unov.un.or.at
19-30 Jul 99	IUGG 22 nd General Assembly www.bham.ac.uk/IUGG99/	Birmingham, UK	IAG E: iag@gfy.ku.dk
14-21 Aug 99 "Note update"	Ottawa ICA 1999 "Touch the Past, Visualize the Future" www.ccrs.nrcan.gc.ca/ica1999/	Ottawa, CANADA	P: +1-613-992-9999/F: +995-8737 E: ica1999@ccrs.nrcan.gc.ca
Tbr Sep 99 approval pending	ISPRS WG IV/6 Workshop on "Global Databases Supporting Environmental Monitoring" www.ngdc.noaa.gov/seg/tools/gis/isprs46.html	tbr	Ryutaro Tateishi, Chair WG IV/6 P: +81-43-290-3850/F: 290-3857 E: tateishi@rsirc.cr.chiba-u.ac.jp David Hastings, Co-Chair WG IV/6 P: +1-303-497-6729/F: 497-6513 E: dhastings@ngdc.noaa.gov

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DATE	EVENT	SITE	CONTACT	
6-10 Sep 99 "NEW" Confirmed by Council	"Automatic Extraction of GIS Objects from Digital Imagery" ISPRS Conference by ISPRS Working Groups II/6, II/8, III/1, III/2, III/3, III/4 www.photo.verm.tu- muenchen.de/isprs/munich99	Munich, GERMANY	Conf. Secretariat ISPRS-Munich99 P: +49-89-2892-2671/F: 89-280-9573 E: isprs_conf99@photo.verm.tu-muenchen.de	
15-18 Sep 99	Institute of Navigation (ION) GPS-99 Meeting and Exhibits www.ion.org	Nashville, USA	Lisa Beaty P: +1-703-683-7101/F: 683-7105 E: lbeaty@ion.org	
19-24 Sep 99	47 th Photogrammetric Week	Stuttgart, GERMANY	Martina Kroma P: +49-711-121-3201/F: 121-3279 E: martina.kroma@ifp.uni-stuttgart.de	
19-24 Sep 99 "NEW"	XIX Brazilian Congress on Cartography	Recife, BRAZIL	Eng. Nei Erling P: +55-021-240-6901/F: 21-262-2823 E: sbccarto@fst.com.br	
26-30 Sep 99 "NEW"	26 th General Assembly of International Council of Scientific Unions	Cairo, EGYPT	P: +33-1-4525-0329/F: 1-4288-9431 E: icsu@lmcp.jussieu.fr	
27-30 Sep 99 "NEW" approval pen- ding	Joint Workshop of ISPRS Working Groups I/1, I/3, IV/4	Hannover, GERMANY	Dr. Karsten Jacobsen (Chair WG I/3) P: +49-511-762-2485/F: 762-2485 E: karsten@ipi.uni-hannover.de Dr. Manfred Schroeder (Chair WG I/1) Prof. G. Konecny (Chair WG IV/4)	
tbr Oct 99 "Note update" approval pen- ding	ISPRS Joint Meeting - Council and Technical Commission Presidents	Amsterdam, NETHERLANDS	Prof. J. Trinder (Secretary General) P +61-29-385-5308/F: 313-7493 E: j.trinder@unsw.edu.au	
3-6 Oct 99 "NEW" Confirmed by Council	XVIII CIPA Symposium on "Architectural & Archaeological Photogrammetry"	Olinda, BRAZIL	Prof. Camillo Jose Martins Gomes P&F: +55-21-542-3598 E: d6mgomes@epq.ime.eb.br	
10-15 Oct 99	FIG Commission 7 Annual Meeting & Symposium	Auckland, NEW ZEALAND	NZIS F: +64-4-471-1907	
25-27 Oct 99 "NEW"	2nd IASTED International Conference Computer Graphics & Imaging 1999 (CGIM '99) www.iasted.com/	Palm Springs, USA	IASTED Secretariat P: +1-714-778-3230/F: 714-778-5463 iasted@cadvision.com	
ISPRS 2 0 0 0				ISPRS
DATE	EVENT	SITE	CONTACT	
Jan 31- 4 Feb 2000 Confirmed by Council	Workshop of ISPRS Working Group VI/3	Ljubljana, SLOVENIA	Prof. Luigi Mussio (Chair WG VI/3) P: +39-2-2399-6501/F: 2399-6530 E: luigi@ipmtf2.topo.polimi.it	
Mar 2000 approval pen- ding	ISPRS Joint Meeting - Council and Technical Commission Presidents	tbr, HUNGARY	Prof. J. Trinder (Secretary General) P +61-29-385-5308/F: 313-7493 E: j.trinder@unsw.edu.au	

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DATE	EVENT	SITE	CONTACT	
Spring 2000 tbr approval pending	ISPRS Working Group III/3 Workshop www.photo.verm.tu-muenchen.de/isprs/wgIII3/wgIII3.html 	Los Angeles, USA	Dr. Ram Nevatia (Co-Chair WG III/3) P: +1-213-740-6428F: 740-7877 E: nevatia@iris.usc.edu	
14-26 Jul 2000 Confirmed by Council	XIX ISPRS Congress "Geo-Information for All" 	Amsterdam, NETHERLANDS	Prof. Klaas Jan Beek (Congress Director) P: +31-53-48724-214 /F: 4874-200 E: ISPRS@ITC.NL	
17-26 Sep 2000 "NEW"	KARST '2000 International Symposium & Field Seminar on "Present State and Future Trends of Karst Studies" www.karst.hun.edu.tr/	Marmaris, TURKEY	Prof. Gultekin Gunay P: +90-312-235-2543/F: 312-299-2136 E: karst@eti.cc.hun.edu.tr	
tbr August 2000 "NEW"	XXI st IUFRO World Congress	Kuala Lumpur, MALAYSIA	UFRO Secretariat P: +43-1-877-0151/F: 877-9355 E: iufro@forvie.ac.at	
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DATE	EVENT	SITE	CONTACT	
tbr 2002	International Geographical Union Regional Conference	tbr, SOUTH AFRICA	Prof. P. Hatting P: +27-12-420-2489/F: 420-3284 E: phatting@scientia.ac.za	

Call for Papers

Please submit a 250–500 word abstract by no later than November 20, 1998. Acceptance notifications will be sent during the month of December, 1998. Accepted camera-ready manuscripts will be due February 20, 1999. Abstracts should be sent to:

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For more information, please sent e-mail to either Professor Shunji Murai at murai@ait.ac.th or Dr. Ron Li at li.282@osu.edu. Or, Visit the website at <http://shoreline.eng.ohio-state.edu/wg2-1/index.html>



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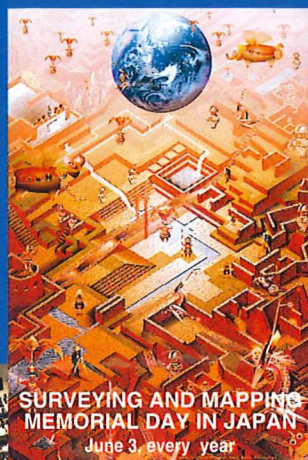
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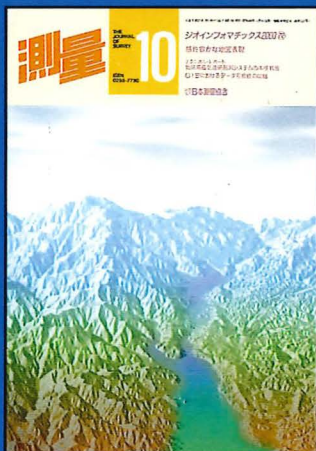


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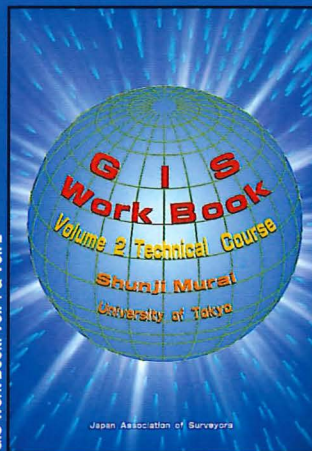
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