

TECHNICAL COMMISSION IV - "MAPPING AND GEOGRAPHIC INFORMATION SYSTEMS"

Dieter Fritsch, Commission IV President
Monika Sester, Technical Secretary
Markus Englich, Administrative Secretary
(FEDERAL REPUBLIC OF GERMANY)

All information about Technical Commission IV can be accessed online on the Web viewing the homepage 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"

Martien Molenaar (Chairman)

YC Lee (Co-chairman)

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 is slow because many data revision processes are handled in kinematic mode, which means, data epochs are collected, updated, and compared with each other. There should be more research into 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 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 should be rigorously integrated, 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, which is important for data revision processes. Further work will show how the current very time consuming algorithms 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 has not resulted in clear visions of data aggregation. Hence, further work is being prepared which starts with a more general object definition than have the classical cartographic investigations of the past. The next two years will show, whether or not this problem can be solved.

The GIS and database industries have made available the Geo-SQL, which 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 will concentrate much more in the near future on small steps for the improvement of GIS products.

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

Emanuel Baltsavias (Chairman),

Michael Hahn (Co-chairman)

Dirk Stallmann (Secretary)

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

One aspect of this forward-looking area 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 has been recognized for some time, but work on how to exploit this information within image analysis has started only 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 about 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, such as 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 makes 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 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% of the features, leaving the remaining part to be done by interactive local extraction with little operator assistance, but with tools such as 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 in its early stages.

Among the topographic objects under investigation, 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 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 promising, and further breakthroughs in this direction are to be expected. In the more traditional image-based approach, there is a tendency to use multiple views, 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 a 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% of features, 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 level of 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 analyses were presented at the workshop. Moreover, a lack of good and clear methodologies is noted. 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. 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 about 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.

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

Lutz Pluemer (Chairman) and Max Egenhofer

The Working Group is active within the ISO Technical Committee TC/211 by the active participation of the Co-Chairman. It is important to note that ISPRS has detailed knowledge especially within TC IV to enable it to make a 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 in 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.

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

Roy Welch, Chairman)

Klaus Tempfli (Co-chairman

Marguerite Remillard (Secretary)

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 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.

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

Jun Chen (Chairman) and Fabio Crosilla (Co-chairman)

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 making them accessible to users is another key issue in designing and implementing GIS projects. Such temporal GISs are also required for analyzing changes to spatial information over time. The following issues have 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 using the Voronoi approach, propagation of updates in multi-scale geographic databases by analysis of geographic changes, progressive and adaptive recursive approach to GIS-based spatio-temporal analysis.

The usual polygon-based GIS data structures are insufficient for supporting dynamic local modification of spatial databases and interactive simulation of real process. Kinematics and 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, and 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 August 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

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"

Gottfried Konecny (Chairman) and Donald L. Light (Co-chairman)

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" made 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 resolution 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 months 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.

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

Jan-Peter Muller (Chairman)

Randy Kirk (Co-chairman)

Karl Mitchell (Secretary)

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"

Ryutaro Tateishi (Chairman)

David Hastings (Co-chairman)

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. 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' ½ 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. David 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/Work-shop 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 Chairs 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 is 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 thematics 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 its 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 TC IV Secretariat decided to award **DM 2.000,-** for excellent papers prepared by Young Authors (not older than 35 years). Funds will be available for honoring 5 young authors.

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 well. The MGM (Mapping and GIS Monthly) is a good media for informing the responsible scientists on actual and important news.
