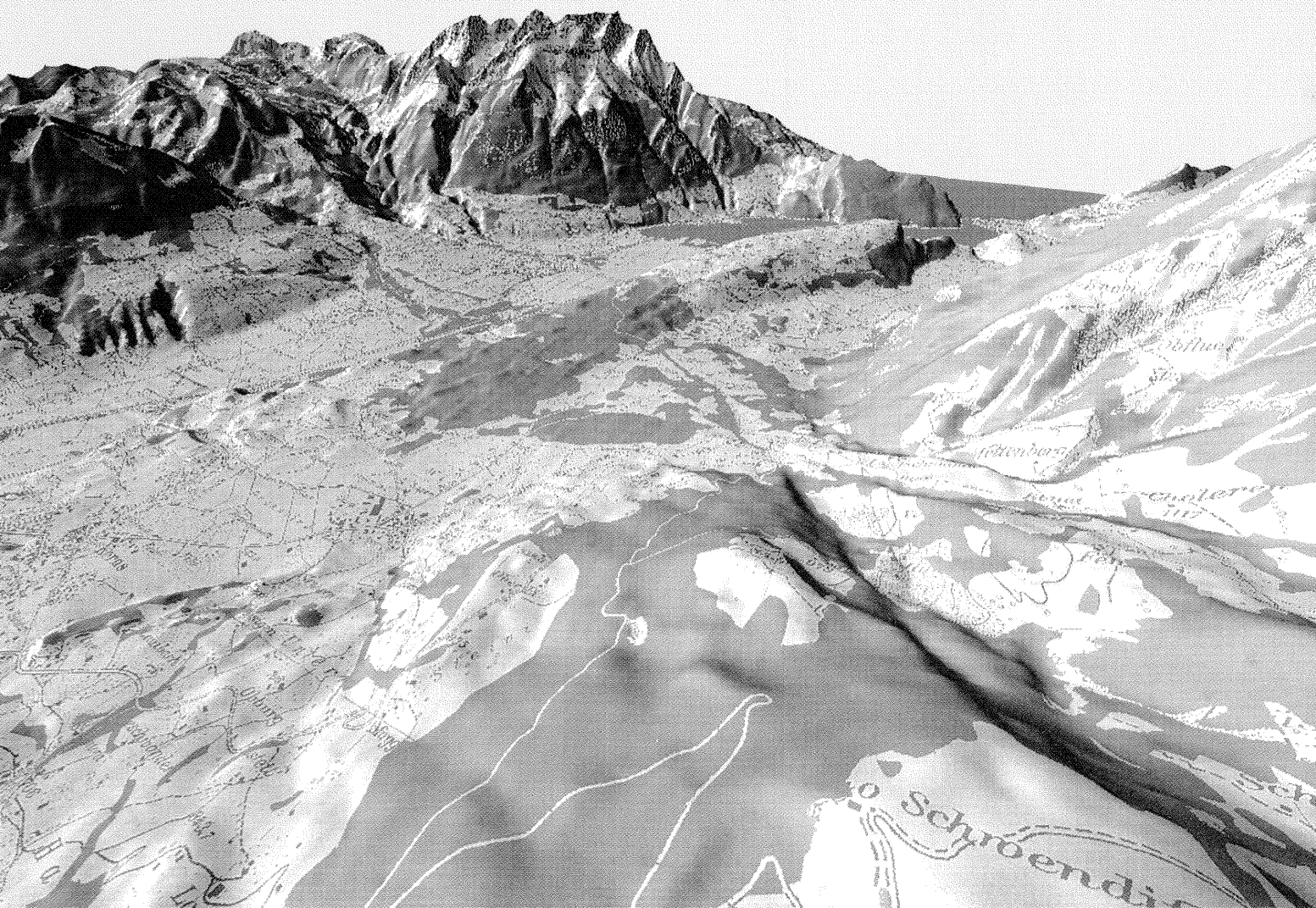


ANNUAL REPORT • 1994



INTERNATIONAL SOCIETY FOR PHOTOGRAMMETRY AND REMOTE SENSING
INTERNATIONALE GESELLSCHAFT FÜR PHOTOGRAMMETRIE UND FERNERKUNDUNG
SOCIETE INTERNATIONALE DE PHOTOGRAMMETRIE ET DE TELEDETECTION



1994 Annual Report
of the
International Society for Photogrammetry and Remote Sensing



"1994 Progress and Activities in Photogrammetry and Remote Sensing"

Table of Contents

Introduction	1
President's Message	2
Technical Commission Reports	3
• Commission I - "Sensors, Platforms and Imagery"	3
• Commission II - "Systems for Data Processing, Analysis and Representation"	11
• Commission III - "Theory and Algorithms"	22
• Commission IV - "Mapping and Geographic Information Systems (GIS)"	28
• Commission V - "Close-Range Techniques and Machine Vision"	35
• Commission VI - "Economics, Professional Matters and Education"	41
• Commission VII - "Resource and Environmental Monitoring"	47
The XVIII ISPRS Congress "Spatial Information from Images"	53
Regional Member Activities	57
• AARS	57
• EARSeL	58
Intersociety Activities	61
• CIPA	61
• IUSM	62
ISPRS Publications	63
• <i>The International Archives of Photogrammetry and Remote Sensing</i>	63
• <i>ISPRS Journal of Photogrammetry and Remote Sensing</i>	64
ISPRS Awards and State of Affairs	65
ISPRS Events Calendar - 1995	67

MEMBERS OF ISPRS

Ordinary Members

Albania - Albanian Society of Geodesy, Cartography and Photogrammetry
Algeria - Institut National de Cartographie
Argentina - Asociacion Argentina de Fotogrametria y Ciencias Afines (AAFyCA)
Australia - Remote Sensing and Photogrammetry Association of Australasia Ltd
Austria - Österreichische Gesellschaft für Vermessung und Geoinformation
Azerbaijan - Ministry of High Education Regional Center of International Education Program AZINPO
Belarus - Ministry of Architecture and Construction
Belgium - Société Belge de Photogrammétrie, de Télédétection et de Cartographie
Bolivia - Instituto Geografico Militar y de Catastro Nacional
Bophuthatswana - National Centre for GIS and Analysis
Brazil - Sociedade Brasileira de Cartografia (SBC)
Brunei Darussalam - Survey Department Ministry of Development
Bulgaria - Union of Surveyors and Land Managers in Bulgaria
Burkina Faso - Institut Geographique
Canada - Canadian Institute of Geomatics (CIG)
Chile - Sociedad Chilena de Fotogrametria y Percepcion Remota
China - Chinese Society of Geodesy, Photogrammetry and Cartography
China-Taipei - Chinese Taipei Society of Photogrammetry and Remote Sensing
Colombia - Sociedad Colombiana de Percepcion Remota y Sistemas de Informacion Geografica
Congo, Popular Republic - Direction of Cadaster and Topography
Côte d'Ivoire - Comité National de Télédétection et d'Informations Géographiques (CNTIG)
Cuba - Instituto Cubano de Geodesia y Cartografia
Cyprus - Cyprus Photogrammetric & Cartographic Association
Czech & Slovak Republics - Society for Photogrammetry and and Remote Sensing
Denmark - Danish Society for Photogrammetry and Surveying
Egypt - Egyptian Committee for Surveying and Mapping
Estonia - University of Tartu, Dept. of Geophysics
Ethiopia - Ethiopian Mapping Authority
Finland - Finnish Society of Photogrammetry and Remote Sensing
France - Société Française de Photogrammétrie et Télédétection (SFPT)
Germany - Deutsche Gesellschaft für Photogrammetrie und Fernerkundung
Greece - Greek Society of Photogrammetry
Hong Kong - Hong Kong Institute of Surveyors
Hungary - Hungarian Society of Surveying, Mapping and Remote Sensing
India - Indian Society of Remote Sensing (ISRS)
Indonesia - Indonesian Association of Surveyors (ISI)
Iran - National Cartographic Centre (NCC)
Iraq - State Commission on Survey
Ireland - Irish Society of Surveying, Photogrammetry and Remote Sensing
Israel - Photogrammetric Society of Israel
Italy - Societa Italiana di Fotogrammetria e Topografia (SIFET)
Japan - Japan Society of Photogrammetry and Remote Sensing
Jordan - Royal Jordanian Geographic Center (RJGC)
Kenya - The Kenya National Committee for Photogrammetry and Remote Sensing
Korea - National Geography Institute
Kuwait - Directorate of Survey Department, Kuwait Municipality
Latvia - Latvian Society of Geodesy & Photogrammetry
Libya - Department of Surveying, Secretariat of Planning and Economics
Lithuania - The Lithuanian Committee for Photogrammetry and Remote Sensing

Madagascar - Association de Photogrammetrie et Télédétection
Malawi - The Department of Surveys, Office of the President and Cabinet
Malaysia - Directorate of National Mapping, Department of Survey and Mapping
Mexico - Sociedad Mexicana de Fotogrametria, Fotointerpretacion y Geodesia
Mongolia - Mongolian National Society for Photogrammetry and Remote Sensing
Morocco - La Direction de la Conservation Foncière du Cadastre et de la Cartographie (DCFCC)
Myanmar - Myanmar Survey Department
Nepal - Nepal Remote Sensing and Photogrammetric Society
Netherlands - Netherlands Federation for Earth Observation and Geo-Information
Norway - The Norwegian Association for Cartography, Geodesy, Hydrography and Photogrammetry
New Zealand - Department of Survey and Land Information
Nigeria - Nigerian Society for Photogrammetry and Remote Sensing
Pakistan - Survey of Pakistan
Peru - Direccion General de Aerofotografia
Philippines - Philippine Society of Photogrammetry
Poland - Polish Society for Photogrammetry and Remote Sensing
Portugal - Associacao Portuguesa de Fotogrammetria e Deteccao Remota
Qatar - Centre for Geographic Information Systems
Romania - Romanian Society of Photogrammetry and Remote Sensing
Russian - National Committee of Russia
Saudi Arabia - Military Survey Department
Slovenia - Ministry for Environment Protection and Regional Planning
South Africa - The South African Photogrammetry and Geo-Information Society (SAPGIS)
Spain - Spanish Society of Cartography, Photogrammetry and Remote Sensing
Sri Lanka - Survey Department of Sri Lanka
Sudan - Sudan Society of Photogrammetry
Suriname - Central Bureau for Aerial Mapping
Sweden - The Swedish Society for Photogrammetry and Remote Sensing
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Syria - General Establishment of Surveying
Tanzania - Survey and Mapping Division, Ministry of Lands, Housing & Urban Development
Thailand - The Royal Thai Survey Department, Supreme Command Headquarters
Tunisia - Office de la Topographie et de la Cartographie, Surveying and Mapping Authority
Turkey - Turkish National Society of Photogrammetry and Remote Sensing
Ukraine - Ternopil Pedagogical Institute, Ministry of High Education
United Arab Emirates - Remote Sensing Center
United Kingdom - United Kingdom National Committee for Photogrammetry and Remote Sensing
United States - American Society for Photogrammetry and Remote Sensing
Uruguay - Servicio Geografico Militar
Venezuela - Sociedad Venezolana de Fotogrametria Percepcion Remota and Cartografia
Vietnam - Institute of Geography, National Centre for Natural Science and Technology of Vietnam
Yugoslavia - Union of Geodetic Engineering and Surveying of Yugoslavia
Zaire - Agence Nationale de Meterologie et de Télédétection par Satellite (METTELSAT)
Zambia - The Surveyors Institute of Zambia
Zimbabwe - Zimbabwe Society for Photogrammetry, Remote Sensing and Cartography

Regional Members

AARS - Asian Association on Remote Sensing
AARSE - African Association of Remote Sensing of the Environment
EARSeL - European Association of Remote Sensing Laboratories
OACT - Organisation Africaine de Cartographie et Télédétection
OEEPE - Organisation Européenne d'Etudes Photogrammetriques Expérimentales
SELPER - Sociedad de Especialistas Latinoamericanos en Percepcion Remota

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Cover Photograph: shows a perspective 3-D view of a part of a scanned topographic map 1:25000 draped over the DTM of the Swiss mountain Pilatus and its surroundings. Visual effects are enhanced by the use of a shading model. This controls the geometric and optical characteristics of the light source and the optical characteristics of the surface. The 3-D view was generated by the visualisation package *RaVis*, developed by Marc Zanini at the Institute of Geodesy and Photogrammetry, ETH, Zurich.

Scanned map ("pixelmap") and DTM courtesy of Landestopographie Bern, Switzerland.

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INTRODUCTION

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The **1994 ISPRS Annual Report** has been prepared and published to meet several ISPRS objectives:

- Promote international cooperation, coordination and advancement of photogrammetry, remote sensing, geographic information systems (GIS) and related sciences.
- Provide timely information on the state of the art research and development to all interested parties.
- Improve communication of ISPRS objectives and activities to ISPRS Member organizations and to other scientific organizations and international forums such as the United Nations.
- Fulfill reporting requirements of Commissions and Working Groups as prescribed in the ISPRS Bylaws and Guidelines.

The activities of ISPRS during 1994 were highlighted by the seven ISPRS Technical Commission Symposia which were held in Melbourne, Australia; Athens, USA; Ottawa, Canada; Munich, Germany; Como, Italy; Rio de Janeiro, Brazil; and Beijing, China. Each of these Symposia was superbly organized and presented timely information on the advancements being made in the profession. In addition to a current review of the State of the Science and Technology for each subject area, this 1994 ISPRS Annual Report contains many summaries of the scientific and technologic papers and discussions presented at the Symposia. The ISPRS Commission Presidents organized the Symposia with close collaboration and coordination of their Working Group Chairpersons. We are very appreciative of their efforts and their insights into the state of the science and technology which they have presented to the readers of this Report.

The Proceedings from each of the seven 1994 Commission Symposia and the Part A Proceedings of the 1992 ISPRS Congress are now available from RICS Books (Coventry, UK) the official source of ISPRS publications listed as the *International Archives of Photogrammetry and Remote Sensing*. See page 63 herein for further details. Summary reports on Events sponsored by ISPRS are published in the *ISPRS Journal of Photogrammetry and Remote Sensing* which is issued six times annually.

ISPRS scientific and technical activities are conducted by 47 Working Groups working under the direction of seven Technical Commissions. Each of the Commissions and Working Groups are guided by 'Terms of Reference' which define their area of responsibility. The Terms of Reference of the Commissions as established at the 1992 ISPRS General Assembly for the 1992-1996 term precede each Commission Report. The Terms of Reference of all Working Groups with the addresses and communication numbers of their officers are available in the ISPRS Silver Book "*ISPRS Organization and Programs 1992-1996*." Plans for 1995 and future activities are contained herein. Persons interested in participating in scientific activities of a Commission are invited to contact the office of the Commission President, whose communication numbers are listed on the facing page (vi).

ISPRS is pleased to welcome to our regional membership the new African Association of Remote Sensing of the Environment and the many new Sustaining Members who help support our endeavors. On behalf of ISPRS Council, I encourage your comments to help us strive to inform you of the activities of our professions. We hope that the information contained herein is of value to you. Please feel free to make copies for further distribution.

PRESIDENT'S MESSAGE

Dr. Shunji Murai, President of ISPRS

1994 was the half-way point towards 1996 Vienna Congress. I am honored to report that all mid-term symposia of seven technical commissions were held with great success in each responsible member country .

Three council members; the President, Secretary General and Congress Director participated in all symposia, while other Council members joined most symposia. Several extra council meetings were convened as well as Technical Commissions Board Meetings during these mid-term symposia. At the final symposium, that is Commission VI symposium held in Beijing, China in October, 1994, a joint meeting with Technical Commission Presidents and Council Members was held: to review activities of the past two years of Technical Commissions; to review the scientific and organizational results of the mid-term symposia; and to allocate technical sessions at the Vienna Congress with respect to Technical Commissions and Working Groups.

Council meetings held in Beijing in October, 1994 also reviewed all ISPRS activities for the past two years and planned the basic strategies towards 1996 Vienna Congress and the General Assembly. Summaries of above meetings are as follows:

- a. Several Working Groups were deactivated due to no activity for the past two years.
- b. Reports of Ad-hoc Committees on ISPRS official journal and on E-mail were submitted to the Council by Prof. Gottfried Konecny and Prof. John Fryer, respectively. The Council decided the strategy to be reported to the General Assembly at Vienna Congress in 1996, as described in this Annual Report.
- c. All arrangements for the Vienna Congress were detailed, discussed and agreed to by the Council and Technical Commission Presidents, as explained in this report by Congress Director Kraus.
- d. Basic but important means to expand ISPRS activity by increasing participation with more remote sensing and GIS scientists was discussed intensively even though a consensus was not yet obtained.

This discussion involves the future direction and identity of ISPRS with respect to membership, name of the society, core specialty, restructuring of technical commissions etc. which will result in amendment of Statutes and Bylaws. I am not ready to report the conclusion of discussion as more is needed, but I would like to continue to review and evaluate the present and future of ISPRS.

e. The Council tried and is trying to encourage all Working Groups to be always "really working" but not sleeping. We cannot sleep because advanced technologies with respect to the relevant specialties are now under drastic change and hard competition with other related societies. To become the Center of Excellence in quality and quantity is only a way to survive for the next generation.

f. The Council is trying not only to improve communications between ISPRS Members and the Council but also to provide the members with more information to improve the overall quality of the Society. The "Annual Report" which the Secretary General initiated in 1993, is a result of the Council's policy.

g. The Council is trying to make our Society more "internationally open". Out of 94 ISPRS Ordinary Members, about 70 percent are from developing countries or reformed countries including former USSR countries.

Those members sometimes have some difficulties joining ISPRS activities mainly because of financial problems. The Council as well as Technical Commission Presidents should always think of those countries and give them more opportunity to join the ISPRS activities on regional and international basis.

Collaborations with ISPRS regional members, for example OEEPE, EARSeL, AARS, and SELPER as well as the United Nations Organizations, for example, ESCAP, Outer Space Affairs, COSPAR, FAO, UNEP, GRID, etc. provide good opportunities for developing countries to share experiences and expertise with developed countries.

Young Author's Award which was initiated at the Washington Congress in 1992 by sponsorship of the Japan Society and the Dolezal Award to be presented by the Austrian Society at the Vienna Congress in 1996 are efforts to open the ISPRS Congress to outstanding scientists from developing countries.

On this occasion, I thank all authors of the Annual Report '94 for their contribution and I request ISPRS members as well as the recipients of the report to support ISPRS activity as well as above mentioned policies. 1994 was a mid-way towards 1996 Vienna Congress. I am honored to report to you that all mid-term symposia of seven technical commissions were held in each responsible member country with great success.

TECHNICAL COMMISSION I

"SENSORS, PLATFORMS AND IMAGERY"

Dr. Luigi Mussio, Commission I President
Gianfranco Forlani, Commission I Secretary
(ITALY)

TERMS OF REFERENCE

- Planning for aerial and space missions.
- Design, construction, testing, installation and calibration of analogue and digital imaging sensors.
- Design and performance of data reception and preprocessing systems.
- Geometric and radiometric properties of image data and quality standards and factors (environmental and others) affecting data quality.
- Technical systems for recording sensor data, film scanners and auxiliary data (time, position, attitude, etc.) and media (film, magnetic, optical, etc.).
- Preprocessing techniques to generate datasets suitable for analysis and measurements (radar image synthesis, multisensor integration, radiometric and geometric corrections, etc).

STATE OF SCIENCE AND TECHNOLOGY OF COMMISSION I TOPICS

Image quality parameters need to be specified to meet the characteristics of digital imagery and to exploit the performance of image analysis techniques, particularly focussing on image compression and optimal pixel size for digitization.

Integrated positioning and navigation systems based on GPS and INS are now almost operational in photogrammetry. Their use combined with laser scanners, though limited to low altitude flights, show great potential in urban mapping and forested areas, with accuracies around 15 cm.

There is growing interest in three-line cameras, with important projects under development and simulations already in advanced stage, both for airborne and spaceborne imagery. At present, this is likely to be the most promising digital sensor for mapping: though large format sensors are now on the market, digital aerial cameras are in fact not yet available.

SAR interferometry has a great potential for DTM generation (accuracies up to a few meters) and even more for change monitoring (terrain motions at the cm level have been noticed and independently confirmed). Improvements in the processing of difficult areas are expected by combination of ascending and descending passes and by tandem satellite missions. Integration with optical sensors should be studied to improve the reliability of the system.

Use of scanners to digitize analogue images is being investigated in cooperation with OEEPE. Initial tests show the suitability of DTP scanners for photogrammetric application, after appropriate calibration. Discussions are still open on test patterns and procedures to fix standards.

ACCOMPLISHMENTS OF COMMISSION I DURING 1994

• *Joint Meeting in Lausanne (Switzerland)*

WG I/5 and its corresponding WG within OEEPE had a Joint Meeting on the "Analysis of Photo-scanners" at the beginning of last February in Lausanne, Switzerland. The meeting was a full success and both WG's decided to establish their cooperation and to join again in a Meeting during the mid-term Commission I Symposium.

• *Cassini Day*

The Technical University of Milan honored Prof. Gino Cassini on occasion of the 30th anniversary of his death, with a half-day Gino Cassini Memorial Meeting. Prof. Gino Cassini was teacher of Applied Mathematics, Geodesy and Photogrammetry at the University of Pisa and the TU of Milan, from twenties to sixties. In Milan he was also the Rector of the TU and the Mayor of the city.

Regarding the ISPRS he served as President of the Society in the period 1934-38; Congress Director for the 5th ISP(RS) Congress held 29 Sep. - 7 Oct. 1938 in Rome, Italy; and President of the Commissions II, V, IV, III (according to the current names and numeration) in the period 1926-30, 1938-48, 1948-52, 1952-56, respectively. Furthermore he was bestowed the position of ISPRS Honorary Member and the ISPRS honored

him, during the meeting, by means of a message from the President Prof. Shunji Murai and a memoir of the Secretary General Dr. Larry Fritz.

The Meeting hosted the contributions of Italian geodesists and photogrammetrists, among which the President of Commission I gave a lecture on Applied Mathematics, Geodesy and Related Sciences. In this frame the history of the Survey and Mapping at the TU of Milan, with special attention to Statistics and Numerical Methods, from the 18th century up to now was reviewed.

The Meeting had a participation of about 80 people, among which Professors, Assistants and Students of the TU of Milan and scientists coming from other universities and research centers.

• *Mid-term Commission I Symposium*

The mid-term Symposium was held on September 12-16, 1994 in Como, Italy. The event took place at Villa Olmo, an old villa with a nice garden placed on the lakeshore, surrounded by hills and mountains, that is the seat of the Centro A. Volta which provided, under a special agreement with the TU of Milan, the local organization.

Since this Symposium followed immediately the mid-term Symposium of ISPRS Commission III, the staffs of both Commissions maintained close contacts, to spread and coordinate the information about the two Symposia. The scheduling was run according to the following time table:

Sep 93	-1st Circular and Call for Papers
Jan 94	-Deadline for Abstracts -Pre-registration
Mar 94	-Notification of Acceptance to Authors -Information about Tutorials -Registration & Accommodation Forms
May 94	-Deadline for Complete Manuscripts -Early Registration
Jul 94	-2nd Circular with Preliminary Program

The Symposium was opened by Prof. Carlo Monti, President of the Italian Society of Surveying and Photogrammetry; furthermore Prof. J. Trinder, the unique past President of Commission I attending the Symposium, presented an "Outline of ISPRS Commission I". A Special Session of the Symposium hosted a Joint Meeting of OEEPE-ISPRS on "Quality Analysis of Photo-Scanners", chaired by Prof. O. Koelbl.

The first day Tutorials on "Acquisition, Characterization and Archiving of Digital Imagery" and on "Microwave Sensors, Calibration and Data Processing", organized

with the contributions of Commission III and the Italian Association of Remote Sensing respectively, were scheduled. The remaining days the Symposium on "Primary Data Acquisition and Evaluation" continued with nine technical sessions, three special sessions and one poster session.

The Tutorials, Technical, Special and Poster Sessions covered all topics of the Commission, its WG's and the Cooperating WG's. The topics were addressed by 45 invited or presented papers.

Most of the papers presented are included in the volume 30 part 1 of the *International Archives of Photogrammetry and Remote Sensing*. A second volume will continue the Proceedings of the Symposium containing the final program, the "compte-rendu", the WG reports and the list of participants in the Symposium, and some late papers.

The list of sessions, reordered from the Symposium schedule according to the WG involved, is as follows:

- WG I/1
 - Digital Image Quality
 - Photogrammetric Image Quality
 - Quality Control and Restoration of Grid Data
- WG's I/1, II/1, III/1
 - GPS, INS and Laser Profile, and their role in Photogrammetry and Remote Sensing
 - Multi-sensors Orientation and Positioning
- WG's I/3, V/2, IC WG V/III
 - Spaceborne Sensors
 - Airborne Sensors
 - Close-range Sensors
- WG I/4
 - Microwave Sensors, Calibration and Data Processing
- WG I/5 and OEEPE WG
 - Hardcopy Scanning
 - Quality Analysis of Photo-scanners
 - Acquisition, Characterization and Archiving of Digital Imagery
- WG I/6
 - Remote Sensing Data Evaluation and Archiving
- WG III/4
 - Items in Mathematical Photogrammetry

The Symposium had a participation of 82 people, of which only 14 from Italy, and 19 foreign countries were represented, while 33 people attended the Tutorials.

• *EUROPTO Series in Rome, Italy*

The President of Commission I supplied scientific contributions to the preparation of the "Conference on Image and Signal Processing for Remote Sensing", within the "International Symposium on Satellite and

Remote Sensing", organized by EUROPTO and SPIE, which was held at the end of September in Rome, Italy.

- *E-mail*

On behalf of ISPRS Council, the Co-Chairman of the "Ad-hoc Committee on E-mail Service in ISPRS" promoted the creation of an archive of e-mail addresses to be used for communication within ISPRS. Therefore with the approval of John Fryer (the Chairman of this Committee) an e-mail message was sent to ISPRS officials, to verify the effectiveness of the system; about 60% of the people replied.

COMMISSION I NEWS

- *Activities within ISPRS*

The President attended the mid-term Symposia of ISPRS Commissions II, III, IV and VI, while the Secretary attended the mid-term Symposia of Commissions III and V. The Commission I staff sincerely apologized with Brazilian colleagues to be unable to attend the mid-term Symposium of Commission VII, due to the closeness of the two Symposia and the beginning of the semester in the TU Milan.

- *Minor activities*

The Commission I staff promoted and satisfied several contacts with different parts of the ISPRS and some sister societies, taking into account both scientific and organizational aspects.

Thus the Chairman of the OEEPE WG on the Analysis of Photo-Scanners Prof. O. Koelbl gave a lecture last April in Milan on "Evaluation of Scanner Performance", while the 2nd Vice-President of ISPRS Prof. A. Gruen has been invited next May in Milan, to give a lecture on "New Developments in Videogrammetry".

Furthermore the President of Commission I gave last September in Saint-Vincent, Italy, at the Italian Society of Surveying and Photogrammetry Congress, a lecture on the "Modern Trend in Digital Photogrammetry", while the Secretary has been invited next March in Ascona, Switzerland, to give a lecture on "Optimal Filtering, Cluster Analysis and Graph Theory for Feature Extraction".

Last but not least the President, on behalf of Dr. W.-D. Schuh, Co-Chairman of WG I/1, established contacts with Prof. E. Ronchetti of Geneva University, an expert in Robust Statistics, in order to bring into this WG new topics useful to combine suitably theory and practice.

- *Further activities*

Technical Commission I will have a 2nd Workshop on "Multimedia GIS Data" in June 1995 in Udine, Italy, where the WG III/4 will offer a Tutorial on "Spatial Data Analysis: Theory and Algorithms".

More activities are scheduled or foreseen for the WGs:

- WGs I/3, V/2 and Inter-Commission WG V/III will have a Joint Meeting on "Digital Imaging Sensors and Systems", in March 1995 in Zurich, Switzerland;
- WG I/1 will organize in April 1995 in Dessau, Germany a Workshop on "Data Quality Control".
- WG I/4 will have a Meeting on "Recent Advances in Signal Evaluation" on occasion of the IUGG General Assembly, in July 1995 in Boulder, Colorado, USA;
- WG's I/2 and II/1 will attend as cooperating WGs the WG III/1 Conference, in September 1995 in Barcelona, Spain.

GENERAL COMMENTS CONCERNING COMMISSION I WORK AND COMMENTS ON ISPRS BUSINESS

- *General Objectives*

In the last decade the nature of the primary data has strongly changed. Platforms on board of satellites, new sensors, the different roles of geodesy and cartography have opened new horizons and shown new directions to scientists and engineers. Indeed the contribution of the GPS, INS and laser profile, the imagery from SPOT, SAR (with special regard to its interferometric use), three line cameras, CCD sensors and scanners, the role of GIS have changed not only the nature of the primary data, but also the methodologies to acquire and evaluate them. The further developments of these techniques and methodologies are very important for the advance in photogrammetry, remote sensing and related sciences, as much for the research as for the applications.

The Commission activities should combine suitably the longstanding experiences and the results coming from the application of new techniques and methodologies to acquire and evaluate primary data. The aim is to bring together experts from various disciplines; therefore scientists, engineers and users in the fields of photogrammetry, remote sensing, geodesy, electronics and computer science coming from universities, research institutes, governmental organizations, industries and engineering firms are kindly invited to participate in Commission I activities.

- *Commission and WG's activities*

All WGs were heavily engaged in the mid-term

Symposium, which provided the most important occasion to meet and to verify their activities. Although a final judgement should be done in Vienna, a preliminary positive judgement for the Commission and all WGs may be formulated.

During this Symposium a Commission Business Meeting was held to plan future activities, especially for participation of Commission I and its WGs in the Vienna Congress. Commission Business Meetings are scheduled, after the Como Meeting, during the Udine Workshop and before the Vienna Congress. An additional comment can be done at the end of the mid-term Symposia season, remarking that this season increased participation in Commission I and offered many occasions to exchange important experiences by means of the Cooperating WGs.

WORKING GROUP ACTIVITIES DURING REPORT PERIOD

WG I/1 - "Image Data Quality Control Assessment and Standardization"

by Chairman: Dr. Hartmut Ziemann (Germany)
Co-Chairman: Wolf-Dieter Schuh (Austria)
Secretary: Anders Boberg (Sweden)

State of Science and Technology of WG I/1 Topics

• *Digital image quality measures*

Image quality of non-isoplanatic CCD-area array sensors has been evaluated, using different image processing algorithms. Quality criteria are based on statistical evaluation of the image processing result, using quantity of information as concept. As quantity of information, an expression for Effective Modulation Transfer Function for non-isoplanatic systems with discrete data registration is used. This quantity is shown to depend on different autocorrelation functions and upon the point spread function of the imaging optical system. It can be used for choice of optimal geometric parameters of the CCD array.

Restoration of optical objects in discrete image data with the use of linear algorithms has been investigated, facilitating the practical use in comparison to Wiener filtering. Using known autocorrelations of object and noise, the error of restoration may be minimized. The influence of discretization in the digitizing process has been investigated.

Noise in CCD-cameras has been investigated for the developed WAOSS (Wide Angle Optoelectronic Stereo) three-line Scanner, but of general interest. Noise properties are shown to be more dependent upon the

design of the camera, especially the focal plane, than upon the CCD array and the electronics. Testing was performed using dark current analysis with original data as well as with filtered data. An analysis of periodic processes showed a clear systematic disturbance, especially after restructuring of data. Corrections were calculated and introduced, resulting in significant improvements.

Radiometric effects of image data compression and decompression was investigated for the WAOSS scanner and also for the HRSC (High Resolution Stereo Camera), both developed for planetary probes. Data compression was based upon the JPEG standard, but the result was also depending upon the data preprocessing, including corrections for response non-uniformity and light intensity fall-off. The efficiency of data compression was especially of faults of pixel. Visual estimation of theoretical and natural scenes were used for assessing the effect of different compression/decompression factors.

• *Photographic image quality measures*

Outside of Helsinki, a permanent test field for aerial image quality has been established, using different kinds of gravel to create grey step wedges, resolution bars and edges for edge gradient analysis. The test field is useful for image scales between 1:2,000 and 1:100,000 covering essentially all normally used flying heights and camera focal lengths. The bar lengths are 1-6 m, the widths 3-150 cm. Results of test flights will be shown.

Beyond investigation of geometric image parameters related to ground control points for aerial block triangulation, image resolution for natural objects of different size, form and contrast has been investigated. Optimization of the photographic process has been studied, as well as design of ground test targets for MTF determination. Existing specifications of aerial photography has been examined in order to suggest photographic specifications for aerial data products. Thus, minimum density above base plus fog in tropical countries is recommended to be raised to 0.4 because of climatic conditions.

A digital system for MTF derivation by Edge Gradient Analysis (EGA) has been developed. It is based upon a solid state camera mounted on a microscope. Software has been developed for data collection of density profiles, for data reduction in the form of unification of several density profile tracks, and for cutting of line spread function (LSF) tails. The degree of smoothing and the differentiation process is controlled by an Expert System routine, checking the asymmetry of the derived LSFs. Expert System support is planned also for interpretation of data reduction

results, in order to facilitate the practical use of MTF analysis.

In order to avoid subjective moments in edge gradient analysis for MTF determination, a technique using a synthetic edge function has been investigated. The synthetic edge is created by convolving a step function with variable contrast and amount of adjacency effect with a line spread function of variable width. The synthetic edge is adjusted to the measured edge trace and the subsequent MTF generation by derivation and Fourier analysis is performed on the synthetic edge. As the method presupposes photographic linearity, this property including adjacency effects was specifically investigated. It was shown, that the complete photographic process including copying is linear in transparency under certain conditions.

• *Standardization activities*

Lately, the role of ISPRS has been strengthened concerning standardization activities. As a consequence, active liaison has been or is being established with several Technical Committees of ISO, the International Organization for Standardization. These Technical Committees refer to Photography, Optics and Optical Instrumentation, and to Aircraft and Space Vehicles. The liaisons have resulted in invitations to meetings and in receipt of information of different kinds.

Accomplishments of WG I/1 During 1994

In two circular letters, the WG has solicited for contributions in the form of reviews of and experiences with image quality measures in accordance with the first term of reference. As starting point we suggested the impulse response function in the form of a point or line spread function or its equivalent, for photographic and CCD as well as for microwave imagery. As first guide, three "abstracts" were distributed, concerning image quality parameters for photographic cameras and images, for digitally recording image systems and for SAR images, respectively. The response of the circular letters was satisfactory, except concerning SAR imagery.

The second and third terms of reference, concerning establishment of contacts, has resulted in an active liaison with ISO TC172 "Optics and Optical Instruments". The fourth term, finally, concerning Recommended Procedures and Specifications, is being handled during the next two-year period.

WG I/1 has close contacts with WG I/5, "Hardcopy Scanning and Preprocessing Systems" because of mutual interest in the programs. H. Ziemann gave an invited paper in the WG I/5 session at the ISPRS Commission I Symposium in Como, entitled "On the Digitization of

Photographic Images". H. Ziemann and A. Boberg gave comments to the proposed actions of the OEEPE WG on Analysis of Image Scanners in 1993.

WG I/1 News

• 26-28 April 1995

A workshop has been planned in Dessau, Germany. The topics addressed will be standardization concerning image quality and image digitizing.

WG I/2 - "System Aspects of Platform Guidance, Navigation and Sensor Positioning"

by Chairman: Dr. Petros Patias (Greece)

Co-Chairman: Jesus Otero (Spain)

WG Members: 21

State of Science and Technology of WG I/2 Topics

At the Commission I Workshop on "Digital Sensors and Systems" in Trento, June 21-25, 1993 there was a special session on "Sensor Positioning and Navigation" where papers from Patias, Manzoni (Cefalo, Cina and Pinto) and Colomina were presented. These papers were mainly concerning the experiences of actual use of GPS in Photogrammetry. The problems of integration of GPS measurements in aerial triangulation was the main concern. In addition, a study has been presented on the current status of the GPS and INS data on the orientation of the image for orthophoto production. Other relevant (in a general sense to the subject) works have been reported concerning Kalman Filtering Techniques (Mussio et al.) and Combined Sensor Systems (Kilian and Schade).

Papers on GPS use in Photogrammetry appeared in the *Photogrammetric Record* (issues Aug. and Nov. 1992), in *PE&RS* (issue Jan. 1993) and in *Professional Surveyor* and *GPS World*. Also there are the proceedings of the "Vehicle Navigation and Information Systems Conference" and the proceedings of the "Photogrammetric Week-1993", where 4 papers (Arnold et. al., Schade, Becker, Blankenberg et. al.) have been presented.

At the Commission I Symposium two technical sessions with a total of six papers were planned. The research interests ranged from GPS/INS/Digital Photogrammetric sensors integration; to systems calibration and quality control; to flight missions guidance; to terrestrial applications.

The sensor orientation problem attracts a special attention of the scientific community in regard to its

algorithmic aspects as well as to the systems component. Thus we see a total of 5 presentations and 17 posters participating at the Commission III mid-Congress Symposium, Munich, Germany.

Regarding the state of the science and technology in WG I/2 topics we can conclude that:

- The GPS supported aerial triangulation is pretty much operational and practical experiences are reported.
- GPS/INS data augmentation of the photogrammetric procedures (orientation with partial or complete elimination of ground control) is researched.
- There are many successful examples of integration of GPS/INS/Digital Sensors.
- Special attention is given to new technological advances in INS technology, so that its lower cost could benefit Photogrammetry.
- Lower cost systems (such as AHRS) are successfully integrated with GPS for applications such as flight mission navigation.
- Much research has been done concerning other (than photogrammetric cameras) sensors.
- Alternatives are sought for computing the sensor attitude without the need of gyro systems. The approach of Line Photogrammetry may offer this alternative.
- All the research is towards elimination of dependance on field work and easy integration to GIS technology.

Accomplishments of WG I/2 During 1994

January 1994

Distribution of material regarding the Commission I mid-term Symposium, Como, Italy; abstracts were sought.

June 1994

Because of the multidisciplinary nature of the subject, discussion carried out during 1993 with WG III/1 (Integrated Sensor Orientation) and WG II/1 (Real-time Mapping Technologies) and other interested organizations, on the possibility of organizing a Joint Workshop on "Integrated Sensor Orientation: Theory, Algorithms, and Systems". The status of the discussion is as follows:

- The Workshop will be hosted in Barcelona, Spain, September 3-9, in conjunction with the 17th ICA Conference.
- The co-organizers (up to now) are: ISPRS WG I/2, ISPRS WG III/1, and IAG SSG 1.105.
- Other organizations, as well as individuals, are being invited to participate and a publisher is sought for publication of the proceedings.

- Discussions are continuing with IAG and FIG officials for both participation and supporting the meeting as an official IUSM meeting.

September 1994

Active participation in Commission I Symposium on "Primary Data Acquisition and Evaluation", Como, Italy. Organization of two technical sessions on WG I/2 topics.

October 1994

Circular Letter distributed. Report on presented research at the Commission I Symposium. Evaluation of current status of WG I/2 topics.

WG I/2 News

- 3-9 September 1995

Joint Workshop on: "Integrated Sensor Orientation: Theory, Algorithms and Systems" to be held in Barcelona, Spain.

WG I/3 - "Optical Digital Imaging Systems"

by Chairman: Hans-Gerd Maas (Switzerland)

Co-Chairman: Battista Benciolini (Italy)

WG Members: 40

State of Science and Technology of WG I/3 Topics

3-line CCD cameras were a very important topic among the WG I/3 related contributions at the Commission I Symposium in Como. They have been tested successfully on space missions and several new cameras will be installed in satellites to be launched soon. The use of 3-line cameras in airplanes is also under development and large format area CCD sensors have meanwhile reached a status, where their application for aerial imaging becomes interesting at least for special tasks. In addition, several new CCD cameras with medium and high resolution have come onto the market, which seem to be very interesting for researchers and practitioners in digital close range photogrammetry:

Accomplishments of WG I/3 During 1994

- During the ISPRS Commission V Symposium in Melbourne, Australia, it was decided to organize a joint workshop of ISPRS WGs WG I/3 "Optical Digital Imaging Systems", WG V/2 "Close-Range Imaging Systems and their Performance" (Chairs H. Beyer & V. Uffenkamp) and IC WG V/III "Image Sequence Analysis" (Chairs E. Baltsavias & H. Baker). The workshop will be held at ETH Hoenggerberg in Zurich, Switzerland, March 22-24, 1995 under the title "From

"Pixels to Sequences - Sensors, Algorithms and Systems". The first announcement has been mailed to all WG members and other interested persons and institutions; furthermore, copies of the announcement have been distributed at several ISPRS symposia and other events, and the workshop has been announced via Internet.

- The WG I/3 second circular letter has been distributed, including an announcement of the Como Symposium.

- WG I/3 had four technical sessions during the Commission I Symposium in Como, 12-16 Sep 1994.

WG I/3 News

- Information about the workshop in Zurich can also be obtained via World-Wide-Web (WWW-page: http://www.p.igp.ethz.ch/p02/events/isprs_workshop.html). We would like to get an estimate on how many members can access WWW and ask you to give us a message if you successfully access the page.

WG I/4 - "Microwave Imaging Sensors and Preprocessing"

by Chairman: Dr. John C. Curlander (USA)
Co-Chairman: Prof. Claudio Prati (Italy)

State of Science and Technology of WG I/4 Topics

- After the spectacular results obtained using ERS-1 interferometry for the estimation of small terrain motions (e.g. Landers earthquake, Nice landslide, ice flow in Antarctica) and the promising results on the estimation of the elevation of the terrain (DEM), several experiments showing the limits of the technique have been presented. Temporal decorrelation and weather effects seem to be the main problems to be solved in order to pass to an operational phase.

- The availability of both ascending and descending interferometric data has been shown to be necessary to generate DEMs of mountainous areas.

- After the positive preliminary results obtained at JPL and DLR from the last two SIR-C/X-SAR missions, interferometric SAR data with high temporal correlation are expected from the forthcoming (Jan. 1995) mission of ERS-1 and ERS-2 in tandem (1 day repeat interval). Experiments with ERS-1//ERS-2 tandem data will probably show how soon satellite SAR interferometry will move into its operational phase.

- Several airborne interferometric SAR systems have shown their capability to generate DEMs with an

elevation accuracy of 1-2 meters due to the high interferogram correlation. They are closer to the operational phase than satellite systems.

- The anechoic chamber of the European Microwave Signature Laboratory (EMSL) at JRC has been exploited for validating 3-D SAR reconstruction techniques. Further tests will be conducted with ERS tandem data.

Accomplishments of WG I/4 During 1994

Prof. C. Prati and Dr. G. Schreier gave a two-hour seminar on SAR interferometry techniques and applications at the one day Tutorial on "Microwave Sensors, Calibration and Data Processing" held in Como, Italy on September 12, 1994.

Prof. C. Prati also gave a presentation at the one day workshop on "Remote Sensing and GIS in the management of Environmental Resources" held at the University of Trento on October 27, 1994.

WG I/4 News

• 17-18 July 1995

A joint workshop has been planned with WG I/6 in Boulder, Colorado, USA. The second day will be dedicated to WG I/4 topics. The meeting will be held at one of the local hotels, probably the Boulderado, but it is far too early to make any arrangements.

WG I/5 - "Hardcopy Scanning & Preprocessing Systems"

by Chairman: Dr. Ralf Bill (Germany)
Co-Chairman: Alessandro Carosio (Switzerland)

State of Science and Technology of WG I/5 Topics

The scanner test is ready to go. Seven test patterns will be scanned at different resolution and with different specifications. The test patterns are:

- a grid plate on glass (21cm by 21cm)
- a grey wedge from Kodak
- a color table from Kodak
- a Fresnel pattern
- a black and white image
- a panatomic image
- a color image

For testing purposes the test plates were scanned by Baltsavias (Zurich). Some of his comments and experiences are used to improve the whole test. The variety of test patterns should allow to derive quality measures for geometric accuracy, radiometric resolution, color separation, irregular patterns in the image, the

modulation transfer function and other parameters. The suppliers of scanners to be asked for scanning the material are Zeiss, Intergraph, Vexcel, Wehrli, Agfa, DBA and others.

Accomplishments of WG I/5 During 1994

- Joint workshop of OEEPE WG on "Analysis of Photo Scanners" together with OEEPE, Lausanne, Switzerland, February 7-8, 1994. A detailed report was sent to the ISPRS Council and to all members of the WG. This workshop was dedicated to define the goals for the work of the joint WG. What should be analyzed? How are the procedures looking to do this analysis? Which quality parameters should be derived? Vendors were invited to give a presentation on their products and their test procedures. The workshop had a very good atmosphere between vendors, practitioners and researchers.

- First Specialist Meeting on "Multimedia and GIS", Rostock, Germany, 26-29 May 1994. A detailed report was sent to the ISPRS Council and to all members of the WG. This workshop tried to identify what is a multimedia GIS. A lot of prototypes were presented and different approaches discussed. The workshop offered a good opportunity to discuss with other scientific disciplines especially from planning and mapping business.

- ISPRS Commission I Symposium, Como, Italy, 12-16 September 1994. At the symposium R. Bill gave a lecture on "Scanning of Hardcopy Images: Achievements and Limitations" as part of the tutorial on "Acquisition, Characterization and Archiving of Digital Imagery". There were about 30 international participants.

WG I/5 organized two sessions at the Commission I Symposium; one was dedicated to the quality analysis of photo scanners. It was a joint session with the OEEPE WG dealing with this topic. The invited paper was given by Ziemann on the physical background of digitization of photographic images. The second invited paper was a survey on scanner technology, the requirements, the products and the photogrammetric requirements. This paper was given by Baltasvias and was a joint paper with the WG Chairman R. Bill. A further paper by Seywald et al. was dealing with the requirements and the test procedures for photogrammetric scanners. Koelbl presented results of

his quality tests with different scanners. The second session was again dominated by the topic 'scanner'. Baltasvias reported about his ideas on the test and calibration methods. Many of these ideas were tested on the Agfa Horizon scanner, which was the theme of his second contribution to this session. Nebiker and Carosio gave a contribution on the post processing of scanned data. In this case topographic maps were scanned and objects were automatically extracted and structured.

Both sessions, dominated by this scanner topic, summarized the state of the art. They gave a good collection of ideas on how to test scanners. In addition the joint WG of OEEPE and ISPRS WG I/5 had a short meeting to discuss the further procedure.

WG I/5 News

Together with the OEEPE Group on the 'Analysis of Photo Scanners' the WG I/5 will start a scanner test in the beginning of 1995. Questionnaires and test material are prepared. Around ten suppliers of photogrammetric scanners will be asked to participate in this test. Three to four university teams will evaluate the results of the test. Hopefully first results will be available in Summer 1995. A workshop on the results of this test is planned for the end of 1995 again at Lausanne University.

WG I/6 - "Preprocessing and Archiving of Satellite Data for Remote Sensing"

by Chairman: Dan Rosenholm (Sweden)

Secretary: Dan Klang (Sweden)

WG I/6 News

(Submitted by Gianfranco Forlani)

The WG I/6 suffered a period of low activity that started after Trento Workshop, on occasion of the retirement of its Chairman. Nevertheless, by an action of the Commission I Secretary, the WG had a special session on "Remote Sensing Data Evaluation and Archiving" during the Commission I Symposium, in which some experts stressed a lot the problems about space photogrammetry, high resolution sensors and scientific and commercial involvements. The positive impression created by the panel discussion promoted a new staff for the WG, that will start its activities in 1995.

TECHNICAL COMMISSION II

"SYSTEMS FOR DATA PROCESSING, ANALYSIS AND PRESENTATION"

Dr. Mosaad Allam, Commission II President

Gordon Plunkett, Commission II Secretary

Jeff Labonte, Commission II Co-Secretary

(CANADA)

TERMS OF REFERENCE

- Design and development of integrated systems for measurement, processing, analysis, representation, and storage of photogrammetric, remote sensing and GIS data
- Study and evaluation of system integration aspects for photogrammetry, remote sensing and GIS data processing
- Analysis of systems and their components for automated, semi-automated and manual digital processing systems
- Development of systems and technologies for radar data processing
- Study of real-time mapping technologies
- Standardization of digital systems for photogrammetry, remote sensing and GIS

STATE OF SCIENCE AND TECHNOLOGY OF COMMISSION II TOPICS

A review of the systems aspect for the processing of geographic data reveals that the progress in this area has been primarily driven by advances in technology. These advances come from the fields of photogrammetry, remote sensing, surveying, and mapping. In particular, progress in computer science, and the major acceptance of geographic information systems (GIS) as a unifying technology are challenging the "separation of disciplines". Consequently, the shift toward integrated systems for processing of geoinformation is driven by advances in hardware, software and networking.

Further, such technological advances are causing a major impact in which photogrammetric, image processing and GIS functions are integrated and applied to real world problems. The trend is toward the developing integrated systems capable of performing

multiple tasks. Although these systems can operate as stand alone workstations, the networking of many of them in a heterogeneous environment is becoming a reality.

Technological advances in integrated systems may be measured in terms of advances in the related technologies of GIS, satellite remote sensing, photogrammetry, GPS, and information technology (multimedia, visualization, DBMS and networking). More emphasis is placed on digital photogrammetry, image processing, integrated systems, and real-time mapping systems. In the transition from analytical to digital photogrammetry, traditional photogrammetric instruments are becoming obsolete. Over the past several years, photogrammetric knowledge has gone into software instead of hardware. There is a growing need for end to end systems, and these are increasingly being assembled with standard off-the-shelf components in order to facilitate software portability across different hardware platforms.

Future advances in systems for data processing, analysis, representation and communication will be measured by the degree of integration. Since the power of the new workstations can be realized only if they can communicate with multiple databases, the development of a spatial information infrastructure for interoperability becomes paramount.

Where once there was a clear division between the various systems and software for geographic information processing, we are seeing the boundaries more and more blurred. In the past, dedicated image processing systems were used to extract information from satellite images and photogrammetric systems to do the same from aerial photos. These data were then transferred to a GIS for analysis or to a separate cartographic system for map output. This is no longer the case.

Systems dedicated to special solutions are becoming obsolete, and the trend is toward the deployment of integrated systems capable of performing multiple solutions. Image processing systems, such as those from PCI and ERDAS offer the capability to perform some

geographic analysis and orthoimage production. On the other hand, system's GISs such as CARIS or ARC/INFO, offer image processing capability and hardcopy output, as do digital photogrammetric systems, such as those from Intergraph, Vexcel or Zeiss.

***Note: names of specific copyrighted products or companies are for illustration purposes only.*

• *Data Users/Producers*

An equally important force behind computer developments has come from producers and users of geographic information. Data producers aim to keep national mapping programs to date, and reply to requests for sale of the digital information from their clients. On the other hand, users are interested in digital, continuous, edgematched and geometrically consistent datasets. Beside datasets derived from the topographic, cadastral and thematic maps, users demand specialized products such as digital orthoimages, cartographic raster data and geometrically corrected satellite images as backdrop for their GISs.

The most important factor in the equation of vendors, data producers and users has become the user. Users have acquired GIS and have begun to realize the power and benefit of data integration and analysis for decision making. Also, they have found that most datasets created by many government, utility and private agencies are available. Although data become more readily available, users, producers and vendors have begun to deal with problems of data integration, data formats, data structures and data communication.

The development of integrated photogrammetric/remote sensing workstations with GIS capabilities have opened the door for their integration with other GISs. Since these systems were developed by multiple vendors on different platforms, the communication between systems via a heterogeneous network has posed many questions. For example: Where are the major repositories of information? How can diverse data formats be integrated with different GIS databases? And, how can the user access, display, select and retrieve the information they need from other geographic information databases?

ACCOMPLISHMENTS OF COMMISSION II DURING 1994

• *Commission II Technical Symposium*

ISPRS Commission II held its Technical Symposium in Ottawa, Canada from June 6 - 10, 1994 in conjunction with the Sixth Canadian Conference on GIS. Under the

theme "a Shared Vision", the joint meeting provided an excellent opportunity to benefit from an expanded program. The Commission II Symposium/GIS'94 Conference was attended by 1,039 paid registrants, representing 30 different countries.

Commission II Symposium activities began on June 4 and 5 with the offer of 10 workshops. Eighty persons attended workshops which ranged in subject from "Mobile Data Collection for GIS" (presented by WG II/1 executives) to "Integrated Methodologies for Environmental Impact Assessment using GIS and Remote Sensing."

The ISPRS Symposium/GIS'94 technical programs were separate and extended over a five-day period. The ISPRS program was comprised of 23 sessions (15 concurrent, 5 plenary, and 3 poster). Ninety papers were presented in the ISPRS Commission II program and are published in the 530 page *Volume XXX, Part 2* of the *International Archives of Photogrammetry and Remote Sensing* which may be purchased through RICS Books in the U.K. for £28.00.

The exhibit area covered over 2,600 square meters, and contained 56 exhibitor booths. All the major GIS, photogrammetric, GPS, remote sensing, and related companies - as well as most of the innovative up-and-coming firms - were included in the 47 organizations that displayed their latest software, hardware and services.

A full and exciting accompanying persons program was offered, and included: city tours, visits to local museums and sites of interest. Social activities began on the opening day with a icebreaker party, and continued for the balance of the week. The highlight activity was the evening boat cruise and dinner along the historic Rideau Canal.

During the Symposium, Commission II held a Board Meeting on Wednesday, June 8, 1994. The meeting assembled the attending ISPRS Council and most Commission II WG executives, attendees are as follows:

ISPRS Council: Shunji Murai, Lawrence Fritz, Karl Kraus, and John Trinder

TCPs: Luigi Mussio - Commission I,
Mosaad Allam - Commission II,
Heinrich Ebner - Commission III,
Li Deren - Commission VI,
Roberto Pereira da Cunha - Comm VII

Commission II: Gordon Plunkett, Jeff Labonte
WG Chairs: Kurt Novak, Manfred Ehlers, Robert O'Neil, Atef Elassal, Ian Dowman, Klaus Szangolies

WG Co-Chairs: Michael Hahn, Nickolas Faust, Mostafa Radwan

WG Secretaries: Holger Schade, David Steiner

The meeting provided an opportunity for ISPRS Council share their respective areas of interest with Commission II. Shunji Murai, ISPRS President, briefed the group on upcoming ISPRS activities, including potential restructuring of Commissions to eliminate duplication. Larry Fritz, ISPRS Secretary General, outlined TCP requirements for *1994 ISPRS Annual Report* submissions, and requested updated changes in addresses, organizations, and titles for the *Blue* and *Silver ISPRS Books*. Karl Kraus, Congress Director, provided a presentation of plans for the 1996 Vienna Congress.

• *Commission II Archives*

Proceedings of the Commission II Symposium in Ottawa were shipped to RICS Books in the United Kingdom during August of 1994.

• *Preparation of a Paper for United Nations*

On behalf of ISPRS, Mosaad Allam, President of Commission II, prepared an invited paper for the "13th United Nations Regional Cartographic Conference for Asia and Pacific" in Beijing, China from May 9 -18, 1994. The paper highlighted the latest developments and trends related to data processing, analysis and representation and their application to the needs of Asia and Pacific. The paper was presented within the digital databases, geographical and land information systems theme of the Conference.

• *ISPRS Journal*

Commission II has continued activities with the *ISPRS Journal of Photogrammetry and Remote Sensing*. In responding to a request from David Tait, Editor *ISPRS Journal*, Commission II has proposed two special theme issues for publication. The first theme issue will be dedicated to the subject of Real Time Mapping technologies, and the second on Applications of Radar Data. Both themes were selected based on a poll of Commission II WG executives, conducted in early 1994.

• *ISPRS 1996 Congress Workshops*

Commission II has proposed three workshops for the ISPRS 1996 Vienna Congress. The proposed sessions are as follows: (1) a full day workshop entitled "Integration and Orientation of Sensor Systems" by WG II/1, (2) a half day workshop entitled "RADARSAT: What's it all about" by WG II/4, and (3) a full day workshop entitled "Technology for Handling Large Volumes of Spatial Data" by WG II/3.

• *ISPRS Joint Meeting of Council and Technical Commission Presidents*

Commission II President Mosaad Allam attended the ISPRS Joint Meeting of Council and Technical Commission Presidents in Beijing, China during 9-10 October 1994. He presented Commission II's proposal for sessions at the ISPRS 1996 Vienna Congress. Commission II also presented a summary of its Symposium and Board Meeting and reviewed the proposed Commission II and WG meetings for 1995.

COMMISSION II NEWS

• *Technical Session and Activities for 1996 Vienna Congress*

At the Joint Meeting in Beijing, China, Commission II was allocated 11 technical sessions, 4 poster sessions, 1 joint Commission I/II/III session and 6 exhibitor's showcase sessions. Commission II is eagerly preparing for these activities and will confirm the titles of the sessions following complete input from WG executives. Plans to arrange for papers and speakers will follow, with input from respective WGs and Commission II representatives.

• *Meetings*

Commission II plans to meet twice during the 1995 period, twice in North America and once in Europe. The first Commission II business meeting is planned during 1-2 March 1995 at the Annual ASPRS Convention in Charlotte, North Carolina, USA. A second business meeting will correspond with the "Canadian Conference on Geomatics", 13-15 June 1995 in Ottawa, Canada. The meeting in Europe is planned for the late summer or fall period. Possible locations and the specific date for a meeting are still under consideration.

WORKING GROUP ACTIVITIES DURING 1994

WG II/1 - "Real Time Mapping Technologies"

by Chairman: Dr. Kurt Novak (USA)

Co-Chairman: Michael Hahn (Germany)

Secretary: Holger Schade (Germany)

WG Members: 80

State of Science and Technology of WG II/1 Topics

The four technical sessions that were organized by WG II/1 at the Symposium in Ottawa give a very good overview of the state of real time mapping technology. There is a wide variety of different topics related to

sensors, systems, and algorithms. Detailed information can be found in the proceedings of the Symposium. A short summary is presented below.

Over the past year the interest of research institutions and private companies in utilizing integrated mapping systems for digital data collection and real time mapping increased considerably. There are no longer just a few departments that concentrate on this topic, but there are many different activities going on world wide. Most of the scientific research is carried out either by Mapping or Navigation Departments. However, other institutes specializing in aviation, electrical engineering and computer science contribute both advanced sensors as well as sophisticated algorithms. The major reason for increased activity in real-time mapping is the improvement of GPS technology. New dual-frequency receivers allow us to position on moving mapping platforms in real-time with centimeter level accuracy. Another reason for the fast progress of this technology is the rapid development of new sensors that should be adapted for real time mapping, such as imaging laser scanners, radars and low-cost inertial systems.

In our limited survey of the technology, we found that most of the activities are concentrated in Germany and North America both on the research and commercial sides. Considerable commercial interest in the technology comes from Australia, as well.

The major objective of real time mapping systems development is the fast collection of digital data for GIS. In the case of airborne systems, research concentrates on supplementing aerial cameras with GPS, INS, and laser scanners to automate DEM extraction and sensor orientation. There is a clear sign that digital photogrammetry by itself (using stereo image matching and feature extraction techniques) cannot solve the data extraction problem. Additional sensors are needed to create accurate geographic data more efficiently. Beside the installation of GPS in the aircraft for absolute positioning of the exposure station (which can be considered operational by now), inertial systems (INS) are needed for determining the absolute or relative attitudes of the photographs, as well as some kind of precise altitude scanner (e.g. LIDAR, laser ranging) for automatically generating surface models. This technology will also improve the capabilities of automatic feature extraction techniques from material photographs.

Terrestrial systems typically integrate even more different sensors than airborne systems: GPS, INS, digital and analog video cameras, voice recording devices, radar, imaging lasers, etc. The major

applications of terrestrial systems are the mapping of inventories along linear features, such as highways or railroads. Collection of geo-coded video has become an important activity to create multi-media GIS. Although the videos are still stored in analog form on tapes or laser disks, they can be linked to geographic databases and serve as an important decision making tool, saving the user expensive trips to the field. Precise positioning of objects with terrestrial systems, e.g. with a stereo vision system, is possible almost in real time. Accuracies better than 30 cm can be achieved. We also found that a number of large contracts have been let in this field which is an encouraging sign for the maturity of real time mapping technology.

There are a number of important research activities that are conducted by different institutions. Most significant are the integration of GPS and Inertial Systems, the implementation of active imaging sensors (instead of passive CCD cameras), and the automation of algorithms (which is a prerequisite for true real time mapping). GPS/INS integration is mostly driven by the advance of car navigation systems. Although they do not require high accuracies there are efforts to build a high precision system that can be used for mapping applications. The key issue is cost - high precision inertial systems are still considerably more expensive than GPS receivers.

On the imaging side we believe that active sensors, such as imaging lasers are the future of real time mapping. These devices create both a depth and a gray value image instantaneously. This means that each pixel of the digital image also has a distance associated with it. Stereo measurements become obsolete and the accuracy of laser distance is accurate to one centimeter. Furthermore, active sensors do not need any light; so they can be used in tunnels, during varying lighting conditions of the day, and they are independent of shadows. They can be used in terrestrial systems as well as from aircraft.

Accomplishments of WG II/1 During 1994

During this year WG II/1 concentrated its activities on the Commission II Symposium in Ottawa, as well as on participation in Symposia of other Commissions and cooperating WGs. Specific activities are as follows:

February 1994

Distributed circular letter: announcement of tutorials and sessions at the Ottawa Symposium.

June 1994

Commission II Symposium: WG II/1 organized four technical sessions with a total of sixteen speakers, as

well as two tutorials covering "Mobile Data Collection for GIS" and "GPS Photogrammetry". A WG meeting was also held in conjunction with the Symposium.

August 1994

Submission of joint tutorial proposal for the ISPRS Congress in Vienna 1996 together with WG III/1 on "Integrated Sensor Orientation".

September 1994

Commission I Symposium, Como: WG II/1 organized and moderated one technical session on sensor integration.

WG II/1 News

• 3-5 April 1995

A technical session and presentations will be prepared for the "Workshop on High Precision Navigation" to be held in Stuttgart, Germany.

• 4-8 September 1995

WG will organize a technical session at the ISPRS Workshop to be held in Barcelona, Spain.

• 8-10 November 1995

Co-sponsor ISPRS Joint Workshop on "Integrated Acquisition and Interpretation of Photogrammetric Data" to be held in Stuttgart, Germany.

• Continue with the development of a report/bulletin on sensor and GIS integration.

WG II/2 - "Hardware and Software Aspects of GIS"

by Chairman: Dr. Manfred Ehlers (Germany)

Co-Chairman: Nickolas L. Faust (USA)

Secretary: David Steiner (Germany)

Members: 64

State of Science and Technology of WG II/2 Topics

So far, most of the recent developments in Geographic Information Systems have been driven by technological advances. For example, the same general purpose workstations are being used as platforms for software packages in remote sensing, GIS, digital photogrammetry, digital cartography and CAD. Progress in computer technology, software concepts such as the object-oriented paradigm, and the design of graphical user interfaces (GUI) have produced better, faster and more powerful systems for handling spatial data. These developments, however, have to be accompanied by integrative and interdisciplinary efforts in research and education. With a common digital technology, it seems that many of the traditional boundaries are beginning to

break down and a new integrated approach to spatial data handling is needed. What is emerging in its place may be the beginning of a broad perspective interdisciplinary science which may be called "Geographic Information Science" (Goodchild, 1992), "Geomatics" (Bedard et al., 1988; Groot, 1989) or "Geoinformatics" (Ehlers, 1993) dealing with the "Acquisition, Processing, Production, Presentation, and Dissemination of Geoinformation".

The witnessed progress in digital data acquisition and processing, geographic information systems, and database development acts as an catalyst for an integrated approach of the disciplines concerned with data gathering, processing, and dissemination of information related to the Earth. It also illustrates that the opportunities offered by digital technology for capturing, handling, and visualizing geo-information can be fully realized only if these disciplines combine their means and techniques and focus on providing the best response to user needs. Integration of multisource information should not be determined by technological advances but rather by user requirements.

The advances in technology demand a stronger emphasis on the integration aspects. Already, the technology-driven developments are mirrored by integrative and interdisciplinary developments in research and education. Some University programs in surveying and mapping, and in geography, such as the Laval University in Quebec, Canada, the International Institute for Aerospace Survey and Earth Sciences (ITC) in Enschede, The Netherlands, or the University of Vechta in Germany, have begun to redefine their scientific fields. Their 'Geo[info]matics' approach sees education, research and system development as a unified and integrative effort.

References:

Bedard, Y., P. Gagnon and P.A. Gagnon, 1988. "Modernizing Surveying and Mapping Education: The Programs in Geomatics at Laval University", *CISM Journal*, Vol. 42, No. 2, pp. 105-114.

Ehlers, M., 1993. "Integration of GIS, Remote Sensing, Photogrammetry and Cartography: The Geoinformatics Approach, *Geo-Information-Systeme (GIS)*, Vol. 6, No. 5, pp. 18-23.

Goodchild, M., 1992. "Geographical Information Science", *International Journal of GIS*, Vol. 6, No. 1, pp. 31-45.

Groot, R., 1989. "Meeting Educational Requirements in Geomatics", *ITC-Journal*, No. 1, pp. 1-4.

Accomplishments of WG II/2 During 1994

• 2-3 February 1994, New Orleans, Louisiana, USA

A special 2-day workshop on the "Requirements for Integrated Geographic Information Systems" was held in conjunction with the "Second Thematic Conference on Remote Sensing for Marine and Coastal Environments." The program focused on issues related to requirements for using integrated geographic information systems. Sponsors included the Marine Spill Research Corporation (MSRC), the U. S. National Biological Survey's National Wetlands Research Center (NWRC), the Environmental Research Institute of Michigan (ERIM), Environmental Systems Research Institute (ESRI), and the German Society for Photogrammetry and Remote Sensing.

Fifty-eight participants from thirteen different countries attended the international workshop which was held at the New Orleans Marriott. Countries represented by the participants were Argentina, Belgium, Egypt, England, Finland, Germany, Hungary, Italy, Japan, the Netherlands, Norway, Puerto Rico, and the United States.

Twelve oral presentations were given on a variety of topics related to the issues and challenges faced by researchers using integrated GIS for work in Belgium, Egypt, England, Germany, Hungary, Italy, Norway, and the United States. These topics included functional requirements for implementing and using GIS; the integration and use of various tools and techniques such as virtual reality, neural networks, and numerical modeling; metadata management; the use of temporal components; commentaries on the status and challenges of implementing GIS in several countries; and case studies in wetland and aquaculture applications. Vendors from six different software corporations also attended to participate in a panel discussion, which was a highlight of the workshop. An interactive poster session was also held, at which seven posters were presented covering diverse areas of application.

The first day's sessions featured presentations on identities through time, application of neural network to classification of satellite and GIS data, virtual reality for natural resource management, and a commentary on the current status of academic GIS in Egypt.

A special feature of the program was the vendor panel which consisted of representatives from Earth Resources Mapper, R-Wel, Intergraph, Environmental Systems Research Institute (ESRI), PCI, and ERDAS. The panel discussion, which included active audience participation, proceeded with a dialogue on three main topics relevant to working with integrated GIS: 1)

functional requirements for truly integrated systems; 2) data conversion and interchangeability, and 3) data and algorithm lineage and documentation. It was felt that systems should be open to data in formats from other systems to allow for interchangeability and facilitate integration of data from various sources. Documentation was also discussed as an important issue, both for algorithm lineage and data. Metadata standardization is an implementation and database design issue which must be addressed now. It was felt that the most urgent points to be addressed in the near future are data standards and data transferability as well as some type of data validation and accuracy assessment.

An interactive poster session allowed researchers the opportunity to display and demonstrate representations of their work and to discuss their projects and exchange information with fellow researchers. Applications presented were fire management; special decision support systems; biodiversity conservation; wetland planning, protection, and restoration; desktop GIS systems, and the integration of various models, tools, and techniques with GIS. Several of the posters also included live computer demonstrations.

The second day of the workshop included presentations on the temporal effects of wetland assessment and mapping, functional requirements for GIS at the Joint Research Centre of the European Communities, integrated GIS tools for aquacultural management, and integration of numerical modeling with GIS decision support systems. Also included were talks on a spatial metadata management system for ocean applications, and several talks on various issues involved in implementing GIS in developing countries.

The overall summary concluded that the use of integrated GIS today can include temporal factors, management and modeling tools, metadata management, and technology such as time, virtual reality, expert systems, and remote sensing. As members of the user community, we need to exert our influence to encourage developers of the software we use to facilitate the integration of all these aspects which can be incorporated into our use of GIS.

• *ISPRS Commission II Symposium: Systems for Data Processing, Analysis and Representation, 6-10 June 1994, Ottawa, Ontario, Canada*

The WG hosted 2 sessions on the 'Hardware and Software Aspects of GIS'. A total of 10 papers was presented in these sessions and included the following topics: forest resource mapping using remotely-sensed images, performance prediction of AVNIR, object oriented query language for images, 3-D virtual GIS, videodisk GISs, and integration of GIS and remote

sensing. In addition, Manfred Ehlers (WG Chair) presented a paper on the status of integrated GIS and the research issues involved.

- Two WG Meetings were also held in conjunction with the conferences listed above. A WG Newsletter was sent to all WG members in May.

WG II/2 News

The proceedings from the New Orleans workshop are currently at the printer and are expected to be ready for distribution by the end of November 1994. An announcement will be sent to all WG members and placed in a number of relevant publications.

- 4-6 October 1995

WG II/2 will co-host, along with WG III/IV "Conceptual Aspects of GIS", a workshop on Advanced Geographic Data Modeling in Merrickville, Ontario, Canada. The major themes for this workshop will be spatial data integration and uncertainty in a remote sensing and GIS environment. The First Announcement and Call For Papers for this workshop has been sent out.

WG II/3 - "Technologies for Handling Large Volumes of Spatial Data"

by Chairman: Dr. Ekow Otoo (Canada)
Co-Chairman: Terry Fisher (Canada)
Secretary: Cherian Chaly (Canada)
Members: 16

State of Science and Technology of WG II/3 Topics

Raster data is perceived in three major forms: still images, video images and matrix encoded images. Vector data continues to be perceived as a digitized network of lines, points and polygons each of which is semantically interpreted via a feature code. Conversely, raster data currently has a number of standard encoding formats. Examples include: JPEG, TIF, GIF, for still images and MPEG for video images. Different formats continue to be the subject of research.

Vector data continues to be retained in diverse formats depending on the source of digitization and the Geographic Information System utilized to clean the data. A number of standards have recently been proposed and efforts are in progress to make them easily interchangeable between Spatial Information Systems. These proposed exchange standards include DIGEST, SDTS, SAIF. An alternative representation that allows for storage of the vector data directly in

either a relational or an object oriented DBMS is the DELTA-X data model. This model is a step towards realizing an open data model for GIS.

There are now considerable efforts at various national levels to provide very high speed communication networks. Most national data networks will soon be transmitting at well over 100 Megabits per second. These, coupled with good data compression techniques (possibly provided as hardware interfaces to computing systems), will facilitate the bulk transmission of both raster and vector data.

The development of database technology that provides uniform integration of all forms of data types that can be handled within a GIS environment is still being researched. A number of the members of WG II/3 are addressing some aspects of this work. With respect to the technology of storage and processing of spatial data, the following are still the dominant issues: optical disk storage system, high density magnetic tapes and digital audio tapes, tape vaults and RAID technology and disk stripping techniques. Although commercially available, these are technologies that are still undergoing research.

Accomplishments of WG II/3 During 1994

The WG organized three technical sessions at the ISPRS Commission II Symposium in Ottawa from 6-10 June 1994. These sessions resulted in presentation and publication of twelve papers.

WG II/3 also held a business meeting on 6 June 1994, the first day of the Commission II Symposium in Ottawa.

Publication of some of the significant papers of the WG from the Symposium.

The WG has also submitted a proposal to hold a one day tutorial workshop on "Technologies for Handling Large Volumes of Spatial Data" during the ISPRS 1996 Congress in Vienna, Austria.

WG II/3 News

- June 13 - 15, 1995

The WG plans to hold a business meeting in during the upcoming "Canadian Conference on Geomatics" in Ottawa, Canada.

- 6-9 August 1995

The WG also plans to hold a second business meeting at the upcoming "GIS Conference on Large Spatial Databases" to be held in Portland, Oregon, USA.

- A site for reading about the activities of the WG II/3 and other papers relevant to the WG's activities is being set up at the GIS Division, Geomatics Canada, Natural Resources Canada. Access via the URL address is <http://www.gisd.emr.ca>.

- The WG plans to prepare the publication of a collection of working papers of the WG members.

WG II/4 - "Systems for the Processing of Radar Data"

by Chairman: Dr. Robert O'Neil (Canada)
Co-Chairman: Dr. Hiroshi Kimura (Japan)
Secretary: Marc D'Iorio (Canada)
Members: 55

State of Science and Technology of WG II/4 Topics

Recently there have been significant advances in the algorithms used to convert Synthetic Aperture Radar (SAR) signal data to imagery. The improved algorithms have superior radiometry and are computationally more efficient. Software based SAR processors operating in a workstation environment are now being offered by a growing number of organizations.

Image analysis techniques that exploit the specific characteristics of SAR imagery are emerging. Some of these may now be found in commercial image analysis software and are being employed routinely in the analysis of airborne and satellite SAR imagery in end-user applications.

The radiometric calibration and geometric correction of SAR imagery have emerged as central issues that need to be addressed before SAR imagery can be used in many applications. Radiometric calibration is particularly important when features are to be compared in imagery collected on different dates. Generally radiometric correction is treated as a SAR system problem (where the system includes the sensor and the ground processing algorithms). Equally important to many applications is a knowledge of the scattering cross-section of a feature as a function incidence angle: this knowledge is improving steadily as the bibliography of rigorously analyzed observations increases. The correction of topographic effects in SAR imagery is largely solved now with commercial software widely available for the purpose. The correction, however, remains problematic wherever adequate elevation models are unattainable. Relatively crude elevation models can be extracted from SAR scene pairs through a process analogous to stereophotogrammetry. The interferometric analysis of ERS-1 AMI scenes acquired from repeated passes has produced high precision

elevation data. The potential of this technique has generated a great deal of excitement in the community and SAR interferometry is the topic of active research in numerous laboratories. Several civilian airborne SARs now exist that can collect interferometric imagery on a single pass using two receive antennas displaced vertically for elevation measurements and fore and aft for target velocity measurements.

Notable progress is also being made in the development of physically-based scattering models to describe the interaction of the incident microwave radiation on features of interest, including forests, vegetated land cover, and the ocean surface. These models are believed to be fundamental to the quantitative interpretation of the SAR observations. Very little of this work has emerged from the early research stages and found its way into the routine interpretation of SAR imagery.

Accomplishments of WG II/4 During 1994

WG II/4 organized two technical sessions, which resulted in the presentation of eight papers during the Commission II Symposium from June 6 - 10, 1994 in Ottawa, Canada.

WG II/4 also held a business meeting during the Commission II Symposium in Ottawa.

WG II/4 submitted a proposal to hold a tutorial workshop on "Applications of RADAR Data" during the ISPRS 1996 Congress in Vienna, Austria.

WG II/4 News

WG II/4 plans to create a CD-ROM containing a series of specially selected SAR scenes that could be used to evaluate or compare the performance of feature extraction algorithms that might be applied to the imagery. This collection of imagery should be ready before the ISPRS 1996 Congress in Vienna.

WG II/5 - "Integrated Production Systems"

by Chairman: Dr. Atef Elassal (USA)
Co-Chairman: Dr. M. Mostafa Radwan (Netherlands)
Secretary: Dr. Roop C. Malhotra (USA)
Members: 20

State of Science and Technology of WG II/5 Topics

The scope of WG II/5 is confined to photogrammetric based Integrated Production Systems (IPS) with data acquisition functionalities. The functionalities of IPS are recognized as:

- spatial data collection, editing, and storage;
- building topology for GIS applications;
- data transfer;
- integration of data sets; and
- user interface to GIS.

IPS integrate various processes of spatial data acquisition, such as: triangulation, compilation and transformations. Data analysis function is integrated to GIS. The linkage between an IPS and GIS is considered essential in the IPS development.

Due to a wide range of existing IPSs, from very simple to highly sophisticated systems, the WG has planned to compile an IPS user's guide with the following features:

- description of INPUT data to the IPS;
- description of data flow or processes in IPS;
- description of functionalities of IPS; and
- definition of accuracy of the data set.

This user's guide will assist in establishing optimum IPSs for users in need of guidance.

Inputs to this IPS user's guide have been solicited from the WG membership, who in turn are getting in touch with individuals familiar or directly involved in the development and/or use of an IPS.

Accomplishments of WG II/5 during 1994

WG II/5 actively participated in the ISPRS Commission II Symposium, June 6-10, 1994 held at Ottawa, Canada. In addition to holding a business meeting, a technical session was also held. The session was well attended. The following papers were presented at the session:

"Selection of an Optimum Structured Methodology for Developing an Information System: A Generic Model", O.U. Essien, C.M. Paresi and M.M. Radwan, International Institute for Aerospace Survey and Earth Science (ITC), The Netherlands

"The National Advanced Remote Sensing Applications Program: an Integrated System of Commercial Off-the-Shelf Components", Gary Vanderhaven, Clifford W. Greve and K. Eric Anderson, U.S. Geological Survey, USA.

"Institutionalization of Integrated Production Systems (IPS) for Spatial Data", Roop C. Malhotra, National Oceanic and Atmospheric Administration, USA.

"Digital Orthophotography: the Base Map of the Future is Here", J. Clark Beattie, Linnet Graphic International Inc., Canada

"Digital Revision of NTS Maps: A Pilot Project", Anna Marie Regan and Costas Armenakis, Natural Resources Canada, Canada.

WG II/5 News

- WG II/5 plans to prepare an IPS User's Guide. Planned Milestones are as follows:

June 1995

first cut: at least one example of an IPS reported in the suggested format or template;

July 1996

final IPS User's Guide with several examples of IPS;

July 1996

implementation action plan for a comprehensive IPS User's Guide to be kept current.

- 27 February - 2 March 1995

Business meeting to be held at the ACSM-ASPRS annual meeting at Charlotte, North Carolina, USA.

- 13-15 June 1995

Business meeting and a technical session during the annual "Canadian Conference on Geomatics" to be held in Ottawa, Canada.

General Comments

Due to budgetary constraints, the trend of members not being able to support Society activities and attend Society meetings has greatly impaired the achievement of WG II/5 goals.

Commission II Special Topic WG -

"Upgrading Photogrammetric Instruments"
by Chairman: Dr. Klaus Szangolies (Germany)
Members: 13

State of Science and Technology of Commission II Special Topic

Approximately 5,000 analog plotters and several hundred analytical stereoplotters are currently used in practice, we have to consider how to further proceed with them. It is necessary to distinguish between the modernization of existing equipment, e.g. by the exchange of obsolete computers and software for new ones, or the replacement of mechanically connected drawing tables by electronically controlled plotters, and complementing existing equipment, e.g. the extension of the viewing system of stereoplotters by superimposition or higher viewing magnification.

There are company representatives advancing the opinion that in 1996, when the next ISPRS Congress will be held, the upgrading of the old instruments will no longer be necessary and will be of academic significance only. They believe digital photogrammetry will have fully replaced conventional photogrammetry at this time. This opinion seems to be unrealistic! What can be expected is that the transition to digital photogrammetry will be steadily continued in map production and in the generation of GIS data banks. It will, however, still take ten years or more until it is completed. And during this time we need functioning plotting instruments as well as techniques mastered by their operators.

Accomplishments of Commission II Special Topic WG During 1994

During the Commission II Symposium in Ottawa, Canada a session on Upgrading Photogrammetric Instruments was organized. The following papers were presented and may be found at the pages indicated below in the *International Archives of Photogrammetry and Remote Sensing, Vol. XXX, Part 2:*

Szangolies, Klaus. "Upgrading of Stereoplotters with new Hardware and Software Components", pp 77-80.

Wong, Patrick. "Upgrading Photogrammetric Instruments", pp 81-86.

Schwebel, Reiner (presented by Kresse, Wolfgang). "Upgrading of Stereoplotters by Carl Zeiss", pp 87-90.

Meid, Alfons (presented by Azubuike, Nwosu). "Upgrading the AVIOLYT Family of Leica's Analytical Instruments to the Leica Photogrammetric Workstation", pp 91-96.

Stapley, Keith. "Analytical Stereoplotters - Another Midlife Crisis?" published *ITC-Sympos.21.4.1993* in Netherlands.

A business Meeting was held at the Symposium in Ottawa on 9 June 1994.

A WG Meeting was held in Munich, Germany on 6 September 1994.

A WG Meeting was held in Como, Italy on 13 September 1994.

A WG Meeting was held in Dresden, Germany during the Annual Conference of the German Society for Photogrammetry and Remote Sensing, 6 October 1994.

Special Topic WG News

Survey of India, Research & Development Directorate, Brigadier N. Dhal, has joined the ST-WG Upgrading Photogrammetric Instruments. Survey of India is now preparing a paper: "Research Projects for Upgrading of existing Photogrammetric Analogue Stereoplotters".

In 1994, the WG was cooperating with active members from Australia, Canada, Germany, India, Switzerland, USA.

Forthcoming WG Activities/Meetings are:

- 2-4 May 1995
Commission II Special Topic WG Meeting during "Geotechnica 1995" in Köln, Germany.

- 11-15 September 1995
Special Topic WG Business Meeting during "Photogrammetrische Woche" in Stuttgart, Germany.

Inter-Commission WG II/III -

"Digital Photogrammetric Systems"

by Chairman: Prof. Ian Dowman (U.K.)
Co-Chairman: Dr. David McKeown (USA)
Secretary: Zubbi Nwosu (Switzerland)
Members: 186

State of Science and Technology of Inter-Commission WG II/III Topics

The main developments in the area of digital photogrammetric systems have been in the area of algorithms for orientation and feature extraction. Work in this area is still mainly in a research stage although the Zeiss Phodis ST30 digital workstation will be supporting automated algorithms for relative orientation. Other systems are being developed for digital triangulation which automate the transfer of points. The papers presented in the two WG sessions at the Commission III Symposium on the topics of Human-computer interfaces, visualization, development of digital systems and automation of orientation and mapping tasks illustrate the key areas of activity within the WG.

Accomplishments of Inter-Commission WG II/III During 1994

Inter-Commission II/III organized two sessions at the Commission II Symposium from 6-10 June 1994 in Ottawa, Canada. Eight papers were presented during these sessions.

Inter-Commission II/III held a business meeting at the Commission II Symposium in Ottawa.

Inter-Commission II/III organized two sessions at Commission III Symposium in Munich, Germany.

Inter-Commission WG II/III News

- 27-29 March 1995

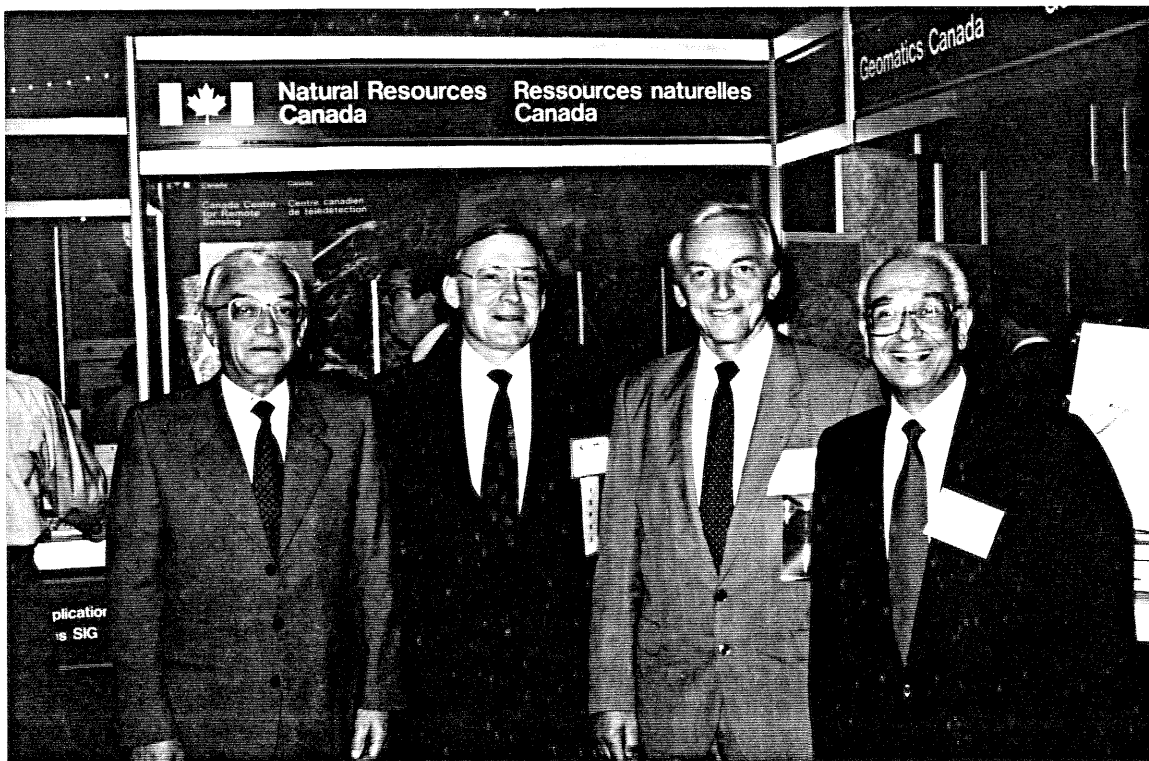
Co-organizer with Technical University of Malaysia, seminar on "Integration of Remote Sensing and GIS for Applications in SE Asia" to be held in Kuala Lumpur.

- 19-21 April 1995

Co-organizer with SPIE, Conference on "Integrating Photogrammetric Techniques with Scene Analysis and Machine Vision" in Orlando, USA.

- 30 August - 1 September 1995

Joint Workshop with ISPRS WG III/2 on "The Role of Models in Automated Scene Analysis" to be held in Stockholm, Sweden.



Sixteen years of Commission II leadership at Commission II Symposium in Ottawa as represented by (l to r) J. Jaksic (1980-1984), L. Fritz (1984-1988), K. Szangolies (1988-1992), M. Allam (1992-1996)

TECHNICAL COMMISSION III

"THEORY AND ALGORITHMS"

Prof. Dr.-Ing. Heinrich Ebner, Commission III President

Dr.-Ing. Christian Heipke, Commission III Secretary

*Dipl.-Ing. Konrad Eder, Commission III Secretary
(GERMANY)*

TERMS OF REFERENCE

- Algorithms for geometric determination and analysis of photogrammetric data
- Feature extraction from multi-sensor, multi-resolution, multi-temporal imagery
- Image understanding
- Integrated sensor orientation
- Image sequence analysis
- Algorithms for digital photogrammetric systems and their GIS integration
- GIS concepts, with particular emphasis on integration of image data

STATE OF SCIENCE AND TECHNOLOGY OF COMMISSION III TOPICS

- GPS supported aerotriangulation is operational and continues to gain acceptance.
- GPS real time kinematic positioning at the 1-10 cm level is a reality for baselines up to 20 km.
- For attitude determination of airborne sensors integrated GPS / INS systems are required.
- General treatment of integrated sensor systems (GPS, INS, multi spectral scanners etc.) is still missing.
- Automatic aerotriangulation is under investigation for frame and line imagery.
- Geometric problems in photogrammetry are becoming more interesting, especially the problem of orientation without approximate values.
- Image compression is gaining interest.

- Image matching is still developed due to problems related to non-smooth surfaces and occlusions.
- Automatic topographic feature extraction attracts many researchers, buildings and roads are of interest especially in the frame of updating such data.
- Common interest has prepared the grounds for an increased cooperation between photogrammetry and computer vision.
- In image understanding the complex aspect of object modelling needs more attention.
- A number of common research issues exists between the more theoretical aspects of GIS and digital photogrammetry, especially in real world modelling and hybrid vector/raster data bases.
- Concepts of object oriented approaches in GIS are being established, but a widening gap between research and implementation is being observed.
- 3D modelling mainly based on vector data has been formulated, but more experience is necessary in order to evaluate the results achieved to date.
- Integration of data from multiple sources needs more attention.
- First attempts to handle GIS data at different aggregation levels.
- Progress can be observed in the investigation on query spaces and the formulation of query languages.
- Uncertainty handling in GIS still needs more attention.

ACCOMPLISHMENTS OF COMMISSION III DURING 1994

- Organization of Inter-Congress ISPRS Commission III Symposium entitled "Spatial Information from

Digital Photogrammetry and Computer Vision" with the participation of some 270 experts from photogrammetry, remote sensing, computer vision, and GIS in Munich, Germany during 5-9 September. (Detailed reports of the Symposium will appear in all major scientific journals of the related fields.)

- Participation in the Inter-Congress ISPRS Symposia of Commissions II, IV and V through the relevant Inter-Commission WGs.
- Improvement of contacts with IEEE and especially with SPIE.

COMMISSION NEWS

- The Commission III WGs will organize various meetings. (See Working Group Activities During 1994 and ISPRS Events Calendar for details.)
- Commission III will have an organizing meeting for all officers in late 1995 for the preparation of the ISPRS Congress in Vienna.

WORKING GROUP ACTIVITIES DURING 1994

WG III/1 - "Integrated Sensor Orientation"

by Chairman: Ismael Colomina (Spain)
 Co-Chairman: James R. Lucas (USA)
 Secretary: Jose A. Navarro (Spain)
 WG Members: 53

State of Science and Technology of WG III/1 Topics

- Theoretical aspects
 - Use of 1-dimensional features as control and tie object features have been partially investigated.
 - Straight lines as tie features in frame and line image triangulation are under investigation.
 - Reliability of GPS supported aerial triangulation has been analyzed.
 - Integrated sensor orientation with photogrammetric and orbital models has been investigated.
 - GPS real time kinematic positioning at the 1-10 cm level is a reality for short baselines (up to 10-20 km) thanks to the maturity of OTF (on-the-fly) ambiguity resolution techniques. Now real-time or rapid orientation algorithms must be developed.

- GPS attitude determination for airborne sensors is at the 0.1° level; integrated GPS-INS systems are still required for precise orientation determination, especially for the non-frame imaging systems.
- Operational aspects
 - GPS supported aerial triangulation continues to gain acceptance and is still a source of many similar papers.
 - Systems for automatic digital point transfer for aerial triangulation exist but are not commercially available. Equivalent systems for 1-line and 3-line digital sensors are under development. It has become a data handling problem rather than a pure photogrammetric one.
 - Procedures which achieve higher levels of accuracy in aerial triangulation have been developed. They are referred to as photo-geodesy.

Accomplishments of Working Group III/1 During 1994

- Participation in the Commission III Symposium "Spatial Information from Digital Photogrammetry and Computer Vision" with one oral and one poster technical session.
- Preparation for the Workshop "Integrated Sensor Orientation: Theory, Algorithms and Systems" to be held in Barcelona, at the ICC (Institut Cartogràfic de Catalunya) new facilities, from 4 Sep 95 (Monday) to 8 Sep 95 (Friday). The Workshop will be co-sponsored by IAG (International Association of Geodesy) and co-organized by the following groups:

Co-organizers:

FIG

WG Kinematic Survey Systems
(E. Cannon and H. Schade)

IAG

SC 4 Application of Geodesy to Engineering
(K. Linkwitz)

SSG 1.105 GPS Kinematic Positioning Methods and Applications (H. Landau)

ISPRS

WG I/2 System Aspects of Platform Guidance, Navigation and Sensor Positioning
(P. Patias and J. Otero)

WG II/1 Real-time Mapping Technologies
(K. Novak and M. Hahn)

WG III/1 Integrated Sensor Orientation
(I. Colomina and J.R. Lucas)

Other Sponsoring Organizations are SECFT (Spanish Society for Cartography, Photogrammetry and Remote Sensing) and SFPT (French Society for Photogrammetry and Remote Sensing). An agreement has been formed with Wichmann Verlag for the publication of the Workshop Proceedings, including the style definition. Other preparations include financial support from CIRIT (Catalan Research and Technology Innovation Commission), and coordination with the Organizing Committee of the International Cartographic Conference.

- Circular letter No. 3 was prepared and distributed.

WG III/1 News

Forthcoming WG activities

• 4 - 8 September 1995

LAG-ISPRS Workshop: "Integrated Sensor Orientation: Theory, Algorithms and Systems" in Barcelona, Spain.

• 13 September 1995

WG Business meeting some time during the "45th Photogrammetric Week" in Stuttgart, Germany.

WG III/2 - "Geometric - Radiometric Models and Object Reconstruction"

by Chairman: Dr. Kennert Torlegård (Sweden)
 Co-Chairman: Dr. Wolfgang Förstner (Germany)
 Secretary: Eberhard Gülch (Sweden)
 WG Members: 69

State of Science and Technology of WG III/2 Topics

- Geometric Problems in Photogrammetry are becoming more interesting, especially the problem of orientation without approximate values and the reconstruction with uncalibrated or only partially calibrated cameras.
- Low level vision seems to be a problem of less interest for photogrammetrists and computer vision (CV) people with photogrammetric tasks. Only few papers have tackled this topic, in contrast to Computer Vision Conferences.
- Geometric transformations as part of image compression routines are becoming more interesting. First results on the effects of image compression on matching and feature extraction procedures are available. The suitable pixel sizes for different automated procedures are not investigated.

- Matching techniques still are further developed, due to the problems of non-smooth surfaces and occlusions. Matching of 2-D images to 3-D objects is main focus.
- Fully automated point transfer for digital aerial triangulation is available. The high precision potential of digital aerial triangulation has been confirmed by the OEEPE test on Digital Methods in Aerial Triangulation.
- Topographic feature extraction attracts many researchers, especially roads and buildings are of special interest.

Accomplishments of WG III/2 During 1994

16 December 1993: Circular Letter No. 3

- Annual WG III/2 report
- Call for papers ISPRS Commission III Symposium, Munich
- Call for topics, Joint Workshop WG III/2 and WG II/III
- Call for information on publicly available digitized image material
- Call for papers, Workshop on Digital Methods in Aerial Triangulation, Espoo

March 1994: Abstract review for ISPRS Commission III Symposium

- About 70 extended abstracts reviewed by Chairman, Co-Chairman and Secretary

23-25 March 1994: Commission III Planning Meeting for Munich Symposium

- Attended by Chairman and Secretary

5-9 September 1994: Commission III Symposium

- About 70 papers presented in WG III/2 sessions
- 2 technical sessions WG III/2
- Joint technical sessions WG III/2 + WG III/3 and WG III/2 + IC WG II/III
- 1 poster session WG III/2
- Joint poster sessions WG III/2 + WG III/3 and WG III/2 and IC WG V/III

WG III/2 News

Further activities on meta database on images have been stopped due to sudden lack of interest among WG participants. It is referred to the ISPRS WG III/3 test material or other publicly available image databases on Internet.

The WG is keeping close contact to specific OEEPE projects:

- Feature Extraction from High Resolution Space Imagery
- Digital Methods in Aerial Triangulation
- Planned activities on producing 3D data in built-up areas for a 3D GIS

• 30 Aug - 1 Sep 1995

Joint Workshop WG III/2 and IC WG II/III on "The Role of Models in Automated Scene Analysis" in Stockholm, Sweden. Contact: Prof. K. Torlegård at Fax: +46 8 790 7343, +46 8 790 8714.

WG III/3 - "Semantic Models and Object Recognition"

by Chairman: Dr. Toni Schenk (USA)
 Co-Chairman: Dr. Dieter Fritsch (Germany)
 Secretary: Monika Sester (Germany)
 WG Members: 49

State of Science and Technology of WG III/3 Topics

The Commission III Symposium in Munich offered an excellent opportunity to assess the state of science and technology of WG III/3. A total of 14 papers with extended abstracts were submitted to WG III/3 and an additional 13 papers jointly to WG's III/2 and III/3. All papers were accepted for publication in the Symposium proceedings. A few of these papers deserve special mention because they really address issues related to the WG topics of image understanding and semantic models. They are:

H. Lange, C. Schroeder: "Analysis and Interpretation of Changes in Aerial Images: Knowledge Representation and Control"

U. Stilla, A. Hajdu: "Map Aided Structural Analysis of Aerial Images"

R. Ruskone et al.: "Road Network Interpretation: a Topological Hypothesis Driven System"

H. Mayer: "Automatic Knowledge Based Extraction of Objects of the Real World from Scanned Maps"

T. Gevers, A.W.M. Smeulders: "Efficient Recognition of 3-D Rigid Solid objects from 2-D projective Images Based on Projective Invariant Descriptions"

Finally the paper describing test images for WG III/3 should also be mentioned here:

D. Fritsch et al.: "Test on Image Understanding in Digital Photogrammetry."

The symposium also confirmed previous impressions that the more theoretical aspects of GIS have a lot in common with digital photogrammetry. This is particularly true for modelling real world objects which are also of great interest in WG III/3. Furthermore, the areas of 'intelligent' data bases and hybrid data bases (vector/image) are common research issues. It will be interesting to see if some of the research, now conducted independently, will eventually lead to joint projects.

Accomplishments of WG III/3 During 1994

A major accomplishment of the WG was to finalize the data sets for the tests on image understanding. The material put together by M. Sester and co-workers was well received and is also used by computer vision research groups. The paper mentioned above describes the test data set and its purpose in detail.

The preparations for the second workshop of WG III/3 are in full swing. The workshop will be held in Stuttgart, November 8.-10., 1995. The title is 'Integrated Acquisition and Interpretation of Photogrammetric Data'. The Workshop will be jointly organized with WG I/3: Integrated Data Acquisition Systems (Prof. R. Bill, Prof. A. Carosio) and WG II/1: Real Time Mapping (Prof. K. Novak, Dr.-Ing. M. Hahn).

The activities and events of the WG III/3 culminated in Munich during the Commission III Symposium. Several discussions within the group took place. Discussions with other WGs were conducted as well. Also, the meeting in Oberammergau (preparation for the Symposium) offered excellent opportunities for official, as well as informal, discussions with other WGs.

WG III/3 News

The major study under way are the investigations with the test data sets distributed in April 1994. The deadline for the test is the end of April 1995. The next official WG III/3 meeting will be held in Stuttgart at the occasion of the second workshop.

WG III/4 - "Tutorials on Theory and Algorithms"

by Chairman: Dr. Fabio Crosilla (Italy)
 Co - Chairman: Gábor Mélykúti (Hungary)
 Secretary: Roberta Raber (Italy)
 WG Members: 3

Accomplishments of WG III/4 During 1994

The chairman and co-chairman participated in the technical meeting held in Oberammergau in March 94 where the program of the Munich Symposium was finalized.

They attended the Commission III Symposium and served as chairmen of the tutorial organized at the Symposium.

The chairman attended the Commission I Symposium in Como.

WG III/4 News

- 13 June 1995

Tutorial on "Spatial Data Analysis: Theory and Algorithms" in conjunction with the Commission I Workshop on "Multimedia GIS DATA" which will be held during June 12-16, 1995 at the International Centre for Mechanical Science in Udine, Italy. Contact: Prof. R. Galetto, phone +39-382-391410, fax +39-382-391419 or Prof. F. Crosilla, phone +39-432-504128, fax +39-432-294928.

- 12-13 June 1995

Tutorial on "Basic Concepts of GIS" to be held in conjunction with "GIS/LIS '95 in Central Europe" at the Technical University Budapest, Hungary. Contact: Dr. G. Melykuti, phone/fax +36-1-1813374.

Inter-Commission WG III/IV -

"Conceptual Aspects of GIS"

by Chairman: M. Molenaar

Co-Chairman: R. Shibasaki

WG Members: 48

State of Science and Technology of Inter-Commission WG III/IV Topics

- Object/Space Modelling for GIS

- Concepts on object oriented approaches in GIS are being established today, and the number of papers on object-oriented approach already seems to be decreasing in conference proceedings and journals. But very few geo-information systems can really handle such an approach, and a gap between research and implementation is observed.

- 3D modelling mainly based on vector form have been formulated, although several problems are left

such as definition of query space in 3D space and development of some of 3D spatial analysis techniques. For further development, closer links with actual applications of 3D GIS would be helpful to validate proposed formulations and data structures, and to drive research towards more efficient 3D data acquisition and development of 3D databases.

- Integration of data from multi-sources

- Unfortunately, there have not been many papers presented in the symposia or the workshop on this topic. However, integration of data from multi-sources especially for continuous and efficient update of GIS databases is increasingly important as more remote sensors are emerging. Since integration or fusion of data is also recognized as an indispensable concept for automated object-recognition, their approach should be integrated at higher level of GIS framework to realize autonomous and continuous development and update of GIS databases.

- Linking aggregation levels

- Relevant developments are in the field of map-generalization, but this is mainly directed at handling maps at different scale levels and thus oriented toward the production of graphical output. Although several papers addressed issues of linking thematic aspects and keeping consistency between different levels, this direction should be promoted more.

- Query space

- Development of query spaces and formulation of query languages is steadily progressing, especially towards accommodating more cognitive aspects. It is expected that these discussions will be feedback to object/spatial modelling.

- Handling uncertainty

- As for uncertainty issues, several papers dealing with specific problems such as fuzzy viewshed due to DEM uncertainties and merging several fuzzy lines into one. Directions toward more general theoretical frameworks should be encouraged more because uncertainties are one of the major characteristics of geo-information. Theories of geo-information uncertainties will serve a basis in pursuing other important research topics such as spatial modelling, integration/fusion data from multi-sources and so forth.

Accomplishments of Inter-Commission WG III/IV During 1994

- One technical session and one poster session during the Commission IV Symposium in Athens, Georgia, USA.
- Two technical sessions and one poster session during the Commission III Symposium in Munich, Germany.
- The WG was involved in the organization of the workshop on "Advanced Geographic Data Modelling" (AGDM'94) in Delft, the Netherlands.

WG III/IV News

- 21-24 August 1995
The WG will jointly organize GIS AM/FM ASIA 95 (ASIA: And Spatial Information Analysis) with Asian Association on Remote Sensing (AARS), AM/FM

International, GIS Commission of International Geographical Union (IGU) and other institutions. Topics of technical sessions will include Development of GIS in Asia, Data Structure, Spatial Analysis, Spatial Modelling, Quality of GIS Data and Error Propagation, Integration of GIS and Remote Sensing, Integration of GPS and GIS, and Automated Data Capture.

- October 1995
The WG will jointly organize a second workshop on advanced geographic data modelling AGDM'95 near Ottawa, Canada with the Canadian Centre for RS and Laval University. The main topics will be: data integration, RS-GIS integration, multi scale problems, and uncertainty.

All WG members, researchers, engineers and practitioners interested in these fields are very welcome to attend these meetings. For more detailed information, contact the WG officers.

TECHNICAL COMMISSION IV

"MAPPING AND GEOGRAPHIC INFORMATION SYSTEMS"

Dr. Roy Welch, Commission IV President

*Dr. Marguerite Remillard, Commission IV Secretary
(UNITED STATES OF AMERICA)*

TERMS OF REFERENCE

- 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 elevation models

STATE OF SCIENCE AND TECHNOLOGY OF COMMISSION IV TOPICS

The Commission IV Symposium held May/June in Athens, Georgia, USA brought leading international scientists together to discuss state-of-the-art research in mapping and geographic information systems (GIS) applications. Dr. Shunji Murai, of the Institute of Industrial Science, University of Tokyo and President of ISPRS was present to give the Opening Remarks for the Symposium. He noted the tremendous growing interest within the scientific community in softcopy photogrammetry, digital elevation models (DEMs) and orthoimage generation, global databases for environmental modeling, map revision and GIS applications that have contributed to the success of ISPRS Commission IV.

Several Invited Papers highlighted the technical sessions and provided valuable overviews/insights on the current state of mapping and GIS. These presentations also offered projections of future directions in technology such as new satellite sensors and image data characteristics. The speakers identified areas in need of further research and technical development. Dr. Freidrich Ackermann from the University of Stuttgart, Germany, discussed techniques, applications and quality

standards in the development of DEMs. Dr. R. Sollner, Weltraum-Institut Berlin, Germany and Mr. Harold Spradley, Survey Resources International, Inc., USA, described Russian remote sensing data (scanned photographs from mapping cameras such as Kate-200 and MK-4) from the view point of commercial distribution and user requirements in Germany and the USA, respectively. These data are generally of high spatial resolution and are especially useful in map revision applications. Other papers concentrated on recently available satellite image data recorded by the German MOMS-O2/D2 and Japanese JERS-1, OPS sensors with along track stereo capability. These data were assessed favorably for their cartographic potential, ability to generate DEMs/orthoimages, and their application in the development of GIS databases.

Strategies for improving the accuracy and specificity of large-area satellite-based land cover inventories are required for the increasing international demand for global databases used in regional/global ecosystem modeling. This topic was addressed in a paper by Dr. Thomas Lillesand, University of Wisconsin, USA. Mr. Thomas Loveland of the EROS Data Center, USA also presented a paper on global environmental monitoring and the development of 1-km global land cover products.

The subject of automatic techniques for map revision is deservedly receiving attention as more and more organizations have completed database construction and are now faced with the task of maintaining these databases with current information. Invited Papers on map and database revision included presentations by Mr. Michael Brand of the Ordnance Survey in Northern Ireland who posed the question, "Your Database - Can it Meet the 21st Century?", and by Dr. Ammatzia Peled, Technion-Israel Institute of Technology, who addressed digital map revision and GIS databases in Israel.

Activity in the field of extraterrestrial mapping is rapidly growing with the availability of stereo imagery for planetary topographic mapping and planned future missions such as the Russian Mars '96 Mission. Germany and the United States are leading this research in planetary mapping. Dr. Merton Davies of

the Rand Corporation, USA discussed extraterrestrial mapping using Clementine and the Lunar Control Network.

Inter-Commission III/IV on GIS Theory is the bridge between theoretical aspects of GIS and their applications. The use of virtual GIS for interactive modeling, for example, was presented in a paper by Dr. Manfred Ehlers, University of Osnabruck-Vechta, Germany. This is an exciting application of GIS theory that will allow managers to 'experience' the effects of management decisions in 'what if' scenarios in the laboratory.

ACCOMPLISHMENTS OF COMMISSION IV DURING 1994

The ISPRS Commission IV Symposium on "Mapping and Geographic Information Systems (GIS)" was held May 31 - June 3, 1994 in Athens, Georgia. Approximately 200 participants attended 12 technical sessions and 3 poster sessions that represented the efforts of authors from more than 28 countries. Held at the Georgia Center for Continuing Education on the campus of The University of Georgia (UGA), the Symposium was organized by Dr. Roy Welch, President of ISPRS Commission IV and Director of the Center for Remote Sensing and Mapping Science (CRMS) at UGA. He was assisted by Dr. Marguerite Remillard, Secretary of Commission IV and Ms. Ginger Vickery, Commission IV Administrative Assistant. The American Society for Photogrammetry and Remote Sensing (ASPRS) co-sponsored the Symposium with support for coffee breaks from Earth Resources Mapping, Eastman Kodak Aerial Systems and Hughes/Santa Barbara Research Center.

The Technical Program focused on ISPRS Commission IV Working Group subject areas and was moderated by the following WG Chair and Co-Chairpersons.

WG IV/1 - GIS Data and Applications

Dr. Lynn Usery, USA

WG IV/2 - International Mapping from Space

Dr. Gottfried Konecny, Germany

Mr. Donald Light, USA

WG IV/3 - Map and Database Revision

Mr. Paul Newby, UK

WG IV/4 - DEMs and Orthoimages for Mapping/GIS Applications

Dr. Luiz Alberto Vieira Dias, Brazil

WG IV/5 - Extraterrestrial Mapping

Dr. Sherman Wu, USA

WG IV/6 - GIS and Expert Systems for Global Environmental Databases

Dr. Ryutaro Tateishi, Japan

Dr. Hiroshi Murakami, Japan

IC WG III/IV - Conceptual Aspects of GIS

Dr. Martien Molenaar, The Netherlands

Dr. Ryosuke Shibasaki, Japan

Several Invited Papers were presented by distinguished scientists as part of the Technical Program. These papers represent the current state of science and technology for topics related to mapping and GIS. The authors and titles of Invited Papers are presented below with further details described under the section of State of Science and Technology of Commission IV Subjects.

WG IV/1

E.L. Usery, USA, "Display of Geographic Features from Multiple Image and Map Databases."

T. Lillesand, USA, "Strategies for Improving the Accuracy and Specificity of Large-Area, Satellite-Based Land Cover Inventories."

WG IV/2

G. Konecny, J. Schiewe and E. Siebe, Germany, "First Examinations of the Cartographic Potential of MOMS-02/D2 Data."

L.H. Spradley, USA, "Cost Effective Data for Regional GIS Databases."

R. Sollner, Germany, "Russian Remote Sensing Data - Status Report from the View Point of a Commercial Distribution and User in Germany."

WG IV/3

P. Newby, UK, "Revision Policy and Practice for Great Britain's Topographic Database."

A. Peled, Israel, "Revision of Digital Maps and GIS Databases."

M. Brand, UK, "Your Database - Can it Meet the 21st Century?"

WG IV/4

C. Nery, R. Rangel and L. Dias, Brazil, "Digital Elevation Models Interpolated by Linear, Akima and Beta-Spline Methods: A Comparison."

F. Ackermann, Germany, "Digital Elevation Models - Techniques and Applications, Quality Standards and Development."

J. Thorpe, USA, "The Handling of Large Digital Orthophoto Raster Databases in GIS."

WG IV/5

S. Wu, USA, "Magellan Radar Data for Venus Topographic Mapping."

M. Davies, USA, "Clementine and the Lunar Control Network."

WG IV/6

- R. Tateishi, Japan, "Database Development for Global Environmental Research."
T. Loveland, USA, "Strategy for Development of 1-km Global Land Cover Products."

IC WG III/IV

- M. Molenaar and D. Richardson, The Netherlands, "Object Hierarchies for Linking Aggregation Levels in GIS."
M. Ehlers, J. Albrecht and H. Brosamle, Germany, "Virtual GIS for Interaction Modeling."

In addition to the 147 papers presented in the Technical Program, Symposium activities included a Technical Workshop entitled, *Introduction to Digital Mapping and GIS*, held May 30 at the Georgia Center for Continuing Education and taught by Dr. Roy Welch and the staff of the CRMS. This workshop included a combination of lectures and hands-on exercises designed to acquaint participants with the use of stereo SPOT digital image data and scanned aerial photographs for generating DEMs, topographic map products, orthoimages, slope/aspect values and 3-D GIS databases. Attendees used the Desktop Mapping System (DMS)TM and pc ARC/INFO software packages for the integration of image processing, mapping and GIS functions.

The Symposium featured exhibits from leading vendors of mapping, GIS and remote sensing equipment and products, including: Autometric, Inc.; American Society for Photogrammetry and Remote Sensing; Center for Remote Sensing and Mapping Science at The University of Georgia; Center for Remote Sensing and Spatial Analysis at Rutgers University; ERDAS, Inc.; ESRI, Inc.; Geostudio Consultants Ltd.; Piedmont, Olsen and Hensley; PCI Remote Sensing Corporation; Rosser Lowe, Division of Rosser International; and Survey Resources International, Inc.

Awards for the Best Poster Papers in each WG were presented at the Closing Session of the Symposium. The authors were presented with plaques that included the title of their paper and the authors' names. The criteria for the awards included quality of presentation, paper content and explanation provided by the author(s) during the poster session.

Proceedings of the ISPRS Commission IV Symposium containing more than 700 pages (Vol. 30, Part 4 of the *International Archives of Photogrammetry and Remote Sensing*, ISSN 0256-1840) are available from RICS Books, Surveyor Court, Westwood Way, Coventry CV4 8JE, United Kingdom, Phone +44-71-222-7000, Fax +44-71-334-3800.

COMMISSION IV NEWS

Commission IV will continue its preparations for the ISPRS Congress to be held July 1996 in Vienna, Austria by soliciting abstracts for Commission IV proposed Workshops and Technical Sessions. Each WG will be responsible for approximately two Technical Sessions with the possibility of additional sessions being allocated upon receipt of sufficient abstract submissions. Commission IV will be involved in at least three Inter-Commission Sessions with two Technical Sessions allocated for Inter-Commission WG III/IV and one shared session with Commission I.

WORKING GROUP ACTIVITIES DURING 1994

WG IV/1 - "GIS Data and Applications"

by Chairman: Dr. E. Lynn Usery (USA)
Co-Chairman: Dr. Kirsi Artimo (Finland)

State of Science and Technology of WG IV/1 Topics

- *Integration of Photogrammetric and Remote Sensing Data with GIS*
- Orthophotos are now accepted as a primary base for GIS and are sometimes preferred to traditional topographic maps. Often terrain data are combined with orthophotos.
- Integrated raster/vector GIS in the commercial marketplace provide capabilities for the use of photogrammetry, remote sensing and GIS on a single platform and within a common windows-based environment. Softcopy photogrammetry and improved performance of personal computer platforms are creating a significant market in areas where workstations are not affordable.
- *GPS, Photogrammetry and Remote Sensing to Construct/Revise GIS Databases*
- GPS/GIS integration is occurring. Road-based transportation organizations in the commercial and public sectors are using real-time GIS to track vehicles. Laptop computers with GPS receivers are being used in the field to update GIS databases.
- *Hardware/Software for GIS Applications*
- 32-bit microprocessors for personal computers are moving to 64-bit (Pentium and PowerPC). Very large data storage and rapid retrieval also are possible with Helical scan tape drives with 8-25 Gbytes per cartridge in silos up to 6 Tbytes with robotic retrieval. Laptop computers with 800 Mb

hard drives and multitasking OS/2 also lead to field-based GIS.

- Data base management systems (DBMS) are being modified or developed which specifically include spatial objects. Academic research on object-oriented models for spatial data handling are coming to fruition in commercial products. Examples include Graphics Data Systems (GDS), the Unisys purchase and reorienting of System 9 and the Open GIS (GRASS) focus on objects.
- *Applying GIS to Mapping, Planning and Resource Inventory*
- Applications of GIS include growing attention to regional/global databases and broad-scale resource modeling.
- The introduction of map composition tools and desktop publishing standards (e.g., TIFF and PostScript) have come to GIS in support of cartographic applications. However, mapping software in GIS is still lacking. Generalization and scale-oriented libraries need to be included. Although production cartography has traditionally relied on master negatives at scales needed for compilation and publishing, digital equivalents do not exist. Digital symbolization, geometry and characteristics required for producing thematic maps and reports need to be documented and installed in GIS software.

Accomplishments of WG IV/1 During 1994

WG IV/1 conducted a session on GIS and Mapping at the ASPRS Annual Meeting held in April of 1994 in Reno, Nevada, USA. Papers on raster features, positional uncertainty, automatic data acquisition from maps and a mapping applications project were presented.

WG IV/1 also participated in the ISPRS Commission IV Symposium on Mapping and Geographic Information Systems held in Athens, Georgia, USA with two oral Technical Sessions and 34 papers in one poster Technical Session. Among other papers and posters, an on-going WG IV/1 project on feature-oriented cartographic symbolization from GIS databases was documented in a poster session by WG IV/1 member Mr. Greg Allord of the U.S. Geological Survey. A WG Meeting also was held during the Symposium to make plans for future activities. Details on a planned Workshop on Mapping and Environmental Applications of GIS are listed below.

WG IV/1 News

WG IV/1 is continuing the study of the development of cartographic objects from GIS. These objects are feature-oriented and provide complete information for placement and construction on a map when the feature is selected from the GIS database.

- 27 February - 2 March 1995

WG IV/1 will hold a Meeting at the ASPRS Annual Convention in Charlotte, North Carolina, USA.

- End of September 1995

A Workshop on "Mapping and Environmental Applications of GIS Data" will be held in Madison, Wisconsin, USA.

WG IV/2 - "International Mapping from Space"

by Chairman: Dr. Gottfried Konecny (Germany)

Co-Chairman: Donald Light (USA)

State of Science and Technology of WG IV/2 Topics

The ISPRS Commission IV Symposium provided a review of state-of-the-art satellite systems for mapping from space. Oral presentations such as those by Maruyama (Japan) and Dowman and Neto (UK) on three-dimensional measurement using JERS-1 OPS stereo image data, by Welch and Lang (USA) on ASTER as a source for global topographic data and Konecny, et al, (Germany) on the cartographic potential of MOMS-02/D2 data exemplify the increased emphasis on high resolution, along track stereo image data requirements for mapping applications beyond the 1990's. Future directions of the Landsat and SPOT programs were discussed by Williams (USA) and Munier and Baudoin (France), respectively. The data from these sensors are widely used as evidenced by the Landsat Pathfinder Program for global change studies (Chomentowski, et al, USA). Future Landsat and SPOT satellites will acquire along track stereo image data of higher spatial and spectral resolution. Spradley (USA) and Sollner (Germany) discussed the newly released image data from Russian satellite sensors and mapping/reconnaissance cameras such as the KATE 200, MK-4 and KFA 1000.

Accomplishments of WG IV/2 in 1994

WG IV/2 had two oral Technical Sessions, one poster Technical Session and one Panel Discussion at the ISPRS Commission IV Symposium. These sessions were well attended and featured presentations from leading international scientists involved in the assessment of image data for mapping and GIS

applications acquired by: 1) several new satellite sensor systems (e.g., MOMS-02/D2 and JERS-1 OPS); 2) current systems such as SPOT and Landsat; and 3) and recently revealed Russian satellites. A panel discussion entitled, "Mapping from Space: Issues and Answers" was skillfully led by Don Light (USA). As moderator, he directed questions to the panel members, Friedrich Ackermann (Germany), Ian Dowman (UK), Harold Spradley (USA), Shunji Murai (Japan) and Karsten Jacobsen (Germany). A WG IV/2 meeting also was held during the Symposium to discuss future activities and directions. These are listed below under the section of WG News.

WG IV/2 News

The 1995 WG IV/2 Workshop on "Mapping from Space" will be held at the Institute of Remote Sensing, Anna University, Madras, India on 27 November to 1 December 1995. The contact person is Prof. V. Guruswamy, Anna University, Institute of Remote Sensing, 600025 Madras. Fax: +91-44-2352 166.

WG IV/3 - "Map and Database Revision"

by Chairman: Paul R. T. Newby (United Kingdom)

State of Science and Technology of WG Subjects

From the evidence presented both formally and informally at the mid-term Commission IV Symposium in Athens, Georgia, USA, advances have occurred in four areas since 1992.

- More organizations are now prepared to take revision seriously and to discuss in public what they are doing about it.
- Some real progress (more than was expected) is being made towards the ultimate goal of automated change detection and feature extraction. However, practical realizations which will help the routine work of mapping organizations still seem to be far in the future.
- Institutional issues are becoming recognized as important, as well as technical issues. Both are worthy of discussion at ISPRS meetings.
- Database revision is now recognized as the 'raison d'être' of the WG and maps are merely among the spin-off products from an up-to-date database of geographical information. Database integrity after update is attracting serious attention and is helped in practice by using the best tools and the best possible imagery as an aid to interpretation.

Accomplishments of WG IV/3 During 1994

The Commission IV Symposium held in Athens, Georgia, USA was a well-supported and successful meeting, as befits the Commission which relates directly to the underlying purpose of almost all ISPRS activity. WG IV/3 plays an increasing role at such meetings, reflecting the slow shift in emphasis from the creation of maps and databases to their revision, which is now well established among leading mapping organizations worldwide. Twelve poster papers were displayed and ten oral presentations were made in WG IV/3 sessions. In addition, many contributions to other WG sessions could just as easily have fallen within this WG. While all made valuable reports on developments, the leading edges of practice and research could be considered as represented by Armenakis and Savopol (two contributions from Canada), Brand and Newby (two contributions from the UK), Peled (Israel), Galetto (Italy), Plietker (Germany) and Boesch (Switzerland). Papers by Young (USA) and Deren Li (China) gave fascinating insights into the problems of maintaining mapping efforts in those two great countries. In other WGs, Meister (Switzerland), Kempainen (Finland), Shibasaki (Japan), Heipke (Germany), Spradley and Clark (both USA), addressed problems or presented developments of considerable importance to the evolution of database revision.

WG IV/3 News

In addition to the technical proceedings in Athens, the WG IV/3 met for one business meeting. Despite program pressures which led to this meeting being held before the formal opening of the symposium, 15 members attended and discussed the future of the WG for the remainder of this session and beyond. The WG has acted as a medium of communication about developments, not as a prescriber of research, although naturally the terms of reference published at the start of the 1992-1996 session provide a framework. This *modus operandi* was endorsed by the meeting and it was agreed that no revision of terms of reference were necessary, although a shift of emphasis towards the database and away from the map per se was readily agreed upon. Collaboration with other relevant groups was emphasized. This is exemplified by the reports by Brand and Galetto noted above, which emerged from an OEEPE project on database updating. The WG Chairman has also made contact with the ICA WG on temporal databases, although this has not yet led to any practical result. The need for an additional Workshop between the Symposium and Vienna Congress was discussed. Although this was agreed to be desirable in principle, practical obstacles to getting the right worldwide constituency assembled more often than every two

years were acknowledged. Moreover, the WG Chairman's recent early retirement from the Ordnance Survey of Great Britain, as a result of a major reorganization there, makes it less likely that such a meeting will be possible in 1995. A clearly identified need for a highly focused workshop could still change this position. Meanwhile, proposals for session and a tutorial at the Vienna Congress have been submitted.

WG IV/4 - "Digital Elevation Models (DEMs) and Digital Orthoimages for Mapping/GIS Applications"
by Chairman: Dr. Luiz Vieira Dias (Brazil)

State of Science and Technology of WG IV/4 Topics

Several topics related to the Terms of Reference for WG IV/4 have been the focus of much attention at various international meetings held this year. For example, on 9-13 May the Chairman of WG IV/4 attended the "II Euro Latin American Space Days Congress" in Buenos Aires, Argentina. At this meeting, the generation and use of digital elevation models (DEMs) was the subject of much discussion. On 16-19 May a symposium for the 20th anniversary of the GDTA was held in Toulouse, France. This symposium was attended by approximately 1,000 participants (mostly from Europe) and the subject of DEMs also received substantial attention. The Chairman of WG IV/4 presented an invited paper on DEMs at this GDTA Symposium. During the IGARSS'94 meeting held in Pasadena, California, (USA) in August, important contacts were made with the radar community to assess DEM generation from radar satellite imagery. Finally, the Chairman met with scientists at the Commission VII Symposium held in Rio, Brazil in September of 1994 and discussed the generation of DEMs and orthophotography.

With the exception of contacts between NASDA (Japan) and Chinese representatives during their respective visits to the Brazilian National Institute for Space Research (INPE), the Chairman of WG IV/4 believes there is a lack of special contact with Asian groups concerning the topics of DEMs and digital orthoimages for mapping and GIS applications. Contacts with the Brazilian, South American, North American and European communities are perceived to be adequate, but improved contact should be made with Asia (especially Korea and Thailand) and Africa (at least South Africa and Kenya).

Accomplishments of WG IV/4 During 1994

The main activity of WG IV/4 was the Commission IV Symposium held in Athens, Georgia, USA. Two oral

Technical Sessions and one poster Technical Session were organized by WG IV/4 and all had an active participation.

WG IV/5 - "Extraterrestrial Mapping"
by Chairman: Dr. Sherman S. C. Wu (USA)
WG Members: 35

State of Science and Technology of WG IV/5 Topics

Papers presented in the WG IV/5 Technical Session at the Commission IV Symposium represented the efforts of leading scientists involved in the mapping of extraterrestrial bodies in space. Although this subject may seem distant from the interests of other Commission IV WGs, participants at the Symposium found WG IV/5 presentations of interest because they included discussion on topics such as topographic mapping with stereo image data, DEM generation, the integration of multiresolution data for photogrammetric processing and the use of GIS for planetary science.

Research currently being conducted in Germany and the United States was reported at the Commission IV Symposium. Papers of note included German scientists' plans for the processing and analysis of image data acquired by the Mars '96 pushbroom cameras (Oberst, et al and Tang) and an Invited Paper on the Lunar Clementine mapping mission and Lunar Control Network by Davies (USA).

Accomplishments of WG IV/5 During 1994

WG IV/5 currently has over 35 members organized into eight Sub-WGs listed below. A major goal of these Sub-WGs is to produce a book entitled, "*Extraterrestrial Mapping*".

1. Cameras, remote sensing devices, and data acquisition.
2. Data processing, enhancement, and management.
3. Coordinate system and control network.
4. Mapping techniques and instrumentation.
5. Advancement of technology.
6. Archives and publications.
7. Planetary missions and coordination.
8. International cooperation.

WG IV/5 organized one oral Technical Session at the Commission IV Symposium held in Athens, Georgia, USA. Seven papers were devoted to aspects of extraterrestrial mapping. Highlights from these presentations are listed below.

WG IV/5 News

WG IV/5 is currently organizing a two-day Workshop on Extraterrestrial Mapping. Although the location and the time for this workshop has not yet been established, the session structure and preliminary program has been proposed. One session will focus on planetary mapping including Lunar Clementine Mission, Venus Magellan Mission and Jupiter Galileo Mission. A second session will include presentations on mapping Mars from data acquired by the Russian Mars '96 Mission and the Mars Global Surveyor Mission.

WG IV/6 - "GIS and Expert Systems for Global Environmental Databases"

by Chairman: Dr. Ryutaro Tateishi (Japan)

Co-Chairman: Dr. Hiroshi Murakami (Japan)

State of Science and Technology of WG IV/6 Topics

There is a common recognition that the development of global environmental databases is the first important step for global change research. Global environmental databases have been and are being developed by various organizations and individual researchers. These organizations/groups include NGDC, Global GRASS, UNEP/GRID, FAO, CIESEN, IGBP-DIS, UCAR/NCAR, ESA, USGS/EDC, IIASA, WGI and NASA. Although their efforts are valuable, there is a lack of basic common concept/architecture. There also is some cultural bias, in that most of these efforts are being conducted by the USA and European countries.

Based on these observations, WG IV/6 should focus its attention on the following topics.

- Establishment of concept/architecture of global environmental databases.
- Elimination of cultural bias by promoting research on the development of global environmental databases in developing countries. This is necessary for source data acquisition and verification of the developed data.

Accomplishments of WG IV/6 During 1994

WG IV/6 organized two oral Technical Sessions and one poster Technical Session at the Commission IV Symposium held in Athens, Georgia, USA. Several interesting papers were presented on global databases for the support of ecosystem/global modeling efforts.

For example, Loveland (USA) discussed the development of 1-km global land cover products, Madry, et al, (USA) presented global GRASS datasets that are available on CD-ROM, and Ann and Tateishi (Japan) provided information on the estimation of global potential evapotranspiration. Other papers included discussions on the use of expert systems for water quality management (Kim, et al, Korea) and for modeling *Cannabis* cultivation (Fung, USA).

In addition to the activities of the Mid-Term Symposium, a Survey of National and Regional Geographic Data Bases has been started by WG IV/6. This survey was distributed to all Ordinary Members and related organizations. It is intended to determine if there are national and regional databases that can be used for integration into global scale analysis and research. The results of this survey will be published by the next ISPRS Congress.

WG IV/6 News

- 30-31 May 1995

The Second International Workshop on Global Databases will be held at the National Geophysical Data Center (NGDC)/NOAA, E/GCI, in Boulder, Colorado. The objectives of this workshop are to 1) promote communication among projects, institutions and individual researchers who are engaged in the production of global data sets/databases of environmental key variables; 2) clarify problems in global data sets/database production; and 3) find ways to facilitate the production of truly useful global databases.

This workshop will be followed by the GLOBE Meeting which will feature the Global Land One-km Base Elevation Data Set. Contact David Hastings, National Geophysical Data Center (NGDC), Boulder, Colorado, USA, Tel: +1 303-497-6729, Fax: +1 303 497-6513 for information on the GLOBE Meeting.

- The Asian Association on Remote Sensing (AARS), a Regional Member of ISPRS, has established a WG which is closely related to the activity of ISPRS WG IV/6. The name of the WG is "1-Km Land Cover Database of Asia". The AARS WG has 44 members from 27 Asian/Oceania countries. Its objectives are to develop land cover databases of Asia and near Asia with the resolution of 1 km using NOAA AVHRR data and to develop global land cover databases by cooperating with other organizations or groups. The chairman of the AARS WG is Ryutaro Tateishi (FAX: +81-43-290-3857), who also is the chairman of ISPRS WG IV/6.

TECHNICAL COMMISSION V

"CLOSE RANGE TECHNIQUES AND MACHINE VISION"

Prof. John G. Fryer, Commission V President

Dr. Mark R. Shortis, Commission V Secretary
(AUSTRALIA)

TERMS OF REFERENCE

- Close-range and microrange measurements
- Recording and monitoring of objects in motion and under deformation
- Optical and integrated close-range sensor systems
- Digital systems and time constrained solutions in close-range applications
- Image analysis and image synthesis algorithms in close-range applications
- Object related processing techniques in automatic, semi-automatic and manual mode in close-range applications

STATE OF SCIENCE AND TECHNOLOGY OF COMMISSION V TOPICS

From the above descriptions of the high technology field in which Commission V activities take place, it can be recognized that the emphasis is ever-increasing on real-time image capture systems which, by the very applied nature of this Commission, must perform to design specifications and produce a result which satisfies a client. The state-of-the-art was well demonstrated at the Inter-Congress ISPRS Commission V Symposium held in Melbourne, Australia from 1 - 4 March, 1994. Approximately 80 papers, over 70 of them presented by overseas researchers, were offered to a gathering of 140 registrants. The Symposium was held in conjunction with two other major conferences which had the themes of Remote Sensing. Nearly 600 participants enjoyed these three concurrent conferences. Some of the plenary sessions were shared, with papers of common interest presented to stimulate scientific interaction.

The practical, developed nature of Commission V's activities were summed up by a senior scientist at the closing session when he indicated what he now understood as the difference between the 'real-time'

photogrammetric industry and that of remote sensing. The requirement to produce a result, often in near-real-time, for a client who is willing to pay and enter a firm contract was seen as the distinguishing feature of Commission V. These activities supported private firms who can compete with other measurement technologies in the market place. Therefore there is a sense of applied, practical science associated with Commission V activities which is still lagging in many of the image gathering fields associated with satellite platforms where the technology, and the clients, have not yet fully determined their market requirements.

This ethos of producing a result by using the highest, yet most cost-effective, technology suited to a particular task was a major theme which underlined the success of the Melbourne Inter-Commission Symposium of Commission V.

ACCOMPLISHMENTS OF COMMISSION V DURING 1994

Commission V's major achievement was the successful organization and staging of the Inter-Congress ISPRS Commission V Symposium. This Symposium was held at the World Trade Centre in conjunction with the Seventh Australasian Conference for Remote Sensing and the Second Pacific Ocean Remote Sensing Conference. A total of nearly 600 scientists were present and at the joint opening session Dr. Noel Brown of the United Nations addressed the gathering on the need to integrate our technologies and work together on large matters of global environmental concern.

A large equipment and technical trade display was held in conjunction with the Symposium. Such a gathering of image capturing equipment (literally from satellites to microscopes) could not have been assembled, nor attracted, by holding the Commission V Symposium in isolation in a country with a relatively small population like Australia.

Several WG Chairman have also been involved with other international events throughout the year, notably:

- "Videometrics III", held in Boston, USA during 2-4 November 1994 as part of SPIE's International Symposium on "Photonics for Industrial Applications".
- Organization of one technical session and one poster session devoted to topics related to Commission V during the ISPRS Commission III Symposium, 5 - 9 September 1994, Munich, Germany.
- Full-day tutorial on "3-D Image Metrology Systems and Applications" by H. Beyer and E. Baltsavias presented at the SPIE Symposium "Photonics for Industrial Applications" 31 October - 4 November 1994 in Boston, USA.
- CIPA meeting and International Colloquium on "Photogrammetry for History and Restoration" held in Bari, Italy, 12 November 1994.
- Second International Symposium on Three Dimensional Scoliotic Deformities and 8th International Symposium on Surface Topography and Spinal Deformity held at Pescara, Italy 26-30 September 1994.

WORKING GROUP ACTIVITIES DURING 1994

WG V/1 - "Knowledge Based Vision Metrology"

Chairman: Prof. Kam W. Wong (USA)
Co-Chairman: Dr. Sabry El-Hakim (Canada)

State of Science and Technology of WG V/1 Topics

The best indicators for the state of science and technology are the contents of papers from the various symposia and conferences with which these WG Chairmen were involved this year. The major topics follow closely the terms of reference and can be grouped into; sensors, algorithms, and applications, with particular emphasis on the applications.

In the choice of sensors, to meet the diverse application requirements, a significant trend away from traditional CCD camera imagery has been observed. Active 3-D laser scanners, integration of range and intensity data, high-speed solid-state cameras, still video, VCRs, structured light, MR images, coded illumination, and a unique peak store frame buffer have been employed.

Camera calibration and system performance evaluation remain to be critical issues for vision-based measurement systems. Algorithms for image metrology included; edge detection, image enhancement and smoothing, subpixel measurements, and target matching.

Selection of the proper vision system requires matching the application demands with the performance characteristics of the system. A variety of applications, using different sensors, system components and configurations, and algorithms were presented. On-line robotics control for car industry and in a large-gap magnetic suspension system, deformation measurement, dynamic tracking of blood vessels and patients undergoing radiation therapy, precise coordinate measurements in shipyard, automatic inspection of inside pipes and tunnels, measurement of structural clearances, and object shape analysis were described.

Accomplishments of WG V/1 During 1994

A major activity has been the preparation for scientific symposia.

- Inter-Congress ISPRS Commission V Symposium: WG V/1 sponsored eight papers at the ISPRS Commission V Symposium. The papers reported on algorithms for image orientation and 3-D extraction by using lines and edges, camera calibration using planar constraints such as brick walls, and a knowledge-based system for performing stereo video measurements.

- SPIE's Videometrics III:

The conference on Videometrics, held in Boston 2-3 November 1994 as part of SPIE's International Symposium on Photonics for Industrial Applications, addressed developments and applications of the state-of-the-art vision-based measurement technologies. Thirty-seven papers from 13 different countries were included in eight technical sessions. Papers were solicited to show the diversity and the multi-disciplinary nature of this field and to cover the many aspects of vision-based measurements.

WG V/1 News

Forthcoming activities and Symposia in which the WG will play a major role include:

• 22-27 October 1995

"Videometrics IV", part of SPIE International Symposium on "Intelligent Systems and Automated Manufacturing", in Philadelphia, Pennsylvania, USA.

WG V/2 - "Close Range Imaging Systems and Their Performance"

Chairman: Dr. Horst A. Beyer (Switzerland)
Co-Chairman: Volker Uffenkamp (Germany)

State of Science and Technology of WG V/2 Topics

The Commission V Symposium was the most outstanding event of the report period. WG V/2 was well represented in Melbourne with 4 sessions including 15 oral presentations and several poster sessions. The session titles grouped the themes of the papers very well and were detailed as;

- Performance in Algorithms
- Advances in Imaging Technology
- Calibration of Optical Systems
- Performance in Applications

Some quite interesting presentations were given, and reading the proceedings of the Symposium is very worthwhile. The papers clearly indicated that basic research and developments are undergoing an optimization process with regard to user friendliness.

A highlight was the relatively new technology of still-video cameras, which have come onto the market within the last couple of years. They allow an acquisition of digital images without the necessity of a permanent linkage between camera and computer. With a resolution of 2000 x 2000 pixels, and more, these cameras offer format and accuracy comparable to film-based middle-sized format cameras. They are on the way to revolutionize the daily practical work of close-range photogrammetry and demonstrate a certain gain in performance.

Accomplishments of WG V/2 During 1994

The Symposium in Melbourne was used to announce in detail our next workshop "From Pixels to Sequences - Sensors, Algorithms and Systems", scheduled for 22-24 March 1995 in Zurich, Switzerland. Planned as a common workshop together with Videometrics IV, 22-26 October 1995, Philadelphia, and Optical 3-D Measurement Techniques, 2-4 October 1995, Vienna, WG I/3 ("Optical Digital Imaging Systems") and Inter-Commission WG V/III ("Image Sequence Analysis"), will be an important event in 1995. The workshop intends to deal with the whole range of digital image technology from data recording to data evaluation, emphasizing on precision, reliability, robustness, speed, technical advancements and new applications. Approximately 25 oral presentations including some keynote speeches were expected but by December, 1994 over three times that number of abstracts had been received.

The WG V/2 Chairmen have met several times in the period March to October 1994 to discuss WG affairs. The main topics have been publication of the Zurich

Workshop, distribution of invitation sheets using personal contacts and evaluation of invited speakers. The remainder of 1994 will continue this theme, including the session planning.

WG V/3 - "Structural and Industrial Measurements with Consideration of CAD/CAM Aspects"

Chairman: Dr. Clive S. Fraser (Australia)
Co-Chairman: Prof. Heinz Ruther (South Africa)

State of Science and Technology of WG V/3 Topics

The state of development of the WG's areas of interest are best reflected by the papers presented at the Commission V Symposium in March 1994, where the WG was allocated three technical sessions. Twelve papers were presented as well as a number of posters. As is typical for the WG, reported projects covered widely diverse applications ranging from engineering structures to accident scenes, medical measurements and underwater deformation surveys. The application of close range photogrammetry to reverse engineering and quality control in industry has, with the improvement of digital systems, the potential of opening an exciting new field for photogrammetrist. Papers on this topic indicated that industry is beginning to accept photogrammetry as a viable and reliable means of providing metric information of acceptable accuracy. Only a few papers dealt with interfacing of photogrammetric systems to CAD/CAM and this area is still very much in a development stage. There is ample room for work in this aspect of the WG's terms of reference and it is hoped that attention will be given to interfacing CAD/CAM to photogrammetric systems and that successful implementations will be reported in future meetings.

Accomplishments of WG V/3 During 1994

During the report period the chairmen of the WG had a number of occasions to meet and discuss WG matters. The WG chairmen attended the ISPRS Commission V Symposium in Melbourne, the ISPRS Commission III Symposium in Munich in September, the Commission VI Symposium in Beijing and the LIESMARS meeting in Wuhan in October.

The activities of the WG, due to its largely application oriented nature, tend to focus on the presentation of papers and project reports at symposia and conferences. Communication among WG members between these events is limited and is largely restricted to 'remaining in contact'. However, this does not suggest that there is no need for the WG. On the contrary, the WG provides a home for the important implementation of

the novel techniques, technologies and algorithms developed and discussed in the other WGs of ISPRS. The fact that the WG is alive and well is borne out by the typically large number of papers offered for presentation at WG sessions in ISPRS congresses.

WG V/3 News

• 7-10 February 1995

A symposium of FIG Commission VI has been organized by Heinz Ruether to be held in Cape Town, South Africa. One of the sessions of this symposium has been dedicated to ISPRS WG V/3. During this session papers will be presented by Commission President John Fryer and by Henrik Haggren, Clive Fraser and Heinz Ruether.

WG V/4 - "Photogrammetry in Architecture and Archaeology"

Chairman: Cliff L. Ogleby (Australia)

Co-Chairman: Dr. Andreas Georgopoulos (Greece)

State of Science and Technology of WG V/4 Topics

- Consolidation of research directions with respect to use of CAD to aid in visualization of ancient monuments.
- Investigations into appropriate surface modelling routines to best define surfaces derived from photogrammetric measurement.
- Development of photogrammetric systems on personal computer platforms for architects and archaeologists.

Accomplishments of WG V/4 During 1994

- An increase with the liaison with CIPA, which is an international forum for promoting the use of photogrammetry to architects.
- Involvement of WG V/4 in CIPA WGs.
- Presentation of papers at the ISPRS Commission V Symposium in Melbourne.
- Involvement of Co-Chair Ogleby in organization of Commission V Symposium.
- Use and encouragement of international E-mail forum for discussion.
- Support of development of CIPA page on World Wide Web system.

- Organization of WG sessions for Vienna ISPRS XVIII Congress, including CIPA session for non-technologists.

WG V/5 - "Biostereometrics and Medical Imaging"

Chairman: Dr. Thomas Leemann (Switzerland)

Co-Chairman: Dr. Harvey L. Mitchell (Australia)

State of Science and Technology of WG V/5 Topics

The ISPRS Commission V Symposium incorporated three sessions devoted to medical photogrammetry. Papers in two sessions included discussions on the three-dimensional use of X-rays, automated back surface measurement, photodynamic therapy of cancer cells and the dynamics of movement, while the keynote speaker in this section related work on the fascinating task of positioning probes being inserted into the human head during brain operations.

The third of the sessions for this WG was given to an informal open discussion, primarily on the matter of the limited implementation of medical photogrammetry despite the effort being devoted to this area of study. The topic of this discussion has become important to the WG, because, over the last year, the Co-Chairs have been increasingly concerned that, to obtain the most benefit from the WG, its activities need to be directed towards issues, rather than technical matters.

Accomplishments of WG V/5 During 1994

The need to concentrate on a "social" issue such as the apparent under-utilization of photogrammetric achievements in the medical field, is partially due to the wide technical diversity of the WG such that technical meetings are not necessarily as productive as they may be for other WGs. In contrast, the non-technical issues which the WG members have in common are quite crucial.

WG members are involved in measurements on a range of areas of the body, from the eye to the entire trunk, using a wide range of techniques, now expanded via digital processing and a range of newer technologies in medical imaging. But it appears that they have a limited amount of technical concerns in common. However, what they do have in common is a range of constraints arising from measurement on live human patients, constraints relating to patient movement, comfort, convenience, safety, even modesty. What they furthermore have in common is the need to relate to non-photogrammetric medical and health practitioners, not only in order to understand their wants and needs

but also to be able to supply medically important information in a useable form.

So, despite the technical diversity, there are many concerns for the WG to consider, including ensuring wider acceptance of photogrammetric methods, finding acceptable means of supplying medically useable information from measurements, considerations of commercial development, means of encouraging the directions of future research, the avoidance of duplication of R&D effort, establishing channels of communication with the broader medical community, and so on.

In some matters, serious problems in medical photogrammetry are now becoming clearer. As the enquiries made by the Co-Chairs show, photogrammetric techniques are being widely developed for gait analysis and back shape recording systems, without reference to established photogrammetrists. Numerous such systems are being sold commercially, and in the case of gait analysis systems, at prices of hundreds of thousands of US dollars, without involvement of ISPRS members. Indeed, the ISPRS is not well known in those medical and bio-engineering circles which could use ISPRS members' expertise.

Hence, it is believed that the most appropriate way to use the WG resources is to examine and report on broader issues. Accordingly, the current priority of the WG is to prepare a report on such issues in medical photogrammetry, particularly referring to the issue of under-usage of photogrammetrists' skills in the medical world in the future. Many readers of this report will know that we have commenced to survey medical practitioners and photogrammetrists, extending beyond the membership of the WG where possible, on their use of photogrammetric and other measurement techniques for medical purposes. The responses will help in the compilation of a report on our findings for the 1996 Vienna Congress, but Council should note that WG members will be invited to contribute to the findings expressed in the report and so it will not only be the opinions of the Co-Chairs.

Unfortunately, some of the matters referred to above have only become clearer to the Co-Chairs as their time in the WG has passed, and the above-mentioned activities held in Melbourne helped to confirm these concerns.

WG V/5 News

This WG has published regular newsletters and can report considerable success from a recent questionnaire

(faxed replies) concerning the level of implementation of photogrammetric techniques into routine medical practice. Analysis of those replies is ongoing with a further report to be published in early 1995 and a final report to the 1996 Vienna Congress.

Approaches to the UK Medical Photogrammetry Group (with assistance from a Council member) to have a joint meeting with this WG in 1994 have, unfortunately, met with no response. The Co-Chairs will now consider the question of whether a (non-technical) meeting could be held to discuss these issues, in 1995, a matter to be taken up in consultation with other Commission office-bearers.

Inter-Commission WG V/III -

"Image Sequence Analysis"

Chairman: Dr. E. Baltasvias (Switzerland)

Co-Chairman: Dr. H.H. Baker (USA)

State of Science and Technology of Inter-Commission WG V/III Topics

Topics related to image sequences, dynamic processes, navigation and motion are constantly gaining in importance both from a theoretical (development of algorithms, sensors and systems) but also, and particularly, from a practical point of view (applications). This trend is clearly demonstrated by the topics of photogrammetric, computer vision, and related conferences the last few years.

The major topics that were handled in the papers submitted to photogrammetric conferences are:

- Surface reconstruction, stereo analysis
- Feature extraction, object detection and recognition
- Tracking in 2-D and 3-D (including deformation analysis)
- Sensor orientation, motion estimation, navigation, obstacle detection
- Camera and system calibration
- Systems and applications (indoor robots, outdoor vehicles, medicine, sport, flow studies)
- Real-time vision systems, real-time mapping

Very little was presented on:

- Sensor fusion
- Active vision
- Placement of the sensors
- Motion planning

The short terms of reference are not informative enough and are very broad, while the extended ones are too detailed. The experience since the Washington

Congress has shown that the majority of the papers are on certain topics, while others are only slightly treated or not at all. Thus, the terms of reference should be reformulated in 1995 before the Vienna Congress with aim to point out some major research areas and make the terms of reference more definitive.

Accomplishments of Inter-Commission WG V/III During 1994

- Preparation and organization of three technical sessions during the March Commission V Symposium. One of the sessions was co-organized with the IUSM WG "Automated Control Measurements".
- Preparation and organization of one technical session and one poster session (devoted mostly to topics related to our WG) during the September 1994 ISPRS Commission III Symposium in Munich.
- Although the WG as such did not have an official role, several topics of our WG were represented, and active researchers presented their work, at the "Videometrics III", 2 - 4 November 1994, Boston. Two of the eight sessions there were devoted to dynamic tracking and motion analysis.
- A full-day tutorial on "3-D Image Metrology Systems and Applications" was presented at the SPIE Symposium "Photonics for Industrial Applications" 31 October - 4 November 1994, Boston by H. Beyer and E. Baltsavias.

Inter-Commission WG V/III News

An updated tutorial on 3-D Image Metrology Systems has been proposed for the Vienna Congress. For the Vienna Congress, the WG has made proposals related to number of sessions, session titles and possible speakers for our WG during the Vienna Congress.

This WG does not have a concrete list of WG members and does not distribute circular letters on a regular basis. The Co-Chairs prefer, for the time being, to follow a more relaxed scheme. They have a list of people that do research on the topics of the WG and these people are addressed on specific occasions like Symposia etc. However, there are a number of people who regularly present papers/participate/show interest in the WG activities (and these can be considered as WG

members). There is a major weakness in the number of computer vision people from North America who are attracted to ISPRS activities.

• 22 - 24 March 1995

Other major involvements of this WG include preparation of an Inter-Commission Joint Workshop, to be held in Zurich. This WG has played the leading role in the establishment of cooperation with WGs I/3 and V/2 and preparation of the workshop. The first announcement and call for papers attracted 78 papers from 15 countries. 36% of the papers are related to this WG and 12% are general but related to the WG. The diversity of the papers (academia, research centres, private companies, photogrammetrists, computer vision, electrical and electronic engineering) is remarkable. To be noted is that only one-third of the submitted papers come from photogrammetrists, and that more than 20% come from private companies. The preliminary program will be distributed in January.

Other activities have involved active linking and cooperation with other WGs. Liaison with WG I/3 and WG V/2 is established. Approaches are being made to other WGs such as I/2, II/2, III/1, III/2, and III/3 which handle related topics of interest. Some of this contact will take place at the Workshop of WGs I/2 and III/1 in September 1995, in Barcelona.

Newsletters from the Japanese ARIDA (Assoc. for Real-Time Imaging and Dynamic Analysis) group have been received and they will actively participate in our 1995 Joint Workshop and hopefully also for the Vienna Congress.

In 1995 a special issue of the *ISPRS Journal* on topics of the WG has already been discussed with the chief editor, D. Tait. It is planned for end of 1995/beginning of 1996. Papers submitted to the Zurich workshop and other invited contributions will be selected for publication.

Other conferences important to the operation of this WG include:

- Videometrics IV, 22-26 October 1995, Philadelphia, USA
- Optical 3-D Measurement Techniques, 2-4 October 1995, Vienna, Austria

TECHNICAL COMMISSION VI

"ECONOMICS, PROFESSIONAL MATTERS AND EDUCATION"

Prof. Dr.-Ing. Deren Li, Commission VI President
Dr. Jianya Gong, Commission VI Scientific Secretary
Xiaoqin Hu, Commission VI Administrative Secretary
(CHINA)

TERMS OF REFERENCE

- Collection, analysis and comparison of educational and training programs and changes in photogrammetry, remote sensing and GIS/LIS
- Investigation of cost and efficiency models in photogrammetric and remote sensing operations
- Investigation of operational management aspects for remote sensing and GIS technology
- Collection and synthesis of reports on national and regional activities
- Promotion and dissemination of information
- Promotion of computer assisted teaching
- Identification of the proper channels for international technical cooperation
- Completion of the History of Photogrammetry
- Promotion of the inclusion of other languages in the Multilingual Dictionary
- Development of recommendations for standards of competence in photogrammetric and remote sensing practice

STATE OF SCIENCE AND TECHNOLOGY OF COMMISSION VI TOPICS

At the Commission VI Symposium held in Beijing, China, 10-15 October 1994, many of the presentations and heated discussion were around the history, development and future trends of our discipline of photogrammetry and remote sensing, which inevitably touched upon the issues of terminology, standardization and compilation of multilingual dictionaries or other information materials. Meanwhile due attention was also given to international cooperation in our profession and education.

However, the most highlighted points in the papers received and presented are the following:

• *Education and Training*

This is a very important issue in our discipline. It will follow the progress and changes in the high technologies; will take the mode of multi-level, multi-status and multi-way in the future; will be more active, flexible, modular and project-oriented; and will integrate photogrammetry, remote sensing and GIS.

• *Computer Assisted Teaching (CAT)*

Hardware, software and datasets are now available for CAT, but more attention to CAT is required in developing countries.

• *Future Directions of Our Discipline*

Faced with changes, chances and challenges, our discipline needs reorganization, reorientation and even renaming, which calls for more reviews and discussions and should be a topic at the Vienna Congress in 1996.

ACCOMPLISHMENTS OF COMMISSION VI DURING 1994

The International Symposium of Commission VI "Facing the Chance and Challenge" was held in Beijing, China from October 10 through 15, 1994. It attracted to Beijing 78 active participants from 19 countries and regions in six continents, with 52 of them from outside of China.

The Symposium featured seven technical sessions with 27 presentations, five demonstration sessions with seven software packages, two tutorial sessions, one business meeting, one panel discussion and two technical visits. Thirty-nine papers by 75 contributors from 16 countries were received and a proceedings of 200 pages was published as Volume XXX, Part 6 of the **International Archives of Photogrammetry and Remote Sensing**.

The topics for the sessions were:

- Session 1: Education and Training (I)
- Session 2: Computer Assisted Teaching (I)

- Session 3: Terminology and ISPRS Multilingual Dictionary
- Session 4: International Cooperation and Technology Transfer
- Session 5: History and Development
- Session 6: Computer Assisted Teaching (II)
- Session 7: Education and Training (II)
- Tutorial 1: GeoStar - an Object-oriented GIS (Jianya Gong, China)
- Tutorial 2: Visualization of the Quality of Data in GIS (Karl Kraus, Austria)

Business Meeting: How to Promote Computer Assisted Teaching in Developing Countries

Panel Discussion: The Future of Photogrammetry and Remote Sensing

All six ISPRS Council Members; the Editor of the *ISPRS Journal*, Dr. David A. Tait; and two Honorary Members of ISPRS, Prof. Wang Zhizhuo (China) and Prof. Gottfried Konecny (Germany) were present as panel speakers, as a special honor for Commission VI.

At the demonstration sessions the following software packages were presented:

- DIPNET - developed and demonstrated by Professor Yang Minghui of the Chinese Academy of Surveying and Mapping in Beijing.
- IDRISI - developed and demonstrated by the IDRISI Project team at the Clark University of USA.
- ASEAN
- GIW
- IMDISP - demonstrated by Dr. Kohei Cho of Research and Information Center at Tokai University in Japan. (Refer to WG VI/2 activities for developers.)
- WuDAMS - a fully automatic digital image matching software developed and demonstrated by Professor Zhang Zuxun of Wuhan Technical University of Surveying and Mapping of China.
- GeoStar - an object-oriented GIS software developed and demonstrated by Professor Dr. Jianya Gong of Wuhan Technical University of Surveying and Mapping of China.

In conjunction with the symposium, the annual Joint Meeting of ISPRS Council and Commission Presidents and an ISPRS Council Meeting were held in the same

building. Dr. Song Jian, the State Councilor of Chinese Government met with most of the Council Members, Commission Presidents and the *ISPRS Journal* Editor.

Also during the symposium at a Commission VI Board Meeting, the ISPRS Council convened with the President, Secretaries, WG Chairpersons and former President of Commission VI to: review the work of the Commission and each WG for the past two years; evaluate the Symposium; and discuss the role of the Commission in the 18th ISPRS Congress in Vienna. A proposal was made at the meeting, which suggested a special poster and demonstration session at the Vienna Congress for Computer Assisted Teaching (CAT), which will be of the nature of a competition and the three best CATs will be duly awarded.

Some participants paid two technical visits to the Chinese Academy of Surveying and Mapping and the Beijing Institute of Surveying and Mapping, where they were much impressed with the facilities and the research work completed or under way.

After the Beijing Symposium, the Third International Colloquium of LIESMARS (National Laboratory for Information Engineering in Surveying, Mapping and Remote Sensing) co-sponsored by Commission VI was held at Wuhan Technical University of Surveying and Mapping in Wuhan, China from 18-20 October 1994. The title of the Colloquium was "Integration, Automation and Intelligence in Photogrammetry, Remote Sensing and GIS (IAI '94)."

This Colloquium provided a rare opportunity for experts in our area to focus on the latest developments in the integration, automation and intelligence in photogrammetry, GPS, RS and GIS with an intention to isolate the major problem areas and to discuss the directions of future research and development. The call for papers for the proceedings of IAI '94 met with very good response and attracted 37 qualified papers, which represented the latest academic achievements or practical developments in the subject fields.

The Colloquium attracted to Wuhan 55 Participants from 15 countries and regions. The technical sessions were classified into the following topics:

- feature extraction from digital images
- integrated navigation and production systems
- knowledge-based spatial data handling
- integrated environmental applications
- object-oriented approaches in spatial data handling
- urban applications
- spatial data handling and analysis: methods and algorithms

- large, multi-scale and temporal spatial databases

Many of the participants joined the technical visit to LIESMARS, Dept. of Photogrammetry and Remote Sensing, and Research Center for GIS at WTUSM.

WORKING GROUP ACTIVITIES DURING 1993

WG VI/1 - "Education, Training and Educational Standards for Photogrammetry, Remote Sensing and GIS/LIS

by Chairman: Prof. Dr. Jozef J. Jachimski (Poland)
 Co-Chairmen: Dr. Greg P. Ellis (Australia)
 Prof. Chen Tuan-chih (China Taipei)
 Prof. Olubodun O. Ayeni (Nigeria)

Accomplishments of WG VI/1 During 1994

The Beijing Symposium of Commission VI, 10-15 October featured two sessions of Education and Training, at which the situation of education in photogrammetry, remote sensing and GIS in USA, China, UK, New Zealand, Poland and Malaysia was introduced and discussed.

WG VI/1 News

At Beijing Symposium, the ISPRS Council held a joint Board Meeting with Commission VI officers, where a proposal was made and agreed upon that Prof. Dr. J. J. Jachimski replace Dr. Steven D. Johnson as the chairman for the WG. Dr. Johnson has resigned from his original post due to heavy social and academic responsibilities, but promised to continue making his contribution to the activities of the Commission.

A plan has been made to hold an education conference in Kracow, Poland in 1995 to discuss ways for the promotion of education in photogrammetry, remote sensing and GIS in the eastern European region under the new situation.

WG VI/2 - "Computer Assisted Teaching"

by Chairman: Dr. Kohei Cho (Japan)
 Co-Chairman: Prof. Dr. Joachim Hoehle (Denmark)
 Co-Chairman: Prof. Charalabos Ioannidis (Greece)

State of Science and Technology of WG VI/2 Topics

Issuing of Newsletters

The WG VI/2 issued CAT (Computer Assisted Teaching) Newsletters No. 1 and No. 2 in 1994. The newsletters cover all the activities of the WG and are

distributed to the members of the WG and those who are interested in CAT.

Software Distribution

The WG VI/2 is collecting/developing non-commercial software for computer assisted teaching, which have been distributed at the Commission VI Symposium and on other occasions. WG VI/2 will continue to collect/develop software for training. The following software are currently distributed by the WG:

- IMDISP (NASA/JPL) - an image processing software developed by NASA/JPL which runs on IBM-PC/MS-DOS environment.
- IMVIEW (Tokai University) - a simple image display software developed by Tokai University, which runs on MS-WINDOWS environment.
- ASEAN (by Dr. Duong of NCSR, Vietnam) - an image processing software for remote sensing, which runs on IBM-PC/MS-DOS environment.
- GIW (by Dr. Fuhu Ren of UNCRD) - a GIS software package which runs on IBM-PC/MS-DOS environment.

Data Sets Distribution

With the cooperation of NASDA the WG distributed 'SAR AND OPTICAL SENSOR DATA SET' CD-ROM upon request to WG members. WG VI/2 will continue to collect and provide this kind of datasets for training.

Accomplishments of WG VI/2 During 1994

- The Third Regional Remote Sensing Seminar on "Tropical Ecosystem Management", 23-28 August 1994, Bali, Indonesia.
 NASDA, United Nations ESCAP, UNCRD, LAPAN organized this seminar, which was attended by nearly 100 participants from 16 countries. The Program Chairman for the Seminar was Prof. Shunji Murai, President of ISPRS. Various presentations and discussions on the use of remote sensing and GIS for ecosystem management took place at the seminar. Dr. Kohei Cho and a number of experts from the WG VI/2 were invited to this seminar to perform a PC based hands-on training. About 20 junior participants from 15 countries have attended the training and learned about remote sensing and GIS.

- ISPRS Commission VI Symposium, 10-13 October 1994, Beijing, China.
 WG VI/2 organized two technical sessions and one business meeting at this Symposium, where a total of six presentations concerning computer assisted teaching

were given followed by discussions. It has become clear that the new computer technologies such as CD-ROM, Photo-CD, Internet, WINDOWS/GUI environment are greatly advancing the abilities of the computer assisted teaching. Several software for computer assisted teaching were demonstrated at the symposium. Several written contributions of the WG on CAT/CAL topics are included in the proceedings of the symposium.

WG VI/2 News

Software Evaluation

WG VI/2 plans to collect and evaluate software for computer assisted teaching. The results will be reported in the forthcoming newsletter.

Software Contest

WG VI/2 plans to perform a software contest on computer assisted teaching at the ISPRS Congress in Vienna in 1996. The details will be announced later.

• 28 March 1995

The teachers of photogrammetry and remote sensing of the northern European countries will discuss CAT/CAL at their meeting in Stockholm, Sweden on 28 March 1995.

• 30 June - 4 July 1995

Dr. Joachim Hoehle will report about the WG VI/2 activities at the International Conference on "Computer Based Learning and Science", which will be held at Opava, Czech Republic.

• August 1995

The Fourth Regional Remote Sensing Seminar on "Tropical Ecosystem Management" is planned to be held in the Philippines, supported by WG VI/2 which will also conduct a small-scale meeting at the seminar.

WG VI/3 - "Terminology and ISPRS Multilingual Dictionary"

by Chairman: Dr. Gerhard Lindig (Germany)

Co-Chairman: Dr. Joern Sievers (Germany)

Co-Chairman: Prof. Dr. Hans-Peter Bahr (Germany)

State of Science and Technology of WG VI/3 Topics

The progress of work on the ISPRS Dictionary is still not very satisfactory, as the response to the questionnaire was not encouraging. Nevertheless, the French Language Group (LG) sent valuable source materials and for the Greek LG the cancelled cooperation will be renewed. The WG is happy to welcome the new members from Romania.

From another source the WG received a copy of '*National Standard of PRC, Photogrammetry and Remote Sensing Terms*', which will surely help the work of the WG.

Accomplishments of WG VI/3 During 1994

One session at the Beijing Symposium on 11 October 1994 was devoted to the following topics:

- automatic translation of photogrammetric texts from English into Chinese
- terms and standards
- compilation of national standard for P & RS terms
- development of a retrieval system for surveying and mapping

The Chairman of WG VI/3 prepared his report for the Commission VI Symposium entitled 'ISPRS Multilingual Dictionary, Status 1994 and Presentation of the German Part' without personal presentation at the Symposium.

Co-Chairman, H-P. Bähr, chaired the WG session presenting his paper 'On Terms and Standards'.

Meanwhile, the Polish part was published at 2nd Edition, whose equivalents will be incorporated into the German part. (The 2nd improved Edition is under preparation.)

The compilation of the volume *Photogrammetry and Remote Sensing* of the trilingual *FIG Dictionary* with the intensive assistance of WG VI/3 has now started.

WG VI/4 - "International Cooperation and Technology Transfer"

by Chairman: Dr. Stanley A. Morain (USA)

Co-Chairman: Prof. Dr. Walter Schuhr (Germany)

Accomplishments of WG VI/4 During 1994

WG VI/4 chaired one technical session at the Commission VI Symposium in Beijing.

WG VI/4 circulated a letter requesting an inventory of ISPRS international cooperative and technology transfer activities to the ISPRS Ordinary Members. Responses received include the following:

• Turkey

Colonel Seydi Gürsel from the Ministry of National Defence, General Command of Mapping, Ankara reports that the Geodesy and Photogrammetry programs are progressing well. The geodetic control network for basic horizontal control is being improved and periodic

GPS measurements are being continued. Both analog and soft copy photogrammetry are progressing at 1:250,000 and, to lesser extent, at 1:25,000.

A series of new initiatives are also reported, some dating back to 1991. The National Gravity Network of Turkey (TUGA-91) has been defined and preliminary measurements are being made. The National Vertical Control Network of Turkey (TUDKA-92) and Turkish Geoid (TG-91) projects are also entering data collection phases. The collaborative program with Massachusetts Institute of Technology (USA) and Institute of Applied Geodesy (Germany) continues to evaluate GPS measurements and best fitting them to ED-50 and WGS-84 systems.

GIS activities have been expanded in 1994, including attention to GIS standards and terms of reference.

• *Iran*

Eng. A. Shafaat from the National Cartographic Center, Plan and Budget Organization, Tehran reports that NCC is extending geodetic networks using GPS. They are also continuing to expand and refine precise leveling and gravimetric networks, producing 1:25,000 national base maps and are completing production of a historical and national atlas of the Islamic Republic of Iran.

Among their other activities were:

- expatriate training for four staff members for MSc degrees (sponsored by UNDP) and completion of seven BSc engineers from ITC;

- production of two technical presentations at the ISPRS mid-term Commission IV Symposium, Athens, Georgia, USA;

- sponsorship of an international conference and exhibit on establishing a National Geographic Information System in Iran;

- commencement of the production of 1:25,000 and 1:1,000,000 GIS base maps; and

- hosting of in-house training courses for GIS and GPS.

• *Belgium*

J. Van Hemelrijck, Secretary for the Belgian Society for Photogrammetry, Remote Sensing and Cartography reports succinctly that they have held meetings in March, April, June, October, November and December resulting in two double volumes of its "*Bulletin Trimestriel*." Its new President is le Prof. R. Thonnard.

• *Japan*

Secretary General Ryutaro Tateishi from the Japan Society of Photogrammetry and Remote Sensing noted:

- aside from donating awards to best speakers and best posters at the Asian Association of Remote Sensing (ACRS), most international activities are performed by individuals, not by the Japan Society.

- A new organization is reported for Japan. The Association for Real-Time imaging and Dynamic Analysis (ARIDA) was established in 1994. It has bi-monthly meetings and produces a newsletter. Its contact is Professor Hirofumi Chikatsu, Tokyo Denki University, (fax) 81-492-96-6501.

- The Japan Association of Remote Sensing (JARS) was established in 1974, and celebrated its 20th anniversary in 1994.

• *Ethiopia*

Mr. Hadgu Medhin, Ethiopian Mapping Authority in the Transitional Government of Ethiopia provides the following summary activities:

- National Topographic Mapping Project at 1:50,000. At present 400,000 km² of the country are covered by a geodetic net using both traditional and satellite techniques;

- Map Revision Project at 1:250,000;

- Orthophoto Map Project;

- Remote Sensing. This consists of remote sensing studies for user-oriented applications; and

- Large Scale Map Production. Thematic maps for a variety of users and applications.

WG VI/4 News

A plan is being made to organize an education conference in 1995 in cooperation with WG VI/1, which will focus on the cooperation in remote sensing and GIS between the eastern and western parts of Europe.

WG VI/5 - "Tutorials"

by Chairman: Dr. Th. Bouloucos (Netherlands)

Co-Chairman: Prof. Dr. Zongjian Lin (China)

Accomplishments of WG VI/5 During 1994

- During the Commission VI Symposium, there was a tutorial organized by the Commission VI President.

- A workshop planned to take place in ITC in 1994 had to be postponed for the next year due to the presently ongoing reorganization of the Department of Geoinformatics at ITC.

WG VI/5 News

The following activities are planned for the future:

- An international workshop "Digital Photogrammetry and Geographic Information Systems - Status and Prospects" is planned to be organized at ITC in Enschede, The Netherlands in 1995.

- A one-day tutorial "Making the Introduction of GIS in Large Organization Manageable" is proposed for the Vienna ISPRS Congress in 1996.

WG VI/6 - "Economics and Business Management"

by Chairman: Dr. Gerard Begni (France)
Co-Chairman: Prof. Dr. Richard Groot (Netherlands)

State of Science and Technology of WG VI/6 Topics

The first report describing the two major projects from European Community using remote sensing data and techniques was given by SCOT CONSEIL of France, with the title "Economic and Financial Analysis of the MARS STAT and MARS CAP Project".

WG VI/Special Project - "History"

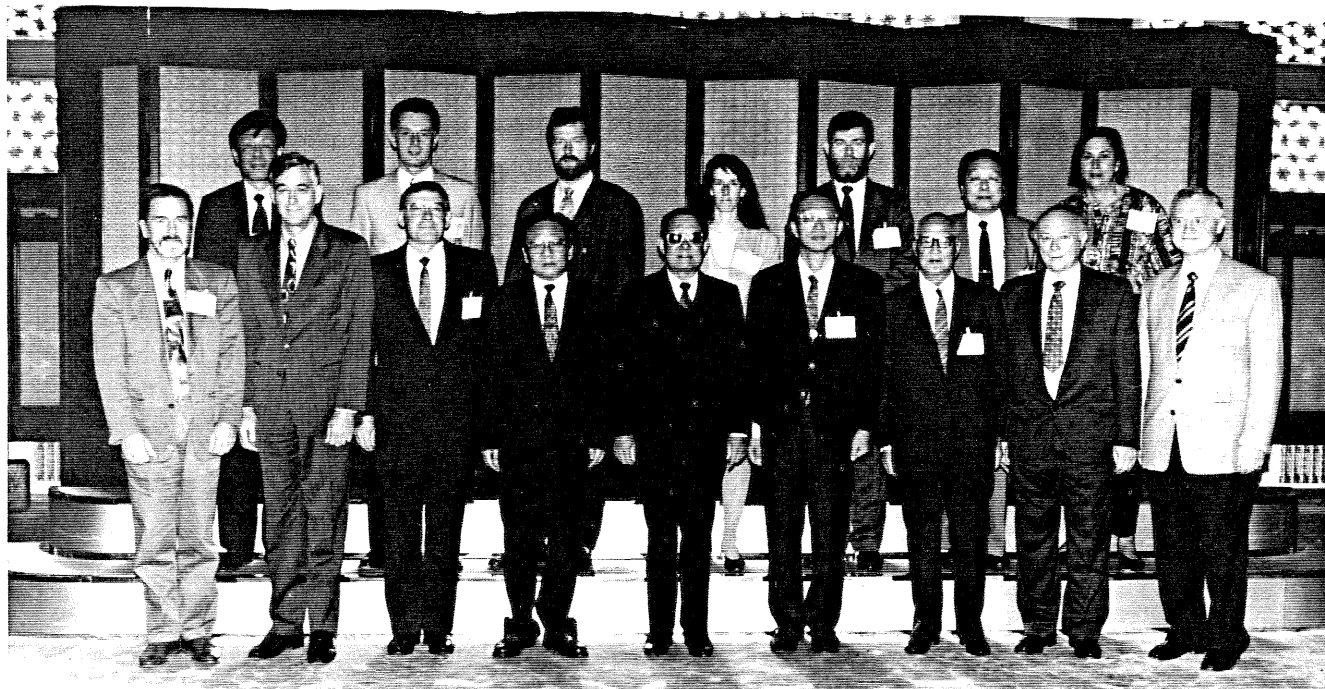
by Chairman: Prof. Dr. Deren Li (China)

State of Science and Technology of WG/SP Topics

After the edition and publication of Volume I of the *ISPRS History of Photogrammetry* in 8 languages: English, Chinese, Spanish, Japanese, German, Polish, Greek and French, the edition of Volume II met with some known-to-all difficulties. Therefore this Special Project has been mainly for the purpose of encouraging well-known experts, such as Honorary Members to write about and publish the history through their own efforts. ISPRS Council no longer offers financial support, although some senior experts have voiced their different opinions on the decision of the Council during the Beijing Symposium.

Accomplishments of WG/SP During 1994

One technical session of the Beijing Symposium was for the presentation and discussion on the history and development of photogrammetry and remote sensing.



ISPRS Officers meet with Dr. Song Jian, Deputy Premier of China for Science and Technology

(front row-l to r) 1st VP-K.Torlegard, Treas-J.Trinder, Secy Gen-L.Fritz, Dir NBSM China-Jin Xiangwen, Dpty Premier-Song Jian, Pres-S.Murai, Hon Mbr-Wang Zhizhou, Hon Mbr-G.Konecny, Cong Dir-K.Kraus.

(back row) NBSM-Prof. Yang Kai, Editor-D. Tait, Com III-K.Eder, Com IV-M.Remillard, Com V-J.Fryer, Com VI-D.Li, Com VII-A.M.Coutinho

TECHNICAL COMMISSION VII

"RESOURCE AND ENVIRONMENTAL MONITORING"

Dr. Roberto Pereira da Cunha, Commission VII President
Ms. Mônica Aparecida de Oliveira, Commission VII Secretary
(BRAZIL)

TERMS OF REFERENCE

- Methodology of visual image interpretation
- Methodology of computer-aided analysis of sensor data
- Spectral, spatial and temporal radiation properties of objects
- Environmental studies, resources inventories, and interpretative aspects of thematic mapping as applied in studies of vegetation, forestry, agriculture, soils, land and water use, geology, geomorphology, hydrology, oceanography, coastal zones, snow and ice, atmospheric sciences, archaeology, human settlements and engineering
- Integration of remote sensing and GIS techniques for the monitoring of resources and environment

ACCOMPLISHMENTS OF COMMISSION VII DURING 1994

During 1994 Commission VII concentrated its activities on the preparation and the organization of its mid-term Symposium - which was denominated **International Symposium on Resource and Environmental Monitoring - ECO-RIO'94**. The Symposium was held 26-30 September at the Convention Center of the Intercontinental Hotel in Rio de Janeiro, Brazil. Three hundred and fifteen papers were received by the Technical Commission of the ECO-RIO'94. About two hundred and forty papers were scheduled for presentations and were divided among poster session and invited papers.

The papers were printed in three volumes of the *International Archives of Photogrammetry and Remote Sensing, Vol. XXX, Part 7, Books A, B, C* totaling 976 pages. Papers not delivered on time by the authors

were published separately in *Vol. XXX, Part C - 10 pages - ABSTRACTS*.

The following organizations participated in ECO-RIO'94:

- Ministry of Science and Technology
National Institute of Space Research - INPE
São José dos Campos, SP, Brazil
- State Government of Rio de Janeiro
- Secretariat of Environment
- Secretariat of Industry, Commerce, Science and Technology, Rio de Janeiro, Brazil
- Brazilian Space Agency
- Prefecture of Rio de Janeiro, Brazil
- Brazilian Society of Cartography, Geodesy, Photogrammetry and Remote Sensing - SBC
Rio de Janeiro, RJ, Brazil
- Latin American Society of Remote Sensing
SELPER, Bogotá, Colombia
- Institute ACQUA, Rio de Janeiro - Brazil
- United Nations Office of Outer Space Affairs
Vienna, Austria
- Indian Space Research Organization - ISRO, India
- Foundation for Space, Science and Technology
FUNCATE, São José dos Campos, SP, Brazil
- SOS Mata Atlântica Foundation, São Paulo, SP
Brazil
- International Union of Forestry Research
Organizations - IUFRO

WORKING GROUP ACTIVITIES DURING 1994

WG VII/1 - "Physical Measurements and Signatures in Remote Sensing"

by Chairman: Dr. Gérard Guyot (France)

Secretary: Dr. Thierry Phulpin (France)

State of Science & Technology of WG VII/1 Topics

The state of Science and Technology of WG topics is presented in the conclusions of the Val d'Isère Symposium (pages: 1215-1234).

Accomplishments of WG VII/1 during 1994

Organization of the 6th International Symposium on "Physical Measurements and Signatures in Remote Sensing" from 17 to 21 January 1994 in Val d'Isère, France. The Symposium was materially organized by the Agence Française de l'Espace (CNES) with the support of:

- National Aeronautics and Space Administration (NASA)
- European Space Agency (ESA)
- Centre National de la Recherche Scientifique (CNRS)
- Institut National de la Recherche Agronomique (INRA)

The symposium was also sponsored by the following societies:

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

The scientific themes promoted during the Symposium included:

- Data preprocessing
- High spectral resolution in the solar spectrum
- Active microwaves
- Passive microwaves
- Polarimetric and directional effects in the optical domain
- Laser active remote sensing and fluorescence
- Use of Remote Sensing Data
- Future systems and projects for earth observation
- Association of physical measurement models and models representing the physical processes of the biosphere.

The Symposium gathered 242 participants from 17 countries (North America, Europe and Asia). They heard 36 oral presentations introduced by 20 co-chairs and previewed 153 posters and a total of 160 papers is published in the proceedings (1241 pages).

The Symposium had some original characteristics:

- a high scientific level due to a very severe selection of the submitted abstracts (40% of them were rejected);
- a structure to promote discussion and networking in key research topics: every half day consisted in a plenary session followed by an interactive poster session. Most of the papers were presented in poster sessions whereas the plenary sessions were reserved for a limited number of invited keynotes papers;
- a half day plenary concluding session organized the last day where co-chairs were required to present their observations and recommendations concerning the 10 themes of the Symposium. Their reports are published in the proceedings;
- a simultaneous translation (French--English) for the plenary sessions; and
- a low absence rate due to the control of the registration of the main authors for the papers.

A detailed report on the symposium prepared by Dr. G. Fedosejevs (CCRS, Ottawa, Canada) is published in the *ISPRS Journal of Photogrammetry and Remote Sensing*, June 1994, Vol. 49 (3):37-39.

Publication: *Proceedings of the 6th International Symposium on Physical Measurements and Signatures in Remote Sensing*, 17-21 January 1994, Val d'Isère (France), G. Guyot Ed., CNES Toulouse (France), 1241 pp.

WG VII/1 News

- 28-31 August 1995

Preparation of the International Colloquium on "Photosynthesis and Remote Sensing: Assessment of Remote Sensing Tools for the Estimation of Photosynthesis and Primary Production, Present and Future Potential", Montpellier, France.

This Colloquium is a satellite colloquium of the "10th International Photosynthesis Congress". It is organized jointly by the European Association of Remote Sensing Laboratories (EARSeL) and ISPRS Commission VII, WG VII/1. It will take place in the congress center of Montpellier: "le Corum". It is supported by CNES; INRA; Joint Research Centre, European Commission (Ispra, Italy); and NASA. The Colloquium is also sponsored by the societies AQT, CRSS, RSS, SFPT.

The scientific program will include the following themes:

- Specificity and points in common of the marine and terrestrial phytosphere
- New means of characterizing the state of the photosynthetic apparatus
- Determination of photosynthetic activity using remote sensing
- Models of photosynthesis and net primary production for the marine and terrestrial phytospheres
- Data integration.

The Colloquium will highlight methodological developments rather than applications. Plenary sessions will consist of invited papers. Contributed papers will be presented during interactive poster sessions in order to avoid parallel sessions.

Each half day will consist of a plenary session (3 or 4 papers) followed by an interactive poster session (15 papers). At the end of days two and three, two round table discussions are planned: one on the integration of remote sensing data within models, and the other on future space systems and their contribution to the estimation of photosynthesis and net primary production.

The Colloquium is planned to last three and half days, the last half day being devoted to a general concluding session. The number of expected participants is around 250. The first announcement is ready and will be sent during the first week of December.

WG VII/2 - "Resource and Environmental Monitoring Using Radar Data"

by Chairman: Hiroyuki Wakabayashi (Japan)

State of Science & Technology of WG VII/2 Topics

• ERS-1

ERS-1 was launched by ESA in July, 91 and is currently being operated in a geodetic orbit model (168 days cycle). The observation frequency (C-band) and incidence angle (23 degree) are suitable for observing ocean and snow/ice fields, and numerous results have been obtained so far in the fields of ocean monitoring, sea ice monitoring and interferometry. After the launch of ERS-2, which is scheduled in January 1995, ERS-1 and ERS-2 will be operated in tandem mode which is expected to contribute to the progress of the interferometry technique.

• JERS-1

JERS-1 was launched by NASDA in Feb. 92 and is being operated on routine basis. Despite low S/N (signal noise ratio) and S/A (signal to ambiguity ratio) caused by trouble of the transmitter, the relatively big penetration depth of L-band frequency proved advantageous for land observation such as forest monitoring and land cover monitoring.

• SIR-C/X-SAR

SIR-C/X-SAR is a joint project between NASDA, DLR and ISA. Two experiments were carried out in April and October 1994 on the Space Shuttle Endeavour. These were the first attempts to acquire multi-frequency and multi-polarization data from space-borne SAR. Since interesting images were acquired successfully during the experiments, the results of data analysis will be reported in the near future.

• Interferometry

Using the 3-day cycle data from ERS-1, a lot of interesting results using the interferometric technique have been reported so far. Five meter for high accuracy in case of extracting DEM and two cm for accuracy of detecting ground level change have been reported. Other interesting results were found in snow and ice fields, such as detecting glacier movements and sea ice level change.

Accomplishments of WG VII/2 During 1994

- A total 27 reports related to WG VII/2 were scheduled at the Commission VII Symposium - ECO RIO'94 but, unfortunately, only about half were actually presented.

- JERS-1 P1 Meeting in November 1994.

WG VII/2 News

For the activities in WG VII/2 in 1995, special radar sessions are planned for the "Tropical Ecosystem Seminar" (location not set yet) and at the "Asian Conference on Remote Sensing" in Vietnam.

WG VII/4 - "Geological and Mineral Resources"

by Chairman: Dr. James V. Taranik (USA)

Co-Chairman: Dr. Alvaro Crósta (Brazil)

WG Members: 18

WG VII/4 News

WG VII/4 deals with geological and mineral resources, including remote sensing applications in geology,

geomorphology and engineering. WG activities are the following:

- To identify and solicit distinguished scientists to serve as members of the WG and who will enable the WG to summarize the state-of-the-technology and science in the applications of remote sensing in geology, geomorphology and engineering.

- Solicit papers for the Commission Symposium that demonstrate the state-of-the-art in the applications of remote sensing.

- Submit a summary report of WG activities for the Commission Symposium and present the report.

- If desired, hold a WG Workshop one year prior to the quadrennial ISPRS Congress. The purpose of this workshop is to present papers which will demonstrate the state-of-the-science and -technology. These papers will serve as the basis for the WG's report to the Congress.

- Solicit papers for the 1996 ISPRS Congress in Vienna that will be representative of the WG's findings and activities.

The focus of WG VII/4's interests are in the following areas:

- Hyperspectral Remote Sensing in the visible, near-infrared and shortwave infrared.

- Multispectral Remote Sensing in the thermal infrared.

- Multispectral/Multipolarization radar.

- High-spatial resolution stereometry.

- Application of image processing and analysis technique to mineral and petroleum exploration and to engineering geology.

- Application of geographic information system techniques to mineral and petroleum exploration and to engineering geology.

The WG held one workshop/meeting in conjunction with the ASPRS/ACSM Annual Meeting in April 1994 in Reno, Nevada. Most of the activities of the WG are conducted through E-Mail and conventional mail.

Persons interested in submitting papers and/or participating in WG activities between the ECO-RIO'94 Symposium and the ISPRS Congress in Vienna'96 should contact the WG Chairmen.

WG VII/5 - "Terrestrial Ecosystem Monitoring"

by Chairman: Prof. Paul Curran (United Kingdom)

Co-Chairman: Dr. Ake Rosenqvist (Japan)

State of Science & Technology of WG VII/5 Topics

The working group aims to use remotely sensed data to further our understanding of terrestrial ecosystems at local to global scales. The activities promoted, discussed and presented by the working group encompass research involving all remotely sensed data and ecosystems where the goal is to understand ecosystem function rather than to know ecosystem characteristics or manage ecosystem change.

Accomplishments of WG VII/5 During 1994

The working group co-organized a very successful meeting on "Scaling-up" at the University of Wales in Swansea in April 1994; three sessions at the Commission VII ECO-RIO'94 Symposium in September 1994 and is organizing a session at "Remote Sensing in Action" to be held at the University of Southampton, UK in September 1995; a meeting at the University of Bangkok, Thailand in December 1995 and two sessions for the 18th ISPRS Congress in Vienna, Austria in 1996.

WG VII/5 News

The next major activity is a session on the remote sensing of terrestrial ecosystems within the 'Remote Sensing in Action'. This conference is to be held between 11-14 September 1995 at the University of Southampton, UK.

WG VII/7 - "Hazardous Waste & Environmental Pollution"

by Chairman: Dr. Vernon Singhroy (Canada)

Co-Chairman: Dr. Charles Nalezny (USA)

WG Members: 8

State of Science & Technology of WG VII/7 Topics

• Development of Remote Sensing (RS)/GIS Techniques to Monitor the Effects of Large Scale Pollution:

- Biomass Burning Emissions in the Cerrado of Brazil Using RS/GIS - (Agency: ANSA)

- Ozone Air Pollution on Canopy Reflectance (Agency: INPE)

• Environmental Site Characterization from RS/GIS Techniques in Relation to Site Rehabilitation

- Environmental Restoration Techniques in the U.S. (US Department of Energy)
- Remote Sensing Techniques to Detect the Effects of Mining in Canada (CCRS).

Accomplishments of WG VII/7 During 1994

- Symposium on Environmental Site Characterization Using RS & GIS Techniques: Publication in Press - San Francisco, January 1994.
- Mid-Term WG VII/7 sessions at the Commission VII Symposium ECO-RIO'94, September 1994.

WG VII/8 - "Snow, Ice, Ocean & Coastal Zone Monitoring"

by Chairman: Dr. Shintaro Goto (Japan)
Co-Chairman: Dr. Katsumoto Seko (Japan)

State of Science & Technology of WG VII/8 Topics

- Constructing GIS for marine environment. Data format standardization as HDF etc. for object oriented approach.
- Monitoring the 2-dimensional wave distribution practically by using microwave remote sensing techniques.
- Glacier-Ice-Sheet monitoring by microwave remote sensing.

Accomplishments of WG VII/8 During 1994

- Attend the "Second Thematic Conference Remote Sensing for Marine and Coastal Environment", January 31-February 2, 1994, New Orleans, USA, to establish a dense human network.
- Internal meeting at Japan Marine Engineering Conference, April 26, 1994.
- Preparing and attend the Commission VII Symposium ECO-RIO'94, September 26-30, 1994, Rio de Janeiro.

WG VII/8 News

- 18-20 September 1995
Meeting for 1996 ISPRS Congress at "Third Thematic Conference Remote Sensing for Marine and Coastal Environments", Seattle, USA.
- November 1995

"International Workshop on Remote Sensing for Marine Engineering", Hiroshima, Japan. (Supported by Japan Coastal Engineering Association).

- 1995

International Workshop on Glacier Fluctuation Detected by Remote Sensing.

WG VII/9 - "Human Settlement"

by Chairman: Dr. Bruce Forster (Australia)
WG Members: 4

State of Science & Technology of WG VII/9 Topics

With the rapid growth of the use of GIS for urban planning and management there has been a commensurate growth in the awareness of the benefits of remote sensing as an effective, rapid and low cost source of data and information. Better understanding of the relationship between the size of a resolution element and the size of the urban features to be monitored has enabled the prediction of the average size and density of these features, particularly single story residential building in low density developed country environments. Increasingly remotely sensed images are being used to resample census data, collected over administrative areas, to a raster based format for input into a GIS. New analysis and classification procedures are being developed for urban studies that use neural network and fuzzy set theory, and end member methods. With the launch of imaging radar satellite systems, the availability of airborne quad-polarised radar data, data from imaging spectrometers, and the proposed launch of very high spatial resolution satellite systems (1 to 2 metre resolution), new sets of data are becoming available for urban monitoring, and research must be increasingly directed to the optimum use of these systems.

Accomplishments of WG VII/9 During 1994

- Conference on "Advantages in Urban Spatial Information and Analysis" in Wuhan, PR China, 19-22 October 1993.
- "Second International Colloquium of LIESMARS" Co-Sponsored by ISPRS WG VII/9. Co-chairman, Associate Professor Chen Jun and Professor Bruce Forster.
- Commission VII Symposium, 26th to 30th of September, 1994, Rio de Janeiro, Brazil.
WG VII/9 Session held as part of the Symposium.
Professor Bruce Forster Chaired the Session.

Working VII/9 News

It is proposed to hold a further WG VII/9 meeting at ITC Netherlands in mid-1995, but this has not been finalised as yet.

The Chairman of WG VII/9, Professor Bruce Forster, has been asked to be the Editor of a Volume of the *3rd Edition of the Manual of Remote Sensing* on "Remote Sensing of Human Settlements" which will draw together much of the work of the WG.

WG VII/10 - "Global Monitoring"

by Chairman: Dr. Sergio Camacho (United Nations)

State of Science & Technology of WG VII/10 Topics

Possible topics for future WG VII/10 sessions and activities include the following:

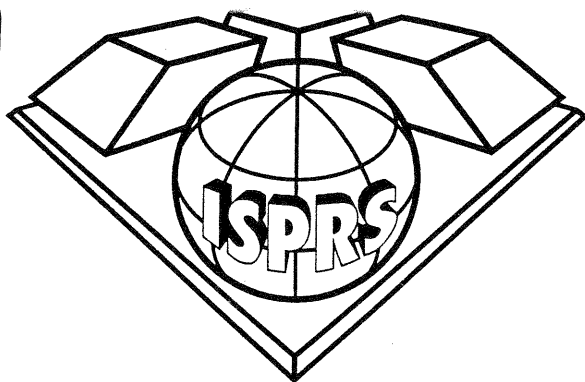
- An intercomparison of sensors and techniques for the global monitoring of biomass burning, about to be undertaken by a team of scientists from NASA, NOAA, EPA and USGS.
- The establishment of a global 1 km. resolution landcover data set using time series of AVHRR images.
- The establishment of an electronic mail referral system for information on Global Change activities and contact points to access or contribute to global data sets, particularly for scientists in developing countries.

Accomplishments of WG VII/10 During 1994

Jointly with a training course on the use of radar data, organized by the United Nations and the European Space Agency, the WG organized a Workshop on Global Change in Lima, Peru. The Workshop was held from 3 to 4 October 1994 and was attended by scientists from 12 countries from the Latin American and Caribbean regions. Although some participants had worked previously in Global Change projects, for many it was an opportunity to become familiar with the objectives and scope of Global Change. A summary of the discussions and observations of the participants has been published in a United Nations Report on the "UN/ESA Workshop on Global Change and Training Course on Microwave Remote Sensing", document A/AC.105/596.

WG VII/10 News

- November 1995
WG VII/10 is planning to organize a meeting during a United Nations "Workshop on Space Technology" to be held immediately before the "VII Latin American Symposium on Remote Sensing" (SELPER Meeting) to be held in Puerto Vallarta, Mexico, from 5 to 10 November 1995. The WG will discuss, among other things, the topics listed in the section on State of Science and Technology of WG VII/10 Topics in this report.



XVIII ISPRS-Congress Vienna, 9 -19 July 1996

Spatial Information from Images

The Austrian Society for Surveying and Geoinformation (ÖVG) is the host for the XVIII Congress of the International Society for Photogrammetry and Remote Sensing (ISPRS), which will be held in July 1996, thus returning to Vienna, Austria, after 83 years.

Programme Overview:

- ⇒ **9 July, evening:** Opening ceremony and opening addresses in the ceremonial hall of the former Imperial Palace, the Hofburg.
- ⇒ **8 and 9 July:** 10 Tutorials.
- ⇒ **From 10 July** onwards in the Austria Center Vienna: *13 Keynote Addresses; 80 Technical Sessions* (mainly in English) covering the fields of
Photogrammetry, Remote Sensing and Geo-Information Systems;
32 Interactive Sessions (authors briefly present their papers in a lecture hall followed by discussions in front of posters) .
- ⇒ **12 and 13 July:** Inter-disciplinary topics and related fields (AARS, CIPA, GPS, IUSM, OEEPE, International Consulting)
- ⇒ **From 15 to 19 July:** Commercial exhibition in the central area of the modern Austria Center Vienna. In addition: Members' exhibition and scientific exhibition.

Other Programme Items:

Technical tours to private companies, governmental organisations and scientific institutions. Evening at a wine tavern, a "Heurigen", on 12 July. Castle fete on 15 July. Gala dinner with dancing in the festival hall of the Vienna City Hall on 18 July. Weekend tours on 14 July to Graz, Salzburg, Bratislava etc. Pre- and post-congress tours to Prague, Budapest etc.

Special fees for students and seniors. High and medium discounts for registrations before 31 August 1995 and 15 January 1996, respectively. Reductions for groups of 10 and 20 people. Special low and medium rates for exhibitors before 28 February 1995 and 31 October 1995, respectively.

See **Second Announcement** for details.

The Congress-Director
Karl Kraus
Vienna University of Technology

Note:

If you have access to the **WorldWideWeb**, you find regularly updated information about the Congress at the address:

<http://www.inf.tuwien.ac.at/isprs.html>

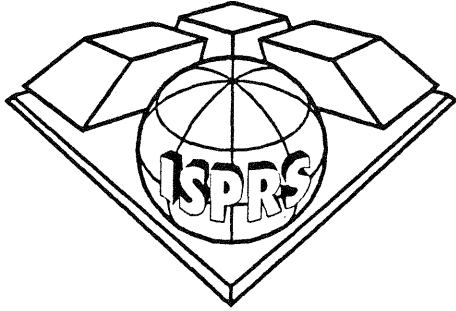
⇒ **Request Second Announcement from:**

MONDIAL CONGRESS
ISPRS '96
Faulmanngasse 4
A-1040 Vienna, Austria

Tel: +43-1-58804

Fax: +43-1-586 9185

Email: isprs96@email.tuwien.ac.at



XVIII ISPRS-Congress Vienna, 9 -19 July 1996

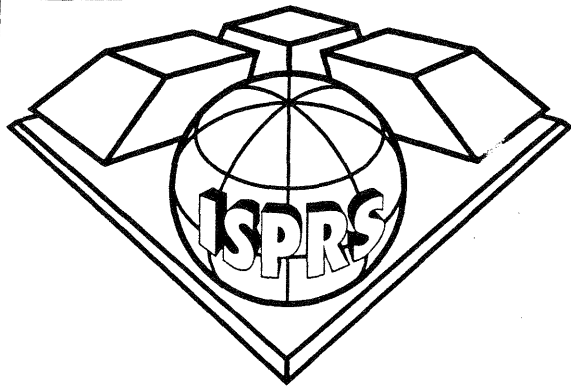
Preliminary Schedule

	8.am	9.	10.	11.	12.	1.pm	2.	3.	4.	5.	6.	7.	8.	9.	10.
MON 8	TUTORIALS														
TUE 9	TUTORIALS														
WED 10	TS		TS			TS		TS							
	TS		TS			TS		TS							
	TS		TS			TS		TS							
	TS		TS			TS		TS							
			PS			PS		PS							
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THU 11	TS		TS			TS		TS							
	TS		TS			TS		TS							
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															Reception at VUT
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	TS		TS			SS		SS							
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SUN 14															

(CONT.)

	8.am	9.	10.	11.	12.	1.pm	2.	3.	4.	5.	6.	7.	8.	9.	10.
MON 15		TS		TS		TS		TS							
		TS		TS		TS		TS							
				PS		PS		PS							
						PS		PS							
								EXHIBITION							
								EXH. SHOW		GA - 3					
TUE 16		TS		TS		TS		TS							
		TS		TS		TS		TS							
				PS		PS		PS							
						PS		PS							
								EXHIBITION							
								EXH. SHOW		EXH. SHOW		GA - 4			
WED 17		TS		TS		TS		TS							
		TS		TS		TS		TS							
				PS		PS		PS							
						PS		PS							
								EXHIBITION							
								EXH. SHOW		EXH. SHOW		GA - 5			
THU 18		TS		TS		TS		TS							
		TS		TS		TS		TS							
				PS		PS		PS							
						PS		PS							
								EXHIBITION							
								EXH. SHOW		EXH. SHOW				Gala Dinner	
FRI 19		TS		TS		Com.Su.		Clos.C.							
		TS		TS											
				PS											
								EXHIBITION							

TS=Technical Session, SS=Special Session (AARS, CIPA, FIG, IAG, ICA, IUSM, OEEPE, etc.), PS=Poster Session, GA=General Assembly Meeting, EXH.SHOW=Exhibitors' Showcase, Sm.R.=Small Reception, O.S.=Official Speeches, Com.Su.=Commission Summary, Clos.C.=Closing Ceremony



XVIII ISPRS-Congress Vienna, 9 -19 July 1996

Spatial Information from Images

For its XVIII quadrennial Congress, the International Society for Photogrammetry and Remote Sensing (ISPRS) announces a

Call for Papers

If you are engaged in the fields of

**Photogrammetry
Remote Sensing
Geo-Information Systems
or any other related area**

and if you feel your recent work needs presenting to an international audience, then we invite you to prepare a paper for this major ISPRS Congress in Vienna, Austria. For your orientation, the following list shows a rough overview of the topics covered by the conference's **80 technical sessions, 32 interactive sessions** and a number of **inter-disciplinary sessions**:

- Sensors, platforms and imagery
- Photoscanners and quality analysis
- Photogrammetric systems and advances in automation
- Digital image workstations
- Sensor and image orientation
- Integrating GPS into photogrammetry
- Matching and 3-D object restitution
- Scene analysis and machine vision
- Digital elevation models and their applications
- Archaeological, architectural, medical, and other close-range photogrammetry
- Mapping and planning technologies
- Theory, systems and applications of GIS
- 3-D databases and information systems
- Problems of data fusion
- Remote sensing techniques and applications
- Landuse and disaster assessment
- Environmental and global monitoring
- Educational and training matters
- International cooperation, consulting and technology transfer
- Inter-disciplinary topics to AARS, CIPA, IUSM, and OEEPE

All you need to do is write an **extended abstract** of 750 words minimum to 1500 words maximum and submit it **before 16 October 1995**. Please, send your request for the detailed guidelines and forms to the Technical Programme Coordinator by mail, telefax or electronic mail. These forms together with the **Second Announcement** contain much useful information. They will be posted to you as quickly as possible.

The Congress Director
Karl Kraus

Note:

If you have access to the **WorldWideWeb**, you find regularly updated information about the Congress at the address:

<http://www.ipf.tuwien.ac.at/isprs.html>

⇒ **Request forms and guidelines from:**

Peter Waldhaeusl
Technical Programme Coordinator
Vienna University of Technology
Gusshausstrasse 27-29 / 122
A-1040 Vienna, Austria

Tel: +43-1-58801 / 3814

Fax: +43-1-505 6268

Email: isprs96@email.tuwien.ac.at

REGIONAL MEMBER ACTIVITIES - 1994

ISPRS REGIONAL MEMBERS

AARS - Asian Association on Remote Sensing

AARSE - African Association of Remote Sensing of the Environment

EARSeL - European Association of Remote Sensing Laboratories

OACT - Organisation Africaine de Cartographie et Télédétection

OEEPE - Organisation Européenne d'Etudes Photogrammétriques Expérimentales

SELPER - Sociedad de Especialistas Latinoamericanos en Percepción Remota

ASIAN ASSOCIATION ON REMOTE SENSING (AARS)

Submitted by: Shunji Murai, AARS General Secretary

Asian Institute of Technology

G.P.O. Box 2754, Bangkok 10501, Thailand

Fax: +66-2-524-5721

Email: smu@cs.ait.ac.th

GENERAL INFORMATION

Asian Association on Remote Sensing (AARS) is a non-governmental organization (NGO) devoted to advancement of remote sensing in Asia and the Pacific Region, mainly through the annual meeting called Asian Conference on Remote Sensing, which has been held since 1980.

Asian and near Asian countries may join AARS as an Ordinary Member. The current Ordinary Members are: Bangladesh, China, India, Indonesia, Iran, Japan, Korea, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam and Near Asian Countries; Australia and New Zealand.

Non-Asian countries may join AARS as an Associate Member. The current Associate Members are: Canada, France, The Netherlands, Sweden and Switzerland. In addition, about 15 companies join AARS as Sustaining Member.

General Conference of AARS is usually held in conjunction with ACRS, when all decisions and necessary actions are made by the national delegates.

THE 15th ASIAN CONFERENCE ON REMOTE SENSING (ACRS)

The 15th ACRS was held in Bangalore, India during 17-23 November 1994 with 320 participants (83 foreigners and 237 Indian) from 24 countries. Sixty-eight papers in oral and 28 posters were actually presented. Two volumes of the proceedings were distributed at the conference.

Chairman of the Organizing Committee was Prof. U.R. Rao, Member of Space Commission (former Chairman of Indian Space Research Organization).

Commercial Exhibits of 14 companies/organizations were also demonstrated during the conference.

In conjunction with the 15th ACRS, a Workshop on "Management of Land and Water Resources Using Remote Sensing and GIS" was held by UN ESCAP, of which participants joined the 15th ACRS.

The quality of presented papers and presentation technique of the speakers were much improved at this time as compared with the past.

The next conference, the 16th ACRS will be held at Nakhon Ratchashima, Thailand in November, 1995.

WORKING GROUPS (WGs)

A WG on "1 Km Land Cover Database of Asia" has been established in 1993 under Chairmanship of Dr. Ryutaro Tateishi, Chiba University, Japan. Dr. Tateishi reported that the WG members are from 28 Asian and near Asian countries with strong interest and collaboration on a voluntary basis. The landcover database will be refined and compiled in 1995.

Two WGs have been newly established in 1994.

- WG on "Text Book of GIS"
Chair: Dr. Ryosuko Shibasaki
University of Tokyo
- WG on "GIS Software for Educational Purpose"
Chair: Dr. Kohei Cho, Tokai University

TRANSLATION OF REMOTE SENSING NOTES INTO LOCAL LANGUAGE

A Text book of remote sensing, namely *Remote Sensing Notes* which was published originally in Japanese by the

Japan Association of Remote Sensing (President Shunji Murai) has been translated into English and Chinese. The text book is now being translated in Persian, Thai, Indonesian and possibly French.

AARS will offer free copyright to those who wish to translate into their own local language in cooperation with Japan Association of Remote Sensing.

AM/FM, GIS ASIA 95

"AM/FM, GIS ASIA '95" will be organized in Bangkok, Thailand from 21-24 August 1995 by AARS, AIT, AM/FM International, ISPRS Commission IV, Geographic Association of Thailand and National Research Council of Thailand (NRCT).

The conference follows the "AM/FM, GIS and Spatial Information Analysis Conference" which was held in Hong Kong, March 1994.

Co-chairmen are Dr. Suvit Vibulsresth, Deputy Secretary General, NRCT, 196 Phaholyothin Road, Chatuchak, Bangkok 10900, Thailand and Prof. Shunji Murai. (See address above.)

EUROPEAN ASSOCIATION OF REMOTE SENSING LABORATORIES (EARSeL)

Submitted by: Dr. Roeland Allewijn, Secretary General

STRUCTURAL CHANGES OF REGIONAL MEMBER EARSeL SINCE LAST REPORT

The Bureau has co-opted a member with specific responsibility for eastern/western European relations: Dr. Peter Winkler of the FÖMI Remote Sensing Centre in Budapest, Hungary.

Twenty-one new member laboratories, one observer member laboratory (from USA) and three individual observers were admitted at the General Assembly held on 7th June 1994 in Gothenburg, Sweden.

EARSeL ACTIVITIES DURING 1994

In 1994 the Association has organised the following meetings:

1. a specialist meeting on "Fractals" 14-15 April 1994, in collaboration with the Joint Research Centre of the CEC in Ispra, Italy;
2. the EARSeL Annual Symposium: "Sensors and Environmental Applications" in Gothenburg, Sweden, 6-8 June 1994;

3. a high-level Workshop on "Topography from Space" in conjunction with the Annual Symposium in Gothenburg, Sweden, 8-10 June 1994;
4. a high-level Workshop on "Remote Sensing and GIS for Coastal Zone Management" in Delft, the Netherlands, 24-26 October 1994.

The Proceedings of each of these meetings are published or are in the course of publication. A selection of papers presented at the high-level Workshops are reviewed before publication in the EARSeL Journal *Advances in Remote Sensing*.

• **Specific Work**

A small group have worked on a report, supported by the CEC DGXII-4, on "Requirements for Satellite Data Accessibility: The View of the Users". The final report should be ready early in 1995.

• **Publications distributed in 1994**

EARSeL Journal *Advances in Remote Sensing*
Vol. 3 No. 1 - "SAR Interferometry"
ISBN: 2-908885-09-3

Proceedings of EARSeL Symposium
held in Dundee, Scotland, UK in June 1993
published by Springer Hungarica, ISBN: 2-908885-08-5

Proceedings of Workshop "Analysis of Earth Observation Space Data Integration"
held in Sinaia, Romania in November 1992
ISSN: 1023-8115 - ISBN: 2-908885-04-6

Report on specialist meeting "*Hydrology and Water Resources*" held in Dundee, Scotland, UK, 28 June 1993
ISSN: 1023-8115

Report on specialist meeting on "*Fractals*" held in April 1994
to be published by Joint Research Centre, Ispra, Italy

4 quarterly issues of the *EARSeL Newsletter*

Proceedings of Annual General Assembly
held in Gothenburg, Sweden

• **Publications to be distributed in 1995**

EARSeL Directory listing all member institutes, their specialisations and equipment

- EARSeL Journal "*Advances in Remote Sensing*"
- Vol. 3 No. 2 - "Microwave Remote Sensing of Ice"
 - Vol. 3 No. 3 - "Lidar Remote Sensing of Land and Sea"
 - Vol. 4 No. 1 - "Remote Sensing and GIS for Forest Fire Management"
 - Vol. 4 No. 2 - "Topography from Space"
 - Vol. 4 No. 3 - "Remote Sensing and GIS for Coastal Zone Management"

Proceedings of EARSeL Symposium 1994
held in Gothenburg, Sweden, to be published by Messrs. Balkema, Rotterdam, The Netherlands

• **Meetings planned for 1995**

- Session to be organised within the "Remote Sensing and Cartography Summit" to be held in Brussels, Belgium - 22-23 February 1995
 - High-level Workshop on "Pollution Monitoring and GIS" to be held in Brandys-nad-Labem, Czech Republic - 15-18 May 1995
 - 2-day expert meeting "Remote Sensing for Integrated Management of Coastal Zones", organised within the Space Congress in Bremen, Germany - 23-24 May 1995
 - Specialist Symposium on "MOMS-02 Mission Results" to be held in Cologne, Germany - 5-7 July 1995 (in collaboration with the German Space Research Establishment - DLR)
 - Symposium on "Assessment of Remote Sensing for Primary Products Measurement: Actual and Potential Capabilities" to be held in Montpellier, France - 20-25 August 1995 (in collaboration with ISPRS WG VII/1). This is a satellite symposium to the 10th International Congress on Photosynthesis.
 - EARSeL Annual General Assembly and Symposium, 4-6 September 1995 in Basel, Switzerland
- Theme of Symposium: "Progress in Environmental Research and Applications", followed by:
- 6-8 September 1995 - Workshop: "Progress in Satellite Meteorology"
 - 6-8 September 1995 - Workshop: "Modelling the Water Cycle: The Use of Remotely Sensed and Other Data Sets"
- Workshop on "Remote Sensing and GIS Applications to Forest Fire Management" to be held at the University of Alcalá de Henares (Madrid), Spain - 7-9 September 1995.

MAJOR ACCOMPLISHMENTS OF EARSeL DURING 1994

Apart from organising the above meetings and arranging for the publication of the relevant Proceedings and Journals, EARSeL acts as a source of information on remote sensing activities throughout the extended European region. The core of the EARSeL Directory, the Newsletters, calendar of activities, and soon the Abstracts of meetings organised by EARSeL, are now available electronically through the European Space Agency Guide and Directory Service (GDS) installed at ESRIN in Frascati, Italy. It is listed as the "EARSeL InfoSys".

• EARSeL Special Interest Groups (SIGs)

In a well functioning organization the members should be actively involved in the work of the association. In the May 1994 EARSeL document "Strategy, Organization and Activities" it has been stated that the best way to mobilize the member laboratories is by grouping institutes which are interested in specific application fields in so-called "Special Interest Groups" (SIGs). These thematic groups focus either on broad fields such as "land," "water," or "atmosphere," or on more limited topics, such as "hydrology," or "sea ice."

In June 1994 during the EARSeL Symposium held in Goteborg, Sweden, six groups were established by the following persons:

- "Land Applications" (Konecny and Buchroithner).
- "Marine Waters, Inland Waters and Coastal Zones" (Allewijn, Vaughan and Sloggett).
- "Atmosphere" (Parlow).

- "Land Ice and Snow" (Seidel and Kennett).
- "Sea Ice" (Gudmandsen and Askne).
- "Hydrology" (Herschly).

Other Special Interest Groups are expected to be formed based on specific interests of the EARSeL members. For example a SIG is expected to be established on "Meteorological Applications" at the EARSeL Annual General Assembly and Symposium in September 1995 to be held in Basel, Switzerland.

What is expected from these Special Interest Groups? The SIGs may prepare Project proposals and perform study contracts. They are expected to inform EARSeL members on important activities in their field by means such as the EARSeL Newsletter. Expert meetings may be organized in which requirements of the scientific user community for future systems and sensors and data-infrastructure can be discussed. The results of these expert meetings can be presented in EARSeL expert reports to organizations such as ESA and the European Union. Other activities of the SIGs may be the organization of EARSeL workshops, of which the refereed papers will be published in the series "*Advances in Remote Sensing*."

RELATIONSHIPS WITH ISPRS

From 28-31 August 1995 we are organising, in collaboration with ISPRS Commission VII, Working Group 1, an International Colloquium on "Photosynthesis and Remote Sensing" in Montpellier, France.

We welcome opportunities to organise joint meetings with ISPRS Working Groups.

INTERSOCIETY ACTIVITIES - CIPA

INTERNATIONAL COMMITTEE FOR ARCHITECTURAL PHOTOGRAMMETRY COMITÉ INTERNATIONAL DE PHOTOGRAMMETRIE ARCHITECTURALE (CIPA) ANNUAL REPORT FOR 1994

Submitted by: Dr. John Badekas, President of CIPA

I. CIPA Committee

The members of the CIPA Committee were appointed in 1993. We were saddened shortly thereafter as Prof. Wester-Ebbinghaus died suddenly. Per the CIPA Statutes, ISPRS Council has replaced him on the Committee by appointment of Ms. Edel Lundemo (Norway) in 1994.

II. Publication of CIPA Pamphlet

As mentioned in my report of 1993 preparations were made for publishing a pamphlet promoting the objectives of the CIPA Committee. The pamphlet was published during 1994 and has been broadly circulated.

III. Annual CIPA Committee Meeting for 1994

The 1994 Annual CIPA Committee meeting took place on the 12 November in Bari, Italy. It was combined with an "International Colloquium on Architectural Photogrammetry." This was the first meeting of the Committee after its formation.

Since the 1993 meeting in Romania members have participated without clear function. Nine of the total twelve Committee members participated in the Bari Meeting. In addition, Mrs. C. Potsiou acting as assistant to the President participated. Those absent were representatives of ICOMOS.

IV. International Colloquium in Bari, Italy

During 10-12 November 1994 an "International Colloquium on Architectural Photogrammetry" was held in Bari, Italy. The Colloquium was organized by the National Research Council of Italy, the Istituto per la Residenza e la Infrastructure Sociali (IRIS) and Galileo Siscam in collaboration with CIPA. The Colloquium was held under the auspices of ISPRS and ICOMOS and was included in the lists of the international events of the two bodies. The theme of the colloquium was "La Photogrammetria per il Restauro e la Storia" tecniche analitiche e digitali and it was attended by many Italian and foreign scientists. There were eight sessions during which 35 papers were presented followed by a round table discussion.

V. CIPA Symposium in 1995

During 1994 much time and effort was devoted to seeking a place for organizing the 1995 symposium of CIPA. Finally a proposal from Indonesia to organize

this meeting in January 1996 was accepted by the CIPA Committee at the Bari meeting. The symposium is to be held in Bali, Indonesia and will be organized by Tono Saksono.

VI. 1997 International CIPA Symposium

The National Committees of ISPRS and of ICOMOS submitted a proposal of Sweden for the 1997 International CIPA Symposium to be held in Cöteborg, Sweden during September or October 1997. The proposal was approved and Professor Jan Rosvall will be the director of the Symposium.

VII. Future Annual Committee Meetings

It has been decided that the annual meetings for the Committee will take place in 1995 at Krakow, Poland; in 1996 at Bali, Indonesia; and in 1996 at Vienna, Austria.

VII. CIPA Meeting at 1996 ISPRS Congress

Prof. P. Waldhausl has informed the Committee that two sessions will be devoted to CIPA activities at the 1996 ISPRS Congress. The Committee will be in close cooperation with ISPRS for the optimal organization of these sessions.

IX. Relations with ICOMOS

Although contacts with ICOMOS are at a satisfactory level, coordination of the CIPA activities with ICOMOS and vice-versa remains poor.

X. CIPA Working Groups (WGs)

Members participating in CIPA activities are not very experienced in WGs. This is very obvious from the activities of the CIPA WGs. With the exception of the WG 1 on "Control Information", all other WGs are somewhat inactive, without clear Terms of Reference or active members. Greater effort must be placed for proper activation of CIPA WGs.

XI. National Delegates and Correspondents

Despite the effort for establishing National Delegates and Correspondents the program moves very slowly because the National Committees are reluctant to propose the appropriate people.

New effort must be initiated during 1995 using new ideas which are under consideration.

INTERSOCIETY ACTIVITIES - IUSM

INTERNATIONAL UNION OF SURVEYS AND MAPPING

REPORT OF 1994 IUSM EXECUTIVE BOARD MEETING

by: *Prof. Dr. Shunji Murai, President of ISPRS*

Lawrence W. Fritz, Secretary General of ISPRS

MEETING SUMMARY

An Executive Board Meeting was held on 8 March 1994 in conjunction with FIG Congress in Melbourne, Australia. The following actions were taken:

- An application for IUSM Principal Membership by the International Hydrographic Organization (IHO) was approved.
- Council members of IUSM were confirmed.
- The new GIS/LIS Working Group Chairman was confirmed.
- Terms of Reference for IUSM Working Groups were adopted.
- Guidelines for Awards of Honors were adopted.
- The 1995 IUSM meetings schedule was confirmed.

MEMBERSHIP

With the admission of the International Hydrographic Organization, IUSM Principal Members are now ISPRS, FIG, ICA, IAG and IHO. Associate Member is SORSA.

IUSM COUNCIL AND EXECUTIVE BOARD MEMBERS

IUSM Council is composed of six members from each Principal Member organization of which two serve on the IUSM Executive Board. ISPRS's representatives are:

Dr. Mosaad M. Allam - Commission II President
Mr. Lawrence W Fritz - Secretary General
Prof. Dr. Armin Gruen - Second Vice President
*Prof. Dr. Gottfried Konecny - Honorary Member
*Prof. Dr. Shunji Murai - President
Prof. Dr. Kennert Torlegard - First Vice President

* IUSM Executive Board Member

MEETINGS OF IUSM IN 1995

Place: Boulder, Colorado, USA
30 June-1 July Strategic Planning Workshop
2 July Executive Board and Council Meetings
4-5 July Working Group Meetings

These meetings will be hosted by IAG in conjunction with the IUGG Conference and XXI General Assembly which convene in Boulder, Colorado, USA during 2-14 July 1995.

In addition, the IUSM Working Group on GIS/LIS has scheduled its meeting for 25-28 September 1994 in Hannover, Germany.

IUSM WORKING GROUPS

There are four Working Groups in IUSM

1. WG on GPS
2. WG on GIS/LIS
3. WG on Education
4. WG on Automated Control Measurements (ACM)

Prof. G. Konecny was elected Chairman of the WG on GIS/LIS to replace former Chairman, Prof. Jean-Claude Müller who had resigned the chairmanship.

The WG on GPS will be organized at ISPRS Vienna Congress.

IUSM EXECUTIVE SECRETARIAT

Information regarding membership, activities and regulations such as the aforementioned Terms of Reference for Working Groups and Guidelines for Awards of Honors may be obtained from:

Mr. J. H. O'Donnell
Executive Secretary, IUSM
Geomatics Canada, NR Canada
10th Floor, 580 Booth Street
Ottawa, ON K1A 0E9 CANADA
tel +613-995-4449
fax +613-995-0842
E-mail:odonnell@cc2smtp.emr.ca

ISPRS PUBLICATIONS

Lawrence W. Fritz, ISPRS Secretary General

The publications of ISPRS are in five categories:

1. International Archives

The *International Archives of Photogrammetry and Remote Sensing* contain the proceedings and the scientific and technical presentations of each Congress, edited and distributed by the Member organization responsible for the Congress. The scientific and technical presentations at Technical Commission Symposia are published by each of the Commission sponsoring Members, also as volumes of the *Archives*.

In 1994 the scientific presentations at each of the seven ISPRS Commission Symposia were published and are available from RICS Books at the address listed below.

2. Official Journal

The *ISPRS Journal of Photogrammetry and Remote Sensing* is the official publication of the Society. It contains scientific and technical articles and reviews in the field of photogrammetry and remote sensing. It also reports on Congresses, Symposia and other activities of the ISPRS and as such, endeavors to be a primary channel of communication for specialists in all countries working in the many disciplines applying photogrammetry and remote sensing.

The *ISPRS Journal* is published by Elsevier Science Publishers and is issued six times per year.

3. ISPRS Annual Report

The *ISPRS Annual Report* contains current information regarding the state of the science and technologies in the fields of photogrammetry, remote sensing, GIS, machine vision and computer vision and other related

sciences. Since 1993 it has been published annually and distributed free to organizations and scientific institutions which collaborate or have interest in ISPRS activities.

4. Activities and Members of ISPRS

The *ISPRS Organization and Programs* (Silver Book) is published every four years. It contains: (1) A brief summary of the Society history, objectives, members, awards, finances and structure; (2) Officers, activities, Commissions and Working Groups, Terms of Reference and planned events; (3) Society Statutes, Bylaws, Guidelines and Awards.

The *ISPRS Member List* (Blue Book) is published annually. It contains complete up-to-date addresses and communication numbers of each member organization (Ordinary Member), its officers and Commission Correspondents, and the officers, Regional Members, Sustaining Members and Honorary Members of the Society.

The Silver Book and Blue Book are available from the Secretary General for a nominal fee (150 Swf each, 250 Swf for both).

5. Special circulars and announcements

The *ISPRS Brochure* is a trifold published periodically and contains a brief description of the Society objectives, members and activities.

Special circulars, announcements and Working Group newsletters are produced and distributed by the ISPRS Technical Commissions to provide information on Congresses, Symposia and other activities of ISPRS.

THE INTERNATIONAL ARCHIVES OF PHOTOGRAMMETRY AND REMOTE SENSING

Originally published in 1909, the *International Archives of Photogrammetry and Remote Sensing* are now published every two years, that is, a volume for the quadrennial Congress and a volume for the mid-Congress Symposia. The Congress volumes contain the Proceedings and the technical presentations of each Congress. They are published in multiple books (Parts) and are edited and distributed by the national ISPRS Member organization responsible for the Congress.

The scientific and technical presentations of each of the seven ISPRS Symposia, which are held quadrennially during the mid-Congress year, are published by the national Member organization responsible for each Commission. The Symposia volume is published in seven books (Parts).

All seven Parts of Volume XXX of the *Archives* (ISSN 0256-1840) from the 1994 ISPRS Commission Symposia

and the just published hardcover Part A, Volume XXIX containing the "*Proceedings of the XVIIth ISPRS Congress*" are now available from:

RICS Books
Surveyor Court
Westwood Way
Coventry CV4 8JE
United Kingdom
Phone: +44-71-222-7000
Fax: +44-71-334-3800

Volume XXIX of the *International Archives* from the XVII ISPRS Congress held in Washington, DC in 1992 is published in 9 books:

- Volume XXIX, Part A, published in hardcover, contains the Congress Proceedings.

- Part B is composed of 7 books corresponding to the seven ISPRS Commissions.
- "Complete Indexes of Authors, Coauthors and Keywords for Vol. XXIX, Part B -All Commissions"

The 1992 *Archives* (ISSN 0256-1840) are available from the:

American Society for Photogrammetry
and Remote Sensing
5410 Grosvenor Lane, Suite 210
Bethesda, MD 20814-2160
U.S.A.
Phone: +1-301-493-0290
Fax: +1-301-493-0208

***ISPRS JOURNAL OF
PHOTOGRAMMETRY AND REMOTE SENSING***
(The Official Publication of the International Society for Photogrammetry and Remote Sensing)

Annual Report to ISPRS Council
Editor-in-Chief, David A. Tait

The Journal has been published according to schedule over the past 12 months with no significant delays in delivery. The issues have been close to the nominal 50 pages and no page adjustment was necessary at the end of Volume 49. At the end of 1994, there were 10 papers with the publisher awaiting publication and a further 23 in the pipeline. This illustrates the substantial increase in the number of papers being submitted to the Journal in recent times.

The first Theme Issue was published as 49/5 (Oct 94). Two other Theme Issues are being prepared and will be published in 1995. It is intended that the Theme Issue concept will be developed further, as a means of delivering a group of high quality papers on important topics.

The Ad Hoc Committee on Journal Development had a special meeting in Munich in September 1994 and reported to Council at its meeting in Beijing in October. The editors have provided information to this Committee. The number of regular subscribers has remained static but the overall circulation has been increased by the action of Council in sending a copy to all Members and to certain Working Group Chairmen. The fact that the Journal is now reaching more of the

active participants in ISPRS affairs may account for the increase in unsolicited articles from active ISPRS workers.

Scientific and technical manuscripts may be submitted in triplicate to:

David A. Tait
Editor-in-Chief, ISPRS Journal
Department of Geography and
Topographic Science
University of Glasgow
Glasgow G12 8QQ, UK
Tel: +44-41-339-8855 x4783
Fax: +44-41-330-4894.

Subscriptions to the ISPRS Journal of Photogrammetry and Remote Sensing (ISSN 0924-2716) may be entered with subscription agents or directly with:

Elsevier Science Publishers
Attn: Jenny Henzen
PO Box 1930
1000 BX Amsterdam
The Netherlands
Tel: +31-20-586-2911
Fax: +31-20-586-2696.

ISPRS AWARDS AND STATE OF AFFAIRS

Submitted by: Prof. Kennert Torlegård, ISPRS 1st Vice President
Prof. John Trinder, ISPRS Treasurer

ISPRS AWARDS

The International Society for Photogrammetry and Remote Sensing recognizes individual accomplishment in photogrammetry and remote sensing by six sponsored awards which are presented at the quadrennial Congresses of ISPRS.

The *Brock Gold Medal Award*, sponsored by the the American Society for Photogrammetry and Remote Sensing, is presented for an outstanding contribution to the evolution of photogrammetric theory, instrumentation, or practice. Ordinary Members (national societies) of ISPRS are invited to recommend recipients of the Award. Recommendations shall be made by two individuals of different nationality and also different from the candidate. Recommendations shall reach the Secretary General of ISPRS, Lawrence Fritz, not later than November 1995.

The *Otto von Gruber Award*, sponsored by the ITC Foundation, is presented to the author, not older than 40 years, of a significant paper on photogrammetry or an allied subject written in the four year period preceding the Congress. The Award consists of a medal and a monetary grant. Applications with 3 copies of the paper shall reach the President of ISPRS, Shunji Murai, not later than December 1995.

The *Samuel Gamble Award*, sponsored by the Canadian Institute of Geomatics, is presented to persons irrespective of nationality, for their contributions to the administration of the Society or to the organization of activities of the Society's Commissions. Recommendations for the Award shall reach the Secretary General of ISPRS, Lawrence Fritz, not later than February 1996.

The *Schwidefsky Medal*, sponsored by the German Society for Photogrammetry and Remote Sensing, is presented to persons who have made significant contributions to photogrammetry and remote sensing, either through the medium of publication as author or editor, or in another form. Recommendations for the Medal shall reach the Secretary General of ISPRS, Lawrence Fritz, not later than February 1996.

The *Willem Schermerhorn Award*, sponsored by the Netherlands' Society of Photogrammetry, is presented to a person who has most significantly contributed to the

activities of a Working Group of the ISPRS during the past four year Congress period. Nominations for the Award shall reach the President of ISPRS, Shunji Murai, not later than February 1996.

The *Edouard Dolezal Award*, sponsored by the Austrian Society of Surveying and Photogrammetry, is presented to a person from a developing or reform country, who has successfully contributed to development of applications of photogrammetry and remote sensing. The Award is a grant to cover expenses for the participation in the Congress. Applications shall reach the President of ISPRS, Shunji Murai, not later than November 1995.

The ISPRS also awards *Prizes for Best Papers by Young Authors*, who are at most 35 years old and are the single author of a high quality paper presented to the Congress. The Prizes are grants to make it possible for the winners to attend the Congress. Applications including the paper shall reach the President of ISPRS, Shunji Murai, not later than January 1996.

Regulations and rules of the five first awards are found in the *International Archives of Photogrammetry and Remote Sensing, Vol XXIX, Part A, 1994* (Proceedings of the Washington Congress 1992), and also in the so called "Silver Book" of *ISPRS Organization and Programs 1992-96*. Rules for the Dolezal Award can be obtained from the ISPRS Congress Director, Karl Kraus, and information on Best Papers from the ISPRS President, Shunji Murai.

MEMBERSHIP and FINANCIAL STATUS

The current membership of ISPRS is:

Ordinary Members	94
Regional Members	6
Sustaining Members	30

Ordinary Membership remained unchanged in 1994. At the end of 1995 the mail ballot vote by the ISPRS General Assembly unanimously approved Regional Membership for the new African Association of Remote Sensing of the Environment (AARSE). Although this brings Regional Membership to six organizations, it is recognized that the other Regional Member of Africa, OACT, has been inactive. Following the drive to

increase Sustaining Membership at the beginning of 1994, five new Sustaining Members joined ISPRS and paid their dues this year. They are:

Member	Country	Category
Hunting Aerofilms	UK	D
INPHO GmbH	Germany	D
SPOT Image	France	B
Adam Technology	Australia	D
Kampax Geoplan	Denmark	B

These new members are welcomed to ISPRS and Council looks forward to many fruitful years of association with them.

Invoices for payment of 1994 subscriptions were distributed by the end of January 1994, and reminders were sent out in July. By the end of November, 47% of Ordinary Members, 80% of Regional Members and 72% of Sustaining Members have paid their 1994 dues. Due to the different categories of membership, the sums collected for 1994 are 77% of total Ordinary Membership dues, 81% of total Sustaining Membership dues, and 80% of total Regional Membership dues. The total amount of unpaid dues at the end of November 1994 is Swf 19,189 or 21% of budget income. A significant number of members have also not paid their subscriptions for previous years. The budget



allowed for a total non payment of dues for 1994 of Swf 10,000. This amount will clearly be exceeded.

The Society's investments have earned Swf 12,610, while a donation of Swf 13,474 to support five Young Author Best Paper Awards for their participation at the Vienna Congress in 1996 was received from Mr. Y. Matsumoto, President of CORE Corporation, Tokyo, Japan. The Council has expressed its sincere thanks to Mr Matsumoto for his generous donation.

Expenditure for 1994 has funded Council activities and subscriptions by ISPRS in a number of related international organisations. Council's decision to distribute The *ISPRS Journal, Photogrammetry and Remote Sensing* to Ordinary Members in 1994 and 1995 has required the expenditure of Swf 12,000 in 1994. The benefits of this decision will be analysed at the end of 1995.

Despite the shortfall in income derived from subscriptions, caused by the significant number of unfinancial Members, the Society's investments in Swiss bonds has enabled it to remain in a very sound financial position. The accounts were audited in May 1994 by the Financial Commission and found to be correct and in good order.

1995

DATE	EVENT	LOCATION	INFORMATION
3-6 Jan. 1995	28th Annual Hawaii International Conference on System Sciences	Maui, Hawaii, USA	HICSS Phone +1-808-956-7396 Fax +1-808-956-3766
* 18-20 Jan. 1995	Navigating the '90's: Technology, Applications, and Policy	Anaheim, California, USA	ION Phone +1-703-683-7101 Fax +1-703-683-7105
3-5 Feb. 1995	Coast GIS '95 - International Symposium on GIS and Computer Mapping for Coastal Management	Cork, IRELAND	University College, Cork Fax +353-21-271980
5-10 Feb. 1995	IS&T/SPIE Symposium on Electronic Imaging: Science and Technology	San Jose, California, USA	SPIE Phone +1-206-676-3290 Fax +1-206-647-1445
6-10 Feb. 1995	International Symposium RS and GIS as Tools for Soil Inventory	Ouagadougou, BURKINA FASO	Dr. R. Escadafal Phone +216-1-750-009 Fax +216-1-750-254
6-10 Feb. 1995	"Second Course on Digital Photogrammetry"	Bonn, GERMANY	H. Ellenbeck Phone +49-228-732716 Fax +49-228-732712
* 7-10 Feb. 1995	ISPRS WG V/3 Session at "Survey '95 Conference" FIG Symposium on Engineering Surveying	 Cape Town, SOUTH AFRICA	Prof. H. Rüther (WG V/3) Phone +27-21-650-3573 Fax +27-21-650-3726
* 21-24 Feb. 1995	International Symposium on Precision Approach and Automatic Landing (ISPA 95)	Braunschweig, GERMANY	German Inst. of Navigation Phone +49-211-36-99-09 Fax +49-211-35-16-45
* 22-23 Feb. 1995	"Remote Sensing and Cartography Summit"	Brussels, BELGIUM	Neale Phillips Phone +44-564-70-3993 Fax +44-564-70-3003
* 1-2 March 95 C	ISPRS Commission II and WG's II/5, IV/1, VII/4 Meetings and Workshops during "ASPRS/ACSM Annual Convention and Auto-Carto Twelve"	 Charlotte, NC, USA	ASPRS Phone +1-301-493-0200 Fax +1-301-493-8245
* 6-8 March 1995	The Expansion of the Remote Sensing Market	Paris, FRANCE	Dr. Paul Kamoun Fax +33-92-92-30-10

C = ISPRS Meeting - Dates confirmed and approved by Council

(?) = ISPRS Proposed Meeting - Dates pending Council approval




* = New or updated information since 15 November 1994 version

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1995

DATE	EVENT	LOCATION	INFORMATION
6-12 March 1995	UN-World Summit for Social Development	Copenhagen, DENMARK	UN/DPI Fax +1-212-963-4361 or 3062
* 12-16 March 1995	International Conference on Water Resource Management in Arid Countries	Muscat, OMAN	IWRA Phone 1-217-244-4459 Fax +1-217-244-6633
* 20-23 March 1995	The Second International Seminar on GNSS	Leeds, UNITED KINGDOM	Professor P. Daly Phone +44-532-332-046 Fax +44-532-332-032 E-Mail: pda@elec-eng.leeds.ac.uk.
20-23 March 1995	AM/FM International Annual Conference XVIII	Baltimore, Maryland, USA	Cindy Achten Phone +1-303-337-0513 Fax +1-303-337-1001
22-24 March 1995 C	ISPRS WG I/3, V/2 & IC WG V/III Workshop "From Pixels to Sequences-Sensors, Algorithms and Systems"	 Zurich, SWITZERLAND	Dr. Emmanuel Baltsavias (V/III) Hans-Gerd Maas (I/3) Dr. Horst Beyer (V/2) Phone +41-1-633-3042 Fax +41-1-633-1101
26-31 March 1995	Joint European Conference & Exhibition on Geographical Information	The Hague, NETHERLANDS	AKM Congress Service Phone +41-61-6915111 Fax +41-61-6918189
* 26 March - 1 April 1995	International School GPS for Geodesy	Delft, THE NETHERLANDS	Netherlands Geodetic Commission Phone +31-15-78-28-19 Fax +31-15-78-27-45 E-Mail: schroder@tudgvl.tudelft.nl.
27-29 March 1995 C	ISPRS IC WG II/III Workshop and Seminar on "Integrating Remote Sensing Data and GIS for Applications in SE Asia"	 Kuala Lumpur, MALAYSIA	Dr. Ian Dowman Phone +44-71-380-7226 Fax +44-71-380-0453
* 27-30 March 1995	GIS '95 and GIS Expo	Vancouver, British Columbia, CANADA	GIS '95 Phone +1-604-688-0188 Fax +1-604-688-1573 E-Mail: gis@unixg.ubc.ca
* 3-5 April 1995	ISPRS WG II/1 Session at the "3rd International Workshop on High Precision Navigation"	 Stuttgart, GERMANY	Geschaefsstelle Phone +49-711-6856615 Fax +49-711-6856670

1995

DATE	EVENT	LOCATION	INFORMATION
4-6 April 1995	MARI Europe '95	Paris, FRANCE	ORTECH Phone +33-1-45230816 Fax +33-1-48240181
* 5-6 April 1995	Understanding Earth: Retrospectives and Visions	Washington, D.C., USA	ERIM Phone +1-313-994-1200 x3453 Fax +1-313-994-5123 E-Mail: raeder@vaxc.irim.org
9-12 April 1995	1995 Symposium on Interactive 3D Graphics	Monterey, California, USA	M. Zyda Phone +1-406-656-2305 Fax +1-406-656-2814
* 17-21 April 1995 C	ISPRS WG II/III Conference on "Integrating Photogrammetric Techniques with Scene Analysis and Machine Vision II" (Part of SPIE 1995 Symposium on Aerospace/Defense Sensing and Dual-Use Photonics)	Orlando, Florida, USA 	Dr. David McKeown, Jr. Phone +1-412-268-2626 Fax +1-412-681-5739
* 24-26 April 1995	Global Environmental Change: Implications for Southern Africa	Pretoria, SOUTH AFRICA	Louise Botten Fax +27-12-841-3791
24-28 April 1995	Ascona Workshop 1995 "Automatic Extraction of Man-Made Objects from Aerial and Space Images"	Ascona, SWITZERLAND	A. Gruen Phone +41-1-6333038 Fax +41-1-6331101
* 24-28 April 1995	The Fourth International Conference on Differential Satellite Navigation Systems (DSNS 95)	Bergen, NORWAY	Nordic Institute of Navigation Phone +47-22-266-225 Fax +47-22-277-424
* 26-28 April 1995 C	ISPRS WG I/1 Workshop on "Image Quality Control"	Dessau, GERMANY 	Dr. Hartmut Ziemann (WG I/1) Phone +49-340-61-94-30 Fax +49-340-61-94-33
* 27-29 April 1995	Europe-China Workshop on Geometrical Modelling and Invariants for Computer Vision	Xi'an, CHINA	R. Mohr Phone +33-76-574-653 Fax +33-76-574-602 E-Mail: Roger.Mohr@Imag.fr.
May 1995 (?)	ISPRS WG VI/5 Workshop "Digital Photogrammetry and Geographic Information Systems - Status and Prospects"	Enschede, NETHERLANDS 	Dr. Theo Bouloucos Phone +31-53-874444 Fax +31-53-874400

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LWF, Secretary General

1995

DATE	EVENT	LOCATION	INFORMATION
2-5 May 1995	ISPRS Commission II Special Topic WG meeting at "Geotechnica 1995"	 Köln, GERMANY	Messe- und Ausstellungs Phone +49-2-21-821-0 Fax +49-2-21-821-2574
* 7-10 May 1995	National Geodata Forum	Crystal City, Virginia, USA	NGF Fax +1-301-571-1988
15-18 May 1995	Pollution Monitoring and GIS	Brandys-nad-Labem, CZECH REPUBLIC	EARSeL Workshop Phone +33-1-45-56-73-60 Fax +33-1-45-56-73-61
22-26 May 1995	62nd FIG Permanent Committee Meeting	Berlin, GERMANY	FIG Phone +61-6-253-2922 Fax +61-6-253-1741
23-25 May 1995	Measuring and Monitoring Forest Biological Diversity: The International Network of Biodiversity Plots	Washington, D.C., USA	Dr. Francisco Dallmeier Phone +1-202-537-4793 Fax +1-202-786-2557
- 23-25 May 1995	EARSeL SIG Meeting on "Remote Sensing for Integrated Resource Management of Coastal Zones" at International Space Congress	Bremen, GERMANY	Mme. M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761
23-26 May 1995	Visual Communications and Image Processing '95	Taipei, TAIWAN ROC	SPIE Phone +1-206-676-3290 Fax +1-206-647-1445
* 26-28 May 1995	Geoinformatics '95 Hong Kong: RS, GIS, and GPS in Sustainable Development and Environmental Monitoring	 HONG KONG	Dr. Hui Lin Phone +852-609-6528 Fax +852-603-5006
30 May - 2 June 1995 C	ISPRS WG IV/6 "International Workshop on Global Databases" and 1995 GLOBE Committee Meeting	 Boulder, Colorado, USA	Dr. Ryutaro Tateishi Phone +81-43-290-3850 Fax +81-43-290-3857
* 5-7 June 1995	ION 51st Annual Meeting "50 Years of Navigation Progress from Art to Utility"	Colorado Springs, Colorado, USA	Dr. Richard L. Greenspan Phone +1-617-258-4041 Fax +1-617-258-4444
7, 10 June 1995 C	ISPRS Council Meeting	 Vienna, AUSTRIA	Lawrence W. Fritz Phone +1-610-531-3205 Fax +1-610-889-3296

1995

DATE	EVENT	LOCATION	INFORMATION
8-9 June 1995 C	ISPRS Joint Meeting - Council and Technical Commission Presidents	 Vienna, AUSTRIA	Lawrence W. Fritz Phone +1-610-531-3205 Fax +1-610-889-3296
* 12-14 June 1995	The 5th Scandinavian Research Conference on GIS	Trondheim, NORWAY	E-Mail: scangis@iko.unit.no
* 12-14 June 1995	The 5th Scandinavian Research Conference on GIS	Trondheim, NORWAY	Jan Terje Bjoerke E-Mail: scangis@ika.unit.no.
12-16 June 1995 C	ISPRS Commission I Workshop on Multimedia GIS Data	 Udine, ITALY	Dr. Riccardo Galetto Phone +39-382-391-410 Fax +39-382-391-419
* 13 June 1995 C	ISPRS WG III/4 Tutorial on Spatial Data Analysis: Theory & Algorithms		Prof. Fabio Crosilla Phone +39-432-504128 Fax +39-432-294928
* 12-17 June 1995 C	GIS/LIS '95-Central Europe with WG VII/3 Workshop "Monitoring of Natural Resources and the Environment"	 Budapest, HUNGARY	Frank Hegyi (WG VII/3) Phone +1-613-237-8055 Fax +1-613-232-5285
- 71 - 12-13 June 1995 C	ISPRS WG III/3 Workshop "Basic Concepts of GIS"		Dr. Gábor Mélykúti (WG III/3) Phone +36-1-181-3374 Fax +36-1-181-3374
* 13-15 June 1995	ISPRS Commission II Sessions and Business meetings at "Canadian Conference on Geomatics"	 Ottawa, Ontario, CANADA	Dr. Ekow Otoo Phone +1-613-788-2600 Fax +1-613-788-4334 E-Mail: otoo@scs.carleton.ca
* 13-15 June 1995	17th Canadian Symposium on Remote Sensing "Radar Remote Sensing: A Tool for Real-Time Land Cover Monitoring & GIS Integration"	Saskatoon, Saskatchewan, CANADA	Jeff Whiting Phone +1-306-933-5423 Fax +1-306-933-7817
* 18-19 June 1995	IEEE Workshop on Physics-Based Modelling in Computer Vision	Cambridge, Massachusetts, USA	D. Metaxas
* 19 June 1995	IEEE Workshop on Context-Based Vision	Cambridge, Massachusetts, USA	T. Strat E-Mail: strat@ai.sri.com
* 19-23 June 1995	European Symp. on Optics for Environment and Public Safety	Munich, GERMANY	Direct Communications Phone +49-30-88-15047 Fax +49-30-88-22028

C = ISPRS Meeting - Dates confirmed and approved by Council

(?) = ISPRS Proposed Meeting - Dates pending Council approval



* = New or updated information since 15 November 1994 version

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FAX: +1-610-889-3296

DATE	EVENT	LOCATION	INFORMATION
20-23 June 1995	5th International Conference on Computer Vision (ICCV)	Cambridge, Massachusetts, USA	E. Grimson Phone +1-617-253-5346 Fax +1-617-258-6287
* 25-30 June 1995	St. Petersburg - Great Lakes Conference "Digital Photogrammetry and Remote Sensing 1995"	 St. Petersburg, RUSSIA	Dr. S. Zheltov Phone +7-095-157-9748 Fax +7-095-157-5097 E-Mail: zhl@fenix.nias.msk.su
26-28 June 1995	International Workshop on Automatic Face and Gesture-Recognition	Zurich, SWITZERLAND	M. Bichsel Phone +41-1-2574358 Fax +41-1-3630035
* 26-30 June 1995	The First International Radionavigation Conference and Exhibition	Moscow, RUSSIA	Moscow '95 Phone +7-95-132-0447 Fax +7-95-132-0822
* 30 June-1 Jul 1995 C	IUSM Strategic Planning Workshop "Interdependence" - all IUSM Council	 Boulder, Colorado, USA	IUSM, Secretariat Phone +1-613-995-4449 Fax +1-613-995-0842
* 30 June-4 Jul 1995	International Conference on Computer Based Learning and Science	Opava, CZECH REPUBLIC	Dr. Joachim Höhle (WG VI/2) Phone +45-9-815-8522 Fax +45-9-815-6541
* 2-14 July 1995	IUGG Conference and XXI General Assembly	Boulder, Colorado, USA	IAG Phone +1-202-462-6910 x238
* 2 July 1995	IUSM Executive Board Meeting	Boulder, Colorado, USA	Hugh O'Donnell Phone +1-613-995-4776 Fax +1-613-995-0842
* 4 July 1995	IUSM Education WG Meeting and IUSM Automated Control Measurements WG Mtg		
* 5 July 1995	IUSM/IAG Symposium on GPS		
3-6 July 1995	5th International Conference on Image Processing and its Applications	Edinburgh, UNITED KINGDOM	IPA95 Secretariat Phone +44-71-3445478 Fax +44-71-4973633
* 5-7 July 1995	DLR Symposium on "Latest results of MOMS-02 Mission"	Cologne, GERMANY	Mme. M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761

1995

DATE	EVENT	LOCATION	INFORMATION
9-14 July 1995	SPIE's International Symposium on Optics, Imaging and Instrumentation	San Diego, California, USA	Dr. Tony Schenk Phone +1-614-292-7681 Fax +1-614-292-2957
10-14 July 1995	IGARSS '95	Florence, ITALY	IEEE Phone +1-713-291-9222 Fax +1-713-291-9224
16-20 July 1995	"5th S.E. Asian and 36th Australian Surveyors Congress"	SINGAPORE	Wee Soon Kiang Phone +65-222-3030 Fax +65-225-2453
17-18 July 1995 C	ISPRS WG I/4 and WG I/6 Workshop on "Recent Advances in Signal Evaluation"	Boulder, Colorado, USA 	Dr. John Curlander (WG I/4) Phone +1-303-444-0094 Fax +1-303-444-0470
25 July-2 Aug. 95	Commonwealth Survey Officers' Conference	Cambridge, UNITED KINGDOM	Paul Newby Fax +44-703-792-230
* 30 July - 2 Aug. 1995	Pacific Rim TransTech Conference & Sixth International Conference on Vehicle Navigation & Information Systems (VNIS '95)	Seattle, Washington, USA	William P. Carr Phone +1-206-705-7802 Fax +1-206-705-6823
30 July - 4 Aug. 95	XVII Brazilian Cartographic Congress	Salvador, Bahia, BRAZIL	SBC Phone +55-21-240-6901 Fax +55-21-262-2823
* August 1995 ?	ISPRS WG VI/2 meeting at the Fourth Regional Remote Sensing Seminar on Tropical Ecosystem Management	PHILIPPINES 	Dr. Kohei Cho (WG VI/2) Phone +81-3-3481-0611 Fax +81-3-3481-0610
* 6-9 Aug. 1995	WG II/3 Business Meeting at "GIS Conference on Large Spatial Databases"	Portland, Oregon, USA 	Dr. Ekow Otoo Phone +1-613-788-2600 Fax +1-613-788-4334 E-Mail: otoo@scs.carleton.ca
7-12 Aug. 1995	The XX IUFRO World Congress - Caring for the Forest: Research in a Changing World	Tampere, FINLAND	Prof. Risto Seppala Phone +358-0-857-051 Fax +358-0-625-308
12-17 Aug. 1995	URISA '95	San Antonio, Texas, USA	URISA Phone +1-202-289-1685

C = ISPRS Meeting - Dates confirmed and approved by Council
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* At present on list of ISPRS members since 15 November 1994 meeting

ISPRS EVENTS CALENDAR






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1995

DATE	EVENT	LOCATION	INFORMATION
21-24 Aug. 1995 C	"GIS, AM/FM Asia '95" Workshop, Conference and Exhibition	 Bangkok, THAILAND	Dr. Shunji Murai Phone +81-3-3402-6231 Fax +81-3-3479-2762
28-31 Aug. 1995 C	"Photosynthesis and Remote Sensing" Colloquium of ISPRS WG VII/1 and EARSeL (follows 20-25 Aug - 10th International Congress of Photosynthesis)	 Montpellier, FRANCE	Dr. Gérard Guyot (WG VII/1) Phone +33-90-31-60-90 Fax +33-90-89-98-10
30 Aug - 1 Sept 1995 C	ISPRS WG III/2 & IC WG II/III Workshop on "The Role of Models in Automated Scene Analysis"	 Stockholm, SWEDEN	Dr. Kennert Torlegard (WG III/2) Phone +46-8-790-7344 Fax +46-8-790-8714 Dr. Ian Dowman (IC WG II/III) Phone +44-71-380-7226 Fax +44-71-380-0453
Sept 1995 (?)	ISPRS WG VII/6 Workshop	 Enschede, NETHERLANDS	Dr. Bruce Forster Phone +61-2-385-4172 Fax +61-2-313-7493
3-9 Sept 1995	17th ICA Conference "Cartography Crossing Borders"	Barcelona, SPAIN	Jaume Miranda i Canals Phone +34-3-218-87-58 Fax +34-3-218-87-59
* 4-6 Sept. 1995	15th EARSeL Symposium "Progress in Environmental Research & Applications"	Basel, SWITZERLAND	Mme M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761
* 6-8 Sept. 1995	Workshop "Progress in Satellite Meteorology"		
* 7-8 Sept. 1995	Workshop "Modelling the Water Cycle"		
4-8 Sep. 1995 C	ISPRS WG III/1, II/1 & WG I/2 Workshop on "Integrated Sensor Orientation: Theory, Algorithms and Systems"	 Barcelona, SPAIN	I. Colomina Phone +34-3-218-8758 Fax +34-3-218-8959
5-8 Sept. 1995	Offshore Europe '95	Aberdeen, UNITED KINGDOM	Spearhead Exhibitions Ltd. Phone +44-81-549-5831 Fax +44-81-541-5657/5016
5-8 Sept. 1995	Optical Tools for Manufacturing and Advanced Automation	Boston, Massachusetts, USA	SPIE Phone +1-206-676-3290 Fax +1-206-647-1445






1995

DATE	EVENT	LOCATION	INFORMATION
* 6-8 Sept. 1995	International Workshop on Stereoscopic and 3D Imaging	Santorini, GREECE	M. Strintzis Fax +30-31-219-783 E-Mail: strintzi@vergina.eng.auth.gr
* 7-9 Sept. 1995	Workshop "Remote Sensing and GIS Applications to Forest Fire Management"	Aleala de Henares, SPAIN	Mme M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761
11-14 Sept. 1995 C	ISPRS Special Session "Ecosystem Monitoring from Regional to Global Scales" at RSS95 Remote Sensing in Action Conf.	 Southampton, UNITED KINGDOM	Professor P. Curran (WG VII/5) Phone +44-703-592295 Fax +44-703-593295
* 11-15 Sept. 1995 C	ISPRS Commission II Special Topic WG and WG III/1 Business Meetings during: "45th Photogrammetric Week"	 Stuttgart, GERMANY	I. Colomina (WG III/1) Phone +34-3-218-8758 Fax +34-3-218-8959 Dr. K. Szangolies (II-ST WG) Phone +49-3641-42-4771 Fax +49-3641-588-3340 M. Kroma Phone +49-711-121-3201 Fax +49-711-121-3297
* 12-15 Sept. 1995	ION GPS-95	Palm Springs, California, USA	Dr. Richard L. Greenspan Phone +1-617-258-4041 Fax +1-617-258-4444 E-Mail: rgreenspan@draper.com
12-16 Sept. 1995	"Space Remote Sensing of Subtropical Oceans"	Taipei, TAIWAN ROC	Cho-Teng Liu Phone +886-35-770-049 Fax +886-35-770-134
18-20 Sept. 1995	3rd Thematic Conference - Remote Sensing for Marine & Coastal Environments	Seattle, Washington, USA	ERIM Phone +1-313-994-1200 x3234 Fax +1-313-994-5123
* 21-23 Sept. 1995	Conference on Spatial Information Theory	Vienna, AUSTRIA	Fax +43-1-514-3535
* 25-27 Sept. 1995 C	IUSM GIS/LIS WG Meeting	 Hannover, GERMANY	Dr. Gottfried Konecny Phone +49-511-762-2481 Fax +49-511-762-2483
27-29 Sept. 1995	9th International Symposium "Computer Science for Environment Protection"	Berlin, GERMANY	Horst Kremers Phone +49-30-25-86-26-87 Fax +49-30-3-72-85-87




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DATE	EVENT	LOCATION	INFORMATION
* 28-29 Sept. 1995 C	ISPRS WG IV/1 Workshop on "Mapping and Environmental Applications of GIS Data"	 Madison, Wisconsin, USA	Dr. Lynn Usery (WG IV/1) Phone +1-706-542-2345 Fax +1-706-542-2388 E-Mail: Usery@Feature.ggy.uga.edu
2-4 Oct. 1995 C	3rd Conference on Optical 3-D Measurement Techniques	 Vienna, AUSTRIA	Dr. H. Kahmen Phone +43-1-58801-3770 Fax +43-1-504-27-21 E-Mail: o3d95@fbgeol.tuwien.ac.at
* 4-6 Oct. 1995 C	ISPRS IC WG III/IV & WG II/2 Joint Workshop on "Conceptual Aspects of GIS"	 Merrickville, Ontario CANADA	Dr. Martien Molenaar (WG III/IV) Phone +31-83-70-82130 Fax +31-83-70-84643 Dr. Manfred Ehlers (II/2) Phone +49-4441-15423 Fax +49-4441-15445
* 4-6 Oct. 1995	MARISY 95 African Forum on "Remote Sensing for Environment and Development"	Rabat, MOROCCO	CRTS Phone +212-7-776-305 Fax +212-7-776-300
* 9-13 Oct. 1995	European Symposium on Satellite Remote Sensing II	Florence, ITALY	Direct Communications Phone +49-30-881-5047 Fax +49-30-882-2028
* 17-20 Oct. 1995	International Symposium "Retrieval of Bio- and Geophysical Parameters from SAR Data for Land Applications"	Toulouse, FRANCE	Christine Correcher Phone +33-61-28-23-88 Fax +33-61-28-13-27
21-23 Oct. 1995	107th New Zealand Institute of Surveyors Conference	Christchurch, NEW ZEALAND	NZIS Conference Secretary Phone +64-3-366-5955 Fax +64-3-366-5944
* 22-25 Oct. 1995	4th International Conference on CAD and CG	Wuhan, CHINA	Feng Gao Phone +86-27-780-1881 Fax +86-27-780-0063
22-26 Oct. 1995 (?)	ISPRS WG V/1 "Videometrics IV Conference", part of SPIE Photonics East '95 Symposium	 Philadelphia, Pennsylvania, USA	Dr. Sabry El-Hakim Phone +1-613-991-6381 Fax +1-613-952-0215
* November 1995 (?)	ISPRS WG VII/7 "International Workshop on Remote Sensing for Marine Environment"	 JAPAN	Dr. Shintaro Goto Phone +81-762-48-1100 x2454 Fax +81-762-94-6711

1995

DATE	EVENT	LOCATION	INFORMATION
5-10 Nov. 1995	VII Latin American Remote Sensing Symposium (SELPER)	Puerto Vallarta, MEXICO	Dr. Roman Alvarez Phone +52-5-622-4339 Fax +52-5-616-2145 Email: Rab@igiris.igeograf.unam.mx
* 5-11 Nov. 1995	AARSE General Assembly and 1st Regional Conference "Remote Sensing and GIS for Environmental and Natural Resources Development and Management in Africa"	Addis Ababa, ETHIOPIA	Peter O. Adeniyi Phone +234-1-820-191 Fax +234-1-820-191 or 617-075
8-10 Nov. 1995 C	ISPRS Joint Workshop on "Integrated Acquisition and Interpretation of Photogrammetric Data" by WG I/5, WG II/1, WG III/2, WG III/3	Stuttgart, GERMANY 	Dr. Ralf Bill (I/5) Phone +49-711-1213-398 Fax +49-711-1213-500 Dr. Michael Hahn (II/1) Phone +49-711-121-3297 Fax +49-711-121-3297 Dr. Dieter-Fritsch (III/3) Phone +49-711-121-3386 Fax +49-711-121-3297
11-17 Nov. 1995	GIS/LIS 1995	Nashville, Tennessee USA	ASPRS/URISA/AM/FM/AAG/ACSM Phone +1-301-493-0290 Fax +1-301-493-0208
* 27-30 Nov. 1995	International Congress on Modelling and Simulation	Newcastle, AUSTRALIA	P. Binning Phone +61-49-215-735 Fax +61-49-216-991 E-Mail: modsim95@newcastle.edu.au
* 27 November - 1 December 1995 C	ISPRS WG IV/2 "1995 Workshop in Mapping from Space"	Madras, INDIA 	Prof. V. Guruswamy Fax +91-44-2352-166
* December 1995 ?	ISPRS WG I/5 and OEEPE WG Workshop on "Analysis of Photo Scanners"	Lausanne, SWITZERLAND 	Dr. Ralf Bill (WG I/5) Phone +49-711-1213-398 Fax +49-711-1213-500

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DATE	EVENT	LOCATION	INFORMATION
15-17 Jan. 1996 C	ISPRS Joint Meeting – Council and Technical Commission Presidents	 Bali, INDONESIA	Lawrence W. Fritz Phone +1-610-531-3205 Fax +1-610-889-3296
18-19 Jan. 1996 C	ISPRS Council Meeting	 Bali, INDONESIA	Lawrence W. Fritz Phone +1-610-531-3205 Fax +1-610-889-3296
19-23 Feb. 1996	Inventory of Nontimber Forest Products (NTFP)	Nairobi, KENYA	Dr. August B. Temu, ICRAF Phone +254-2-521-450 Fax +254-2-521-001
* 15-22 March 1996	Conference on the Application of Remotely Sensed Data & GIS in Environmental & Natural Resources Assessment in Africa	Harare, ZIMBABWE	AARSE Phone +234-1-820-191 Fax +234-1-820-191 or 617-075
25-28 March 1996	AM/FM International Annual Conference XIX	Seattle, Washington, USA	Cindy Achten Phone +1-303-337-0513 Fax +1-303-337-1001
-78* Spring 1996	EARSeL Workshop "Telematics for the Environment"	Florence, ITALY	Mme. M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761
15-19 April 1996	63rd FIG Permanent Committee Meeting	Buenos Aires, ARGENTINA	FIG Fax +54-1-343-8423
20-26 April 1996	"ASPRS/ACSM '96"	Baltimore, MD, USA	Phone +1-301-493-0200 Fax +1-301-493-8245
* May 1996	4th Circumpolar Environment Conference	Copenhagen, DENMARK	Mme. M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761
* 20-24 May 1996	EARSeL General Assembly, Symposium and Workshops	Valletta, MALTA	Mme. M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761
3-14 June 1996	"Habitat II; UN Conference on Human Settlements"	Istanbul, TURKEY	UN/DPI Fax +1-212-963-1186
2-5 July 1996	World Congress of Engineering Deans and Industry Leaders	Paris, FRANCE	UATI, UNESCO, WFED Phone +33-1-45-66-94-10 Fax +33-1-43-06-29-27

1996

DATE	EVENT	LOCATION	INFORMATION
6-8 July 1996 C	ISPRS Council Meeting	 AUSTRIA	Prof Karl Kraus Phone +43-1-58801-3811 Fax +43-1-505-6268
9-19 July 1996 C	18th ISPRS Congress (with IUSM Executive Board Meeting)	 Vienna, AUSTRIA	Prof Karl Kraus Phone +43-1-58801-3811 Fax +43-1-505-6268
4-14 Aug. 1996	30th International Geological Congress	Beijing, CHINA	Prof. Zhao Xun Phone +86-1-832-7772 Fax +86-1-832-8928
* 25-30 Aug. 1996	ICPR '96 13th International Conference on Pattern Recognition	Vienna, Austria	
* Autumn 1996	EARSeL Workshop "Remote Sensing of Snow and Land Ice"	NORWAY	Mme. M. Godefroy Phone +33-1-45-567-360 Fax +33-1-45-567-761
* 16-22 Nov. 1996	"GIS/LIS '96"	Denver, Colorado, USA	ASPRS/URISA/AM/FM/AAG/ACSM Phone +1-301-493-0290 Fax +1-301-493-0208

- 79 -

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1997

DATE	EVENT	LOCATION	INFORMATION
* 6-13 April 1997	ACSM/ASPRS '97	Seattle, Washington, USA	ACSM Phone +1-301-493-0290 Fax +1-301-493-0208
11-16 May 1997	64th FIG Permanent Committee Meeting	SINGAPORE	FIG Fax +65-225-2453
22-28 June 1997	18th International Cartographic Conference ICC '97	Stockholm, SWEDEN	Bengt Rystedt Fax +46-26-653160
1997	IHO Congress (with IUSM Executive Board Meeting)	MONACO	IHO Fax +33-93-25-20-03

1998

DATE	EVENT	LOCATION	INFORMATION
18-25 July 1998	XXI FIG Congress - 21st GA and 65th PC Meeting (with IUSM Executive Board & Council Meetings)	Brighton, UNITED KINGDOM	FIG Fax +44-71-222-9430
* 10-15 Aug. 1998	Applications of Remote Sensing Data in Environmental Hazard Zoning and Mapping	Eritrea, ETHIOPIA	AARSE Phone +234-1-820-191 Fax +234-1-820-191 or 617-075