ISPRS Society

Announcement of Events Calendar Editor

Professor Tuan-chih Chen, ISPRS Events Calendar Editor,
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To: Technical Commission Presidents, Working Group Chairpersons, & Event Organizers

Events Calendar Editor greatly appreciates your responses to this announcement

The ISPRS Events Calendar is published in the quarterly ISPRS bulletin, ISPRS Highlights, and frequently updated on the ISPRS Web Page. The Calendar contains a list of all ISPRS sponsored and co-sponsored congresses, conferences, symposia, workshops, tutorials and other meetings. It also contains details of all international and national events on topics related to the activities of ISPRS, including those in photogrammetry, remote sensing, spatial information systems, geomatics, surveying, mapping, machine vision, image processing and similar areas.

The purpose for ISPRS is to allow Commissions and WGs to identify open dates or events which they may link up with or avoid conflicting with. This avoidance of conflicting with other events externally and definitely internally is a major responsibility of ISPRS. We publish the calendar to encourage other sister societies to do likewise. It is important that we cover events which are on the interdisciplinary boundaries of ISPRS so that our Commissions and WGs are aware of who and how they can interface with related organizations. Please refer to the Appendix 3 of ISPRS Orange Book, too: http://www.isprs.org/documents/orangebook/app3.html

The Events Calendar Editor respectfully asks all TC Presidents, WG Chairpersons and Members to submit the details of their congresses, conferences, symposia, workshops, tutorials and meetings:

1) Date (maybe open or pending, see above),
2) Event,
3) Web site address,
4) City, Country,
5) Contact person, TEL, FAX, & E-mail.

Please email or fax the details to:

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Thank you very much for your support and your assistance.

ISPRS Workshop High-resolution Earth Imaging for Geospatial Information

By G. Boettcher, e-mail: boettcher@ipi.uni-hannover.de

We would like to draw your attention to the upcoming ISPRS Hannover Workshop 2005 'High-Resolution Earth Imaging for Geospatial Information' held in Hannover from May 17-20, 2005.

Workshop Goals

Earth imaging from air and space have undergone major changes over the last years. Examples of new and significant developments comprise the advent of digital aerial cameras, of high-resolution and hyper-spectral satellite imagery, and of laser scanning and SAR/InSAR data. With the integration of data from different sources, also calibration issues have become more important.

Today, all these data are used for the production, refinement, and update of geospatial information. At the same time updating existing geospatial databases has gained more importance, while automation and the worldwide web have had a significant impact on the photogrammetric and remote sensing processing chain.

These developments form the background for the ISPRS Hannover Workshop High-Resolution Earth Imaging for Geospatial Information 2005, to which you are cordially invited. This meeting is a follow-up workshop of those held in Hannover in previous years, and also focuses on airborne issues, while giving due regard to developments in the satellite arena.

The single-track workshop addresses experts in geospatial Earth Imaging from research, government, and private industry. It consists of high quality papers, presented orally or as posters, and will provide an international forum for discussion of leading research and technology developments and applications in the field.

IPI is proud to announce that Z/I Imaging has agreed to be the exclusive sponsor of this event. During Thursday afternoon Z/I Imaging will conduct a master class in which the processing chain of photogrammetry and remote sensing is illustrated through software demonstrations and real-life examples.

Topics and Paper Submission

You are encouraged to contribute to the workshop by submitting your latest research and development results in the areas of

- Digital aerial cameras
- Handling of high resolution space imaging
- Potential of small satellites for topographic mapping
- Airborne laser scanning
- Synthetic aperture radar (SAR) and interferometric SAR
- Sensor and system calibration and integration
- Direct georeferencing and automatic image orientation
- Sensors and methods of DEM generation
- Aerial image analysis
- GIS driven updating and refinement of geospatial databases, incl. quality and assessment and quality control
- From experimental systems for object acquisition and updating to commercial solutions
- Delivery mechanisms for photogrammetric products and services.

The conference language is English. All accepted papers will be published on CD-ROM which will be available at the workshop, and on the web. We strive to publish selected papers in the new ISPRS book series after the workshop.

Important Dates

Deadline for abstracts (approx. 1000 words): 1st February 2005
Notification of acceptance: 1st March 2005
Deadline for full papers: 15th April 2005

For further information as paper submission, registration, fees etc. please see http://www.ipi.uni-hannover.de/ISPRS_workshop_05

Youth Forum and Youth Camp

By Prof. Dr Orhan Altan, ISPRS Secretary General, e-mail: oaltan@itu.edu.tr

During the XXth Congress of ISPRS held in Istanbul, Turkey from 12–23 July 2004, the Youth Forum was organised for the first time in the history of ISPRS and attracted great attention. A special day was allocated to the youth on 17 July when two scientific sessions and one poster session was arranged. As a result of the poster session, a special "Youth Forum Best Poster Award" was announced on the last day of the Congress, on 23rd July at the Closing Ceremony and thus ISPRS Youth was encouraged.

Following the Congress, a Youth Camp in the Guzelyalı District of Canakkale was planned where the aim was to bring the young ones of the profession together to get to know each other. The Ministry of Education allocated the camp only to the young participants of the ISPRS Congress and a minimal fee of USD 90.- was collected from them

Guzelyali - location of the ISPRS Youth Camp.

Participants at the Trojan Archeological site.

Participants at departure.

for one week of full board stay in the camp including transportation to and from Istanbul to the camp site.

The district of Guzelyalı was especially interesting since it is very near the historical site of Troy. They also had the chance of visiting the Anzac Cove and the Memorial erected for the dead fallen during the First World War which is one of the legends of the world history.

Many activities of different kinds were prepared in the camp where they could indulge in the special tasks they were interested in and also many sport activities.
However perhaps the best part was having the chance of swimming in the azure waters of the Aegean Sea and also sunning under a clear sky.

Obituary T.J. Blachut Dr.Sc. Techn, Dr.h.c., F.R.S.C., F.PAN. (1915-2004)

Teodor J. Blachut, a well-known photogrammetrist, died on 17 June 2004 at the age of 89.

He was born and educated in Poland. He graduated from the Geodetic Department of the Technical University of Lwow in 1938 and received in 1971 the degree of Doctor of technical sciences from the Swiss federal Institute of Technology (ETH) in Zurich.

During the Second World War Blachut served with the Polish army in France. After the fall of France, his division crossed the border to Switzerland and was interned there. After the war, he joined the staff of the ETH and eventually worked as an engineer at the Wild Company participating in the development of photogrammetric equipment.

Ted Blachut (left) receiving CIG honorary membership certificate from George Babbage, 1987. Photo credit: Wally Winges.

He had, at that time, already established a reputation for himself as a knowledgeable photogrammetrist. In 1951 he visited Ottawa to install and calibrate a Wild precision photogrammetric plotter at the federal mapping agency and spent three months instructing the technical staff in the operation of new equipment. Canada was, at that time, a heavy user of aerial photographs for resource

and topographic mapping. To help government agencies with their mounting problems in photogrammetric mapping, the National Research Council of Canada, which was already responsible for the calibration of aerial cameras, decided to start a laboratory for photogrammetric research. Dr Blachut was invited to become the head of this laboratory which, under his guidance, became one of the leading research centres in the world in the field of photogrammetry.

The Photogrammetric Research Section organized and participated in various mapping experiments and established a number of test areas with precisely surveyed targeted control points for the analysis of photogrammetric images, map products and digital data. An example of a mapping project was part of a research project carried out in conjunction with McGill University in the high Arctic. It involved the mapping and analysis of the Thompson Glacier on Axel Heiberg Island. Glacier movements were monitored from photogrammetric data over several years and maps were compiled using topographic map representation methods used in Switzerland.

The use of radar for providing elevation control for photogrammetric mapping of remote or mountainous regions was studied in detail by Dr Blachut throughout the 1950s and was based on a narrow beam radar altimeter, the Airborne Profile Recorder, designed by the NRC Division of Radio and Electrical Engineering.

Instruments serving the photogrammetric data collection process were invented and developed in the Section. The photogrammetric Analytical Plotter is one example. This instrument facilitates on-line processing of photogrammetric data and has been accepted worldwide. Different photogrammetric equipment manufacturers produce it. Another instrument, the Monocomparator, developed by the Section, is based on a special, and at the time unique, technique to allow high precision measurements of single photogrammetric images. A Canadian company that sold about 20 of these comparators manufactured a commercial version of the instrument. The last example, mentioned here, is the instrumentation for extracting graphical and digital data from orthophoto images, using stereoscopic interpretation and measurement, allowing for more simplified and inexpensive data collection equipment. The stereoorthophoto approach was conceived as a practical means of providing multipurpose mapping for developing countries.

Software developed by the Section, particularly in the area of analytical aerial triangulation and block adjustment, is used by different mapping organizations all over the world.

Dr Blachut also recognised the potential of the photogrammetric technique in applications not related to mapping of the Earth surface. Examples can be found in a wide area of engineering, medical and architectural projects in which the potential of photogrammetry for the derivation of geometric data of objects in motion, deformations or geometrical analysis in general was demonstrated. In many cases, these projects were carried out jointly with other research groups at NRC, with universities, or with government and private organizations. An example is a single-camera solution to record movement parameters of a fast moving vehicle in highway barrier design. This idea evolved into the vision system of the Space Shuttle Canadian made robotic arm. Another example is the subject of underwater photogrammetric mapping that was studied in co-operation with Parks Canada and applied to precise and detailed archaeological surveys of the remains of shipwrecks off Canada's coasts. This work was carried out using an Analytical Plotter at Parks Canada.

Dr Blachut made extensive use of the Post Doctorate Fellowship program at NRC. Over the years he invited young engineers and scientists to work in the Photogrammetric Research Section for a period of one or two years. Many of these professionals decided to stay and make Canada their home.

Upon his retirement from NRC in 1980, Dr Blachut continued to be active in his profession. He presented seminars and lectures in Europe, North and South America, Asia, Australia and Africa. In addition, he formulated projects in the area of land inventory in various South American and African countries.

Dr Blachut was elected Fellow of the Academy of Science of the Royal Society of Canada and of the Polish Academy of Sciences (F.PAN), and was awarded an honorary doctorate by the University of Mining and Metallurgy in Krakow, Poland. He was made an honorary member of the Canadian Institute of Geomatics, the Ordre des arpenteurs-géomètres, Quebec, and the Brazilian Cartographic Society. He received various honorary medals and awards among others from the Technical University of Milan, Italy, the American Society of Photogrammetry and the National Cartographic Institute of Colombia.

Dr Blachut authored 6 patents connected with photogrammetric instrumentation and produced over 130 publications on geodetic, photogrammetric and cartographic subjects in various languages.

He is survived by his wife of 55 years Fanni, his three sons and ten grandchildren, all in Canada.

Allan Richens and Mariu Van Wijk

(Published in Geomatica Vol. 58, No. 32004)

Obituary Prof. Dr Y.C. Lee (1948-2004)

It is with great sadness that we announce the passing of our colleague Prof. Y.C. Lee. He died on June 23, 2004 in Fredericton, NB, Canada after a long battle with cancer. He served as Vice-President of ISPRS TC IV during 2000-2004, Co-Chair of IC WG IV/III.1 during the 1996-2000 and Guest Co-Editor of the September 2000 ISPRS Journal issue Vol. 55, No. 3.

Yuk-Cheung Lee, known to all as Y.C., was born on 30 March 1948. He went to the University of New Brunswick (UNB), in 1977 after receiving a Bachelor of Science in Computer Science from Simon Fraser University. His Masters thesis was ' A Topological Data Structure for Polygonal Maps.' He graduated in May 1980.

In 1981 he began his Ph.D. with the Surveying Engineering department (now Geodesy and Geomatics Engineering). He was a part-time student and part-time programmer analyst with Dr Sam Masry. The work he did with Dr Masry was to design and implement a digital land information system for resource mapping. His dissertation was on ' Conceptual Models for Geographic Information Systems' . Dr Masry and Y.C. built a Geographic Information System that today is the basis of Dr Masry's company, originally called Universal Systems Limited and now called CARIS. Y.C. graduated with his Ph.D. in 1987.

In September 1986, Y. C. was appointed as a lecturer in the Department of Surveying Engineering. In July 1987 he was appointed an assistant professor in the same Department and in July 1991 he was promoted to associate professor. He received a UNB Merit Award for 1991/92. He was granted tenure in July 1992 and in July 1996, he was promoted to the rank of professor.

In 1995, Y.C. took a two-year leave of absence to take up a Professorship position in the Department of Land Surveying and Geoinformatics, Hong Kong Polytechnic. He felt he could take UNB's values, curriculum, and teaching ideals for the advancement of geographic information systems being developed in China, Australia, and Hong Kong. He was there on the beginnings of the GIS undergraduate and graduate programs at the Hong Kong Polytechnic. Y.C. stayed in Hong Kong for two more years and while at Hong Kong Polytechnic, in 1999 Y. C. won that university's President's Achievement Award.

He returned to UNB in August 1999 and took on the duties of Director of Graduate Studies (DoGS). He held the DoGS position until February 2002 when he underwent the first of a number of operations for cancer.

Y. C. was a gifted teacher concerned with developing innovative teaching methods to explain difficult concepts. His students, who consistently gave him excellent opinion surveys, appreciated his efforts. He was in demand as a community and regional speaker because he was so capable of making complicated material simple to grasp. He had a wonderful ability to formulate and articulate concepts.

In his own words, this is how Y. C. saw his arrival at UNB:

Before immigrating to Canada from Hong Kong, I spent a year at ITC in the Netherlands studying cartography. A computer cartography course there in 1973 intrigued me, and I asked staff members and students at ITC where I should go for further studies in Canada. There seemed to be one clear answer: UNB. After landing in Vancouver in 1974 and holding two jobs in drafting, I entered Simon Fraser University and in 1977 obtained a BSc in Computing Science with a minor in mathematics. I hadn't gone straight to UNB because of a miscommunication between my aunt, who thought I should stay in Vancouver, and myself who fully intended on heading east. My aunt won, for a while, but then it was time for UNB. I applied to the Department for a Masters degree, and was encouraged to enter a joint program with Computer Science because of my BSc. I took that suggestion and thought that after the MSc I would go elsewhere, perhaps Ottawa, to find a job. Well, things didn't work out that way!

Y. C. was a very talented photographer and some of his work can be see at http://www.pbase.com/ycleepersonal. A scholarship has being established in Y. C.'s memory (http://gge.unb.ca/Alumni/News/News.html#LeeMemorial) .

Y.C. was an excellent colleague, teacher, researcher and a good friend to many of us in ISPRS community. He will be dearly missed.

International Workshop on 'Service and Application of Spatial Data Infrastructure'

Hangzhou, China from 14-16 October 2005

Organisers

- ISPRS Working Group IV/ 1 (Spatial Data Infrastructure)
- ISPRS Working Group IV/ 8 (Spatial Data Integration for Emergency Services)
- ISPRS Inter-Commission Working Group II/ IV (Dynamic and Multi-Dimension Systems and Applications)

Co-Organisers

- PCGIAP Working Group II (Fundamental Data)
- PCGIAP Working Group III (Cadastre)
- CEOS WGISS
- GSDI
- IS /TC211 AG on outreach

Sponsors

- ESRI China (Hong Kong) Limited
- National Geomatics Center of China
- Zhejiang Bureau of Surveying and Mapping, China
- China Association of GIS

Background

In recent years, significant developments have been made in Spatial Data Infrastructure (SDI). Datasets of various types have been produced at national, regional and global levels. Efforts have also been made at city level. However, currently value- add services and operational applications of SDI are still at exploration stage. This leads to the idea of holding a workshop on this special topic.

Objective of the Workshop

The proposed workshop is a joint workshop of ISPRS working groups, i. e. WG IV/ 1 "Spatial Data Infrastructure", WG IV/ 8 "Spatial Data Integration for Emergency Services" and Inter- Commission WG II/ IV "Dynamic and multi-dimensional Systems and Applications", together with Permanent Committee on GIS Infrastructure (PCGIAP) WGs, The CEOS Working Group on Information Services and Systems (CEOS- WGISS), Global Spatial Data Infrastructure Association (GSDI) and ISO/ TC211 AG on Outreach. The objective of the workshop is to provide a platform for scholars and professionals in relevant areas to exchange research ideas and interests, to present the newest research results, to discuss the cutting-edge technology, and to promote the development of SDI in Asia and the Pacific Region and the international collaboration.

Workshop Themes

Advanced technology for SDI

- Development, access and management of SDI at national, regional and global levels
- Data modelling methods and data model for multi-level SDI
- 3D and temporal spatial information in SDI
- Standards for content, access, interoperability, service, evolve and update of data framework
- Quality evaluation methods for data integration, interoperating and application in multi-level SDI
- SDI in urban areas and marine areas

Value-add services and operational applications of SDI

- Data harmonisation, integration and synergy approaches for multi-scale vector data and raster imagery within multi-level SDI
- Integration of SDI with environmental and socio-economic data for various geo-information services
- Web-based geo-information systems for the application of SDI in e-government or public services
- Spatial data Integration for emergency Services

Regional development of SDI

- Regional geodetic infrastructure
- Regional geo-framework dataset
- Regional data node network

Programme

The scientific programme of the workshop will include Keynote speeches, sequential technical sessions, technical exhibition, and technical training provided by ESRI China (Hong Kong) Ltd. on SDI.
Technical visits and tours will be arranged during and after the workshop.

Registration

Participants will be responsible for their own expenses.
Registration fee is US$ 250 which covers the participation in all workshop sessions and technical exhibition, workshop proceedings, welcome reception, lunches and coffee breaks. Workshop dinner, technical visits and tours will not be included in the registration fee.

Paper submission and publication

You are kindly invited to submit a paper for the technical sessions of the workshop. All papers should be sent to the Workshop Secretariat. The important dates are

31 March 2005	Deadline for Abstract submission
15 May 2005	Notification of paper Acceptance
30 August 2005	Deadline for Full paper submission

Hardcopy proceedings will be published in the format of ISPRS archives, and will be included in the registration package. Selected papers from the workshop proceedings will be published as one of the ISPRS book series (be published by Swets & Zeitlinger B. V. in the Netherlands) before 2006 Commission IV Symposium.

Exhibition
An exhibition of advanced technology (software and hardware) will be organised during the workshop. Companies and organisations interested in presenting their product please contact the Workshop Secretariat for further information and reservations.

Scientific Committee
Chair
- John Trinder (1st Vice President, ISPRS), Australia

Co-chairs
- Jun Chen (Congress Director, ISPRS), China
- Shailesh Nayak (President, ISPRS Technical Commission IV), India

Members
- Jie JIANG (Chair, ISPRS WG IV/ 1), China
- Sisi Zlatanova (Chair, ISPRS WG IV/ 8), The Netherlands
- Chirstopher Gold (Chair, ISPRS IC WG IIIV/), U. K.
- Zhilin Li (Co-Chair, ISPRS IC WG IIIV/), Hong Kong, China
- Ian Williamson (Chair, PCGIAP WG III), Australia
- Jean Pierre Antikidis (CEOS- WGISS), France
- Hans Knoop (ISO /TC211 AG on outreach), Germany
- Qiming Zhou (Hong Kong Baptist University), Hong Kong, China

Organising Committee
Chair
- Jie JIANG (Chair, ISPRS WG IV/ 1), China

Co-chairs
- Gabor Remetey- Fulopp (Co-chair, ISPRS WG IV/ 1), Hungary
- John Faundeen (Chair, CEOS- WGISS), U. S. A.

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- Gholam Reza Fallahi (Chair, PCGIAP WG II), Iran
- Winnie Tang (Chief Executive Officer, ESRI China (H. K.) Ltd.), H. K., China
- Ivan Petiteville (Vice Chair, CEOS- WGISS), Italy
- Alan R. Stevens (Chair of Conference Planning Committee, GSDI), U. S. A.
- Chuang LIU(User Vice Chair, CEOS- WGISS), China
- Andrea Fabbri (Secretary, ISPRS WG IV/ 8), The Netherlands

Local Organising Committee
- Jie JIANG (Chair, ISPRS WG IV/ 1), China
- Gang HAN (Secretary, ISPRS WG IV/ 1), China
- Tao Xu (Zhejiang Bureau of Surveying and Mapping), China
- Dengzhou Wu (China Association of GIS), China
- Jingwe LI (National Geomatics Center of China), China
- Xu Zhou (National Geomatics Center of China), China

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Workshop Website: http://isprs-wg41.nsdi.gov.cn

Addendum to the 'Best Poster Awards' awarded during the XX. ISPRS Congress in Istanbul

These two posters were selected as two of the fourteen best posters during The XX. ISPRS Congress held in Istanbul, Turkey, during 12 – 23 July 2004

"Multi-resolution and multi-spectral image fusion for urban object extraction"
By Y. Zhang, R. Wang

"Semi-automated CSG model-based building extraction from photogrammetric images"
by S.D. Wang, Y.H. Tseng

Report on Inter-organisational Relations

By Ian Dowman, Secretary General, ISPRS 2000-2004, e-mail: idowman@ge.ucl.ac.uk

A major objective of ISPRS is the development of international co-operation for the advancement of the photogrammetry, remote sensing and spatial information sciences. A major activity is to represent the photogrammetry, remote sensing spatial information sciences communities to Intergovernmental organisations and to other international societies. ISPRS is a member of a number of international organisations, and also collaborates with others. Table 1 gives a summary of ISPRS relationships with international organisations, divided into Intergovernmental bodies, international umbrella organisation and other international societies. Some additional information on the major inter-organisational activities follows the table.

Organisation	ISPRS Status	Activities in 2000-2004	Representatives
United Nations			
UN Economic and Social Council (ECOSOC)	Accredited NGO		
UN Committee on Development Information (CODI)	Accredited NGO	Cartgraphic Conferences for Africa	John Trinder
UN Statistics Division	Accredited NGO	UN Regional Cartographic Conferences	John Trinder
UN office of Outer Space Affairs (OOSA)	Observer	Annual Meetings of COPUOS and COPUOS Science and Technology Sub Committee	COPUOS – John Trinder COPUOS S & T – Ian Dowman
FAO	No formal status. Seeking to sign a MoU.		
International umbrella organisations			
International Council of Science (ICSU)	Member	Plenary meeting in Rio de Janeiro 2002 Unions Meeting, Paris, 2004	John Trinder Ian Dowman
International Union of Technical Associations and Organisations (UATI)	Resigned in 2001		
Committee on Earth Observation Satellites (CEOS)	Associate	Annual Plenary Working Group Calibration and Validation Working Group on Information Systems and services. Working Group on Education	John Trinder Ian Dowman Poul Frederiksen Tania Maria Sausen John Trinder
International Standards Organisation (ISO)	Liaison member	Represented through Working Groups	
Open GIS Consortium (OGC)	No formal relationship	Collaboration through WGs	
Organization of Islamic Cities and Capitals (OICC)	MoU signed	Attended meeting in Cairo	John Trinder
COSPAR	Became a member in 2004	Not yet attended any meetings	Ian Dowman
GSDI	No formal relationship	Represented at Bangalore Council Meeting	Ryutoro Tateishi

Organisation	ISPRS Status	Activities in 2000-2004	Representatives
Other international societies			
Joint Board of Geospatial Information Societies	Member	Annual meetings at members conferences	John Trinder Ian Dowman
International Society for Optical Engineering (SPIE)	MoU signed	Sponsorship of meetings, particularly the Videometric conferences.	Sabry el Hakim
IEEE-GRS	MoU signed	Attend IEEE-GRS Board meeting	John Trinder
CRTEAN	Associate 2003	Not yet attended any meetings	

UN Statistics Division

The Regional Cartographic Conferences, which have traditionally been held under the auspices of the UN Economic and Social Council (ECOSOC) have now been transferred to the UN Statistics Division. President Trinder attended UN Regional Cartographic Conference for the Americas in New York in January 2001 and the UN Regional Cartographic Conference for Asian and the Pacific in Okinawa Japan in July 2003, where he presented papers on ISPRS activities on cartographic applications of aerial and space images. The UN cartographic conferences for Africa have been transferred to the UN-CODI (Committee on Development Information). President Trinder attended CODI-2 conference in September 2001 and CODI-3 conference in May 2003, both in the UN-ECA at Addis Ababa, Ethiopia, where he presented papers on ISPRS activities. CODI meetings have emphasised the development of spatial data infrastructure for African countries and workshops on the topic have been held at both meetings.

UN Committee on the Peaceful Uses of Outer Space (COPUOS)

COPUOS is organised by the Office of Outer Space Affairs (OOSA) from the UN Office in Vienna. ISPRS has attended and presented technical reports and statements at the annual Science and Technology meetings of COPUOS in February and the COPUOS Full Annual meetings in June, since 1989.

President Trinder signed a Memorandum of Understanding (MoU) with the Director of the Office of Outer Space Affairs, Dr Sergio Comacho on cooperation between the two organizations. Items in the MoU include: joint co-sponsorship annually of an event (workshop, seminar, tutorial. etc.); coordination of schedules, events, topics and/or specialist needs in pre-planning related activities; jointly seeking financial support and identification of relevant high-quality specialists and lecturers for United Nations led events that require photogrammetric, remote sensing and Geographic Information Systems expertise; inclusion of joint events in the quadrennial ISPRS Congress, and in relevant quadrennial ISPRS Commission Symposia and Working Group activities; the provision by ISPRS of scientific and technological expertise through reviews, evaluations or recommendations on space matters related to remote sensing; and facilitation and initiation of opportunities for fellowships, grants and awards in remote sensing, photogrammetry and geo-spatial information sciences.
Council have agreed to support OOSA activities as far as is possible within the constraints of the ISPRS budget.

International Council for Science (ICSU)

ICSU is a non-governmental organisation founded in 1931 to bring together natural scientists in international scientific endeavour. It comprises 98 multi-disciplinary National Scientific Members, Associates and Observers (scientific research councils or science academies) and 27 international, single-discipline Scientific Unions to provide a wide spectrum of scientific expertise, enabling members to address major international, interdisciplinary issues which none can handle alone. ISPRS became a full Union Member of ICSU in 2002.

Membership of ICSU has enabled ISPRS to play a greater role in a number of areas of ICSU. ISPRS President and Secretary General make regular contributions to the ICSU Secretariat on relevant scientific matters. Professor Ray Harris is representing ISPRS on the Priority Area Assessment Committee on Data and Information, and thus is in a position to present the case for ISPRS on access and availability of data. A meeting of Unions was held in February 2004 and was attended by Ian Dowman. ISPRS is also a member of the GeoUnions Group which has been set up so that the Unions in involved in the use of geographical information can exchange views.

As well, Secretary General Ian Dowman is the contact person for the group of Unions with interests in Health and Well-being. President Trinder has been liaising with researchers in the International Union of Biological Science (IUBS) with a view to collaborating on environmental issues. Membership of ICSU facilitates communication with the ICSU Advisory Committee on the Environment as well as interaction with IGBP, DIVERSITAS, and Unions which can contribute to multi-disciplinary research projects on the environment. The development of a collaborative project on sustainability indicators using remote sensing, which are intended to provide early warning indicators of unsustainable development practices, is still

being investigated. This is an important issue that can only be addressed with the assistance of experts in such areas as soil science, plant biology, ecology and geomorphology and remote sensing.

Committee on Earth Observing Satellites (CEOS)

CEOS Plenary

ISPRS is a CEOS Associate and so is represented at the CEOS Plenary. ISPRS is also involved in the three CEOS Working Groups: Information Systems and Services (WGISS), Cal/Val (WGCV) and Education (WGEdu). During the past year ISPRS has made input to the CEOS Utilisation Team and to all of the Working Groups.

CEOS WGCV

During the past two years ISPRS has been collaborating with CEOS, through the Working Group on Calibration and Validation (WGCV), on the Joint ISPRS/CEOS Task Force on Radiometric and Geometric Calibration which has held a workshop and produced an interim report. Work on this will continue.

CEOS WGISS

ISPRS WG II/3 is the contact point to CEOS-WGISS. Two subgroups are active under WGISS, i.e. the subgroup for Technology and Services and the subgroup for Projects and Applications. Both subgroups are subdivided into Task Teams. A closer relationship between ISPRS and WGISS could be established through EOGEO, which comprises a series of workshops for developers of geo-spatial data services over the Web. It covers a wide field of applications from Earth Observation and GIS to Internet standards. The common themes are Web based solutions to resource discovery, interoperable data access, distributed data services and data fusion.

WGEdu

CEOS will play a key role in establishing a resource library of information regarding Earth observation training and education together with an interactive, user-driven, web-based access mechanism. The WGEdu continues to develop a web portal site (Discovery Web Site) that will allow systematic access to information and web links on a broad range of educational resources available from CEOS and others.

While recognising that CEOS Agencies have their own data policies and data distribution principles, CEOS will draft and adopt a set of general data principles for education and training use. The new set of data principles will enable timely and affordable access to data for Earth observation education and training efforts and encourage CEOS Agencies to incorporate the general CEOS principles into their own policies as far as possible and practical.

ISO

ISPRS is a liaison member of several ISO Technical Committees and has a commitment to supporting efforts to establish standards for data format and transfer. ISPRS also supports efforts for interoperability and data transfer through the Open GIS Consortium (OGC). In order to implement this support, explicit reference to ISO and OGC is made within the terms of reference of 5 ISPRS Working Groups. The most important of these is WG II/4, which has the specific remit to develop image standards. The chair and co-chair of WG II/4 are involved in ISO TC/211, for projects ISO 19129 'Imagery, gridded data, and coverage framework', ISO 19130 'Sensor and data models for imagery and gridded data', ISO 19115-2 'Metadata – Part 2: Metadata for imagery and gridded data' and ISO 19101-2 'Imagery – reference model'. The WG has established links with many other groups working in this area.

A new working group on radiometric calibration of remote sensing data is being set up with Liping Di as chair and Stan Morain as editor.

ISPRS currently has liaison status on the following ISO Technical Committees:

- ISO/TC 20 'Aircraft and Space Vehicles' - 'Space Systems and Operations' and 'Space Systems and Information Transfer Systems'
- ISO/TC 42 'Photography'
- ISO/TC 172 'Optics and Optical Instruments' - 'Electro optical systems'
- ISO/TC 211 'Geographic Information/Geomatics'.

Ryosuke Shibasaki, co-chair of WG IV/7, has been working for the Work Item 14 'Quality Evaluation Procedures' (QEP) as a project team leader (project No. 19114). QEP have reached the stage of Draft International Standard, which means the work is coming to an end. Ryosuke is also a team member of the 'Data Product Specifications Project.

ISPRS representatives to ISO/TC 211are Hans Knoop and Norman Andersen.

Joint Board of Geospatial Information Societies

The Joint Board is an association of international societies concerned with geospatial data. The members are FIG, ICA, IAG, IHO, IMTA, ISCGM and ISPRS. Meeting have been held in Budapest (AIG), Washington DC (FIG), Durban (ICA) and Istanbul (ISPRS). The President has reported further on this activity.

Other Relationships

ISPRS has established a relationship with other organisations such as OICC, OGC, COSPAR, GSDI, Digital Globe and CRTEAN in order to keep in touch with regional activities and to co-ordinate programmes where appropriate. Council will be reviewing ISPRS activities with other organisations and ensuring that we have appropriate representation.

Report of the Financial Commission 2000-2004

By Heinz Rüther, Financial Commission Chairman, ISPRS 2000-2004,
e-mail: heinz.ruther@eng.uct.ac.za

1. Membership of the Financial Commission

The General Assembly at Amsterdam 2000 appointed the following members of the Financial Commission:

- Heinz Rüther (Chair)
- Iffat Huque
- Marcio Barbosa

2. Role of the Financial Commission

ISPRS Statute XIV defines the role of the Financial Commission as advisory and consultative. Further, the Statue requires the Financial Commission to examine expenditure incurred by the Society and to suggest to the General Assembly broad lines of financial policy with regard to the Society's scientific responsibilities.

The use of the term 'examine' in the formulation of this Statute is open to interpretation and can imply a financial audit, a scrutiny of the nature of the Society's expenses or both. It would appear that historically the emphasis of the Financial Commission's activities has been on the auditing function, while there was little cause to question the nature of the expenses. This pattern remained largely unchanged for the 2000-2004 period. The specific reference to 'scientific responsibilities' in Statute XIV suggests, on the other hand, that it was the intention of this Statute to create an independent body with input into Council decisions on the use of Society funds for scientific activities. To date Financial Commissions appear to have had only a limited role in this regard. While the advisory function of the Financial Commission is not fully realized, the auditing activities are overemphasized und form the core of the Commission's activities. This is inappropriate as, firstly, it would appear not to be in the spirit of Statute XIV and, secondly, as auditing should follow formal procedures and be executed by a professional auditor.

3. Meetings of the Financial Commission

Other than a meeting immediately after the election of the Commission in Amsterdam in 2000, there was no opportunity for the Commission to meet during the 2000-2004 period, nor could any of the members take part in a Council meeting. This was due to a lack of financial resources for travel expenses, as well as the inability of one of the members to dedicate much time to the Commission as a result of exceptional and unforeseen professional commitments.

In spite of this, communication between Council and the Commission was, with a few exceptions, satisfactory. One such exception was more complex financial discussion regarding the ISPRS Foundation, which was difficult to follow by E-mail only, and it would have been preferable if one Commission member could have attended a Council meeting in which the Foundation was discussed.

It is therefore recommended that provision be made in future budgets for one Commission member to attend at least one Council meeting during the four year period. This recommendation is in contrast to the view expressed in the report of the 1996-2000 Financial Commission, where it was stated that E-mail communication can replace physical meetings.

4. Approval of Budgets and Accounts

In practical terms, the principal activities of the Financial Commission are:

- the examination of the annual budget.
- the examination of the annual statements of accounts and the treasurer's report.

The annual budget is prepared by the treasurer, who estimates income and plans expenses for the fiscal year, submitted to the Financial Commission for inspection and, once endorsed by the Commission, presented to Council for acceptance. The annual statements, together with copies of all receipts, payments and invoices are submitted to the Commission for scrutiny.

Budgets and statements for the four years from 2000 to 2004, were submitted by the treasurer as required, found to be appropriate and correct respectively, endorsed and presented to Council.

The treasurer is to be complimented on the detailed annual financial reports and budgets. A new and more pragmatic approach was introduced by the treasurer for the budgeting process. In stead of basing the expected income from subscriptions on the actual amount of outstanding payments, only a 'probability' income from members is entered into the budget. This is a more realistic approach to budgeting, but should be slightly modified to adhere to proper accounting procedures. This can be done by adding an amount for bad debt.

5. Member Contributions

Income from member contributions remained stable with an annual average of 100 000 SwF for the past two council periods and with annual fluctuations of less than 20%.

6. Publications
The previous Financial Commission questioned the relatively large amount spend on the publication of Highlights. The expenses for Highlights have since reduced from an approximate SwF 165 000 to SwF 80 000 for a four year period. This is a notable reduction, but as in the 2000 report, the question arises if the Society wishes to spend such an amount on the publication of Highlights.

7. Scientific Initiatives
The increase of funds for Scientific Initiatives to 20000 SwF for 2003 and 30000 SwF for 2004 is welcomed by the Financial Commission . It is regrettable that no suitable submission for the award were received in 2003.

8. Investments
The investment policy of the Society and the distribution of the investment to different currencies and risk levels, with the majority of the funds in conservative, low risks investments, proved prudent. The adopted investment structure avoided potentially significant losses due to fluctuation in the international investment and currency markets experienced over the past years and the Society's assets seem to be secure.

9. Change of Fiscal Year
The Financial Commission is in full support of Council's decision to change the Fiscal year from the period of April 1st to March 31st to a Julian fiscal year starting at January 1st and ending December 31st. Such a transition was already discussed during the 1996-2000 Council term and the Financial Commission welcomes the change. No negative impact on the administration of the Society's finances is expected as a result of the change.

10. Recommendations and Conclusion
In conclusion it is suggested that the incoming council:

- revisit the definition of the role of the Financial Commission, its modus operandi and its interaction with Council.

- place even greater emphasis on the encouragement of scientific initiatives and the support of young researchers.

Finally it can be stated that the Society's finance is in good standing and the financial affairs of the Society are well managed.

Dr K. Kasturirangan Receives The Highest Honour of ISPRS: The Brock Gold Medal

By Prof. Dr Orhan Altan, ISPRS Secretary General, e-mail: oaltan@itu.edu.tr

During the Opening Ceremony of the XXth ISPRS Istanbul Congress on 14th July 2004, the Brock Gold Medal was presented to Dr Krishnaswamy Kasturirangan (India). The highest honour of ISPRS was presented to Dr Kasturirangan by the President of ISPRS, Prof. Dr John Trinder and President of ASPRS, Dr Russel Congalton in the presence of the Minister of Defense of Turkey. The medal is instituted jointly by the ISPRS and the ASPRS: The Brock Gold Medal is awarded for outstanding contribution in the fields of Photogrammetry, remote sensing and spatial information sciences. Over 2000 delegates attending the Congress were present during the Opening Ceremony when the medal was presented to Dr Kasturirangan.

Dr Kasturirangan is presently a member of Parliament of the Upper House of India. As Chairman of the Indian Space Research Organisation, the Space Commission and Secretary to the Government of India in the

Dr Kasturirangan receiving the Brock Gold Medal at the Opening Ceremony of the XX. ISPRS Istanbul Congress.

Department of Space, from which he stepped down in August 2003, he has made significant contributions in developing the Indian Space Programme. Dr Kasturirangan, who has led the Indian Space Program to great heights, has played an important role in furthering the use of Indian Remote Sensing Satellites both at national and global levels. He played a pioneering role in developing the Indian Space Program e.g. the successful launching and operationalisation of India's most prestigious launch vehicle, the Polar Satellite Launch Vehicle; the first successful flight testing of all important Geosynchronous Satellite Launch Vehicle. He has also overseen the design, development and launch of some of the world's best civilian satellites, IRS-1C and 1D, realisation of the second generation and initiation of third generation INSAT satellites, besides launching ocean observation satellites IRS-P3/P4. He was instrumental in developing a strategic direction of Indian space endeavours for the future. These efforts have put India as a pre-eminent space-faring nation among the handful of countries that have major space programmes.

He was earlier the Director of ISRO Satellite Center, where he oversaw the activities related to the development of new generation spacecrafts, Indian National Satellite (INSAT-2) and Indian Remote Sensing Satellites (IRS-1A & 1B) as well as scientific satellites. He was also the Project Director for India's first two experimental earth observation satellites, BHASKARA-I & II and subsequently was responsible for overall direction of the first operational Indian Remote Sensing Satellite, IRS-1A.

Dr Kasturirangan is a member of many important scientific academies, both within India and abroad. At the present he is the President of the Indian Academy of Sciences at Bangalore and General President of the Indian Science Congress.

ISPRS Council Meeting

Bursa, Turkey, 9-11 July 2004

Minutes

Attendees

President	John Trinder (JT)
Secretary General	Ian Dowman (ID)
First Vice President	Lawrence Fritz (LF)
Congress Director	Orhan Altan (OA)
Treasurer	Ammatzia Peled (AP)
Second Vice President	Gerard Begni (GB)

1. Opening Remarks and Approval of Agenda

JT opened the meeting and noted that this would be last of this four year period. He thanked OA for hosting the meeting and hoped that it would not be too demanding before the heavy duties of the Congress.

2. Review of Beijing Council Meeting Minutes

ID reviewed the minutes and comments were made on the following items:

Item 3 There was still no action on FAO or GeoSpatial Workforce Development.

Item 8.1 ID had written to El Salvador, but had received no reply.

3. Confirmation of Congress Program

3.1. Scientific program & exhibition

OA reported on arrangements for the Congress and noted that arrangements were well in hand with no major problems.

3.2. Daily timetable

Council schedules were reviewed and ID would keep these up to date during the Congress.

Flags should be distributed to exhibiting Sustaining Members by JT with photographer during the walk through after the opening of the Commercial Exhibit.

3.3. Staffing, communications, security

All pigeon holes will be located on the on Lower level, and will be controlled by staff. Staff would also control entry to the General Assembly.

3.4. Archives A & B

ID had been through the requirements for the Archives with the compilers and would provide all the information generated at the Congress. It was agreed that obituaries for Wang, Allam and Jaksic, should be included, and possibly Blachut.

3.5. Meetings at congress

ID had generated a list of meetings and outline agendas. These would be prepared and distributed during the Congress. ID would liaison with the staff of the ISPRS Daily to ensure that important items were included.

4. General Assemblies

4.1. Agenda review & timing

The draft agenda of the General Assembly was confirmed. It was agreed that India will bid for TC IV and Israel for TCVIII

4.2. Guests and observers

It was noted that the 'Observer' status was poorly defined in the Bylaws and would not be used. Anyone

who is not a delegate or advisor will be given a 'Guest' badge.
Council needs to address this issue in next sessions.

4.3. Statutes and Bylaws
Council reviewed the proposed changes to the Statutes and Bylaws which had been circulated, and agreed that no further changes were needed.

5. Awards

5.1. ToRs
LF presented the revised ToRs for the Wang Zhizhou Award,. Council approved them, and they now required confirmation from China and ratification by the General Assembly.
Council approved minor changes to von Gruber and Helava awards

5.2. Citations
Council noted the TCP recommendations for Presidents Citations.

5.3. Other gifts
Council agreed on what gifts would be presented by the President and Secretary General.

6. Ceremonies

6.1. OA reviewed the arrangements for the Opening Ceremony and Closing Ceremony and stressed the need for a rehearsal for the Opening.

7. Resolutions Process

LF outlined the current status of resolutions and the procedure to be followed at the General Assembly. Good progress has been made and meetings have been set up to be held during the Congress.

8. Foundation

LF reviewed the contract for financial services, signed with Bormel, Grice and Huyett, PA, in Laurel MD.

Council discussed possible nominations for the officers, particularly whether the Operations Officer and Finance Officer should come from Council. No decision was made.

Council discussed the presentation of the Foundation to the GA, this would be linked to the item on Registration.

Council discussed the items for the agenda at the Board Meeting. The documents were reviewed and some minor changes made. Priorities and typical amounts for grants were allocated .

It was noted that it will take several years to accumulate enough capital to award significant grants. Corporations often prefer to give one-off grants for specific projects, for which they will see some immediate benefit. A mixed approach was therefore desirable.
It was agreed that UN earmarked funds should be transferred to Foundation.

9. ISPRS Membership

9.1. Changes in membership
ID outlined the changes in membership which had taken place throughout the past 4 years.

Council and partners at Nicea.

Council and partners tracking on Mt. Olympos to store up energy for the coming XX. ISPRS Istanbul Congress.

9.2. Members in default
Council reviewed overdue subscriptions and identified the following to be removed:

Ord Mbs 19
Ass Mbs 4
Reg Mbs 1

This would be reviewed before presentation to the GA.
Council will propose to the GA that these members be expelled, and will also list those over 5 years overdue. The new Council should pursue countries where societies are known to have expired and to seek a new member.

10. Financial Affairs

10.1 Treasurer's Report
AP reported current balances which are healthy; cash flow should be no problem for the rest of the year. He also noted high cost of Highlights due to printing of additional copies for Congress and the preparation of the questionnaire.

11. Publications

11.1 Journal
JT reported that the contract with Elsevier had been signed.
EB has negotiated a contract for digitising volumes 1-19 for the Elsevier archive, for access at a charge to subscribers. This contract will be signed at Congress. Electronic subscription for individuals is now available.

11.2 ISPRS Highlights
Council reviewed the latest version of the contract for Highlights. This would be signed at the Congress after clarification of some points of detail on the return to ISPRS on advertising and cost of mailing.

11.3 Book Series
The current status of the Book Series was reviewed. Council was concerned at the lack of focus in the contents of two of the books published or proposed. Meetings will be arranged with Maxim Shoshany and Janjaap Blom at the Congress to discuss the future of the series.

12. ICORSE

ID reported that communication was still difficult and that it looked unlikely that ICORSE would be represented at the Congress. JT reported a very encouraging meeting with the ISRSE Director in St Petersburg and stressed that Council or TCPs must be represented at the next organising committee meeting in late October or early November.

13. Inter-Organisational Relations

13.1 CRTEAN
ID reported that he had received an invitation to attend a seminar of High Resolution sensors in Tunisia and that there was also a request to support the seminar financially. Council required more information on the nature of the meeting and were not inclined to offer financial support.

13.2 GSDI
There had been no further incentive for ISPRS to join GSDI, but we would continue to keep in touch.

13.3 ERWDA conference in Abu Dhabi
ISPRS had been invited to take part in the International Conference of Sustainable Transport in Developing Countries in Abu Dhabi in February 2005. It was agreed that Stan Morain would represent ISPRS. [Note: The Chairman of the Conference Committee attended the Congress and met Council there.]

14. Council Reports
Council reports were given orally.

15. Actions of Council
Council reviewed the list of outstanding actions.

16. New Actions
ID noted new actions agreed at the meeting.

17. Other Business
There was no other business.

JT closed the meeting and thanked all participants for a constructive meeting and looked forward to a successful Congress.

35 Years of Internet, 10 Years of ISPRS Online

Fabio Remondino, Webmaster, ISPRS; Institute of Geodesy and Photogrammetry, ETH Zurich, Switzerland, e-mail: fabio@geod.baug.ethz.ch, Tuan-chih Chen, Events Calendar Editor, ISPRS; Dept. of Civil Engineering, China Institute of Technology, Taipei, Taiwan, e-mail: profchen@ms13.hinet.net

The Internet and the most known part of it, the World Wide Web, are one of the greatest inventions of our time. The formation and the growth of these big Net has changed the way we do business, communicate, entertain, retrieve information, and even educate ourselves. This worldwide medium allows interaction with people without regard for geographic location and it is a great exchange and source of data, information and software. Inside this electronic world, ISPRS is present since 1994 with the goal of providing information, coordination and operations structure of its activities. In this paper, at first a short history of the WWW is presented, with its main facilities and possibilities. In the second part, after a short introduction on the web site of the society, are presented history, presence, and future plans about the use of Internet by ISPRS, and how ISPRS can make use of existing technologies to improve what it now offered, including the educational strategy. The ISPRS Events Calendar is also presented.

1 Introduction

The Internet is big and global collection of networks connected together in different ways to form a single entity. The Internet is at once a broadcasting capability in the entire world, a mechanism for information dissemination and a medium for collaboration or interaction between individuals and their computers without regard for geographic location. Sometimes called simply "the Net," it is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people, a worldwide network of networks in which a user with his computer can get information from any other computer.

Nobody owns the Internet but there are some no-profit organisations that define how we use and interact with the Internet. The most widely used part of it is the World Wide Web, created in 1990 as user-friendly face of the information available on the Internet and, together with e-mails and search engines, provides efficient access to an increasing amount of information. Other services widely used are FTP, e-mail and telnet.

After 35 years of developments and improvements, nowadays there are more than 600 million people online. Everyday more people use an online computer to find information, learn, educate and communicate. But the presence and the access to the Internet are not well distributed in all the countries as there are still part of the world were the use of Internet has yet to grow

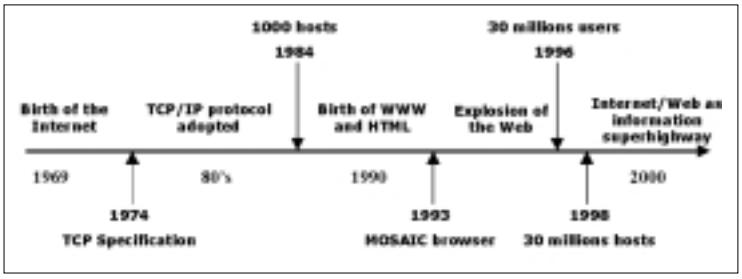

Figure 1: The history of the Internet, summarise in few key points.

because it was politically repressed or the infrastructures are still in development.

Inside this big electronic world, ISPRS is present since 1994 with the goal of providing information, coordination and activities of its structure.

The goal of this work is to review the history of the Internet and the WWW, as well as give an overview over the global network, its services and its growth. Then is also described how ISPRS is inserted since 10 years in this network and which initiatives are taken to present the society to the world-wide public.

2 Internet and www

2.1 The history [ISOC]

The precursor of the Internet is called ARPANet (Advanced Research Projects Agency Network). The US Department of Defence in fact developed it in the late 60's an experiment in wide-area-networking that would survive to nuclear war. ARPA was the answer to the rising American Cold War fear about military inferiority, fuelled not least by the Russian Sputnik success. In the autumn of 1969 the first ARPANET computer was connected to the ARPANET's IMP node at the University of California at Los Angeles (UCLA) and by the end of the year, the network included four computers (the University of California, Santa Barbara and the University of Utah). All the computers used different operating systems and they were able to talk to each other across the network.

During the 1970's, the ARPANET grew to connect research institutes and laboratories supported by the Department of Defence in various parts of the USA. Many of these were university laboratories studying data processing and computer networks, which developed the TCP/IP network protocol and its applications for the Internet.

During the 1980's, the Internet was still considered to be a temporary system designed for the research world while in the 1984 the TCP/IP data transmission protocol was adopted as the US Department of Defence's official network standard. At the same time that the Internet technology was being experimentally validated and widely used amongst a subset of computer science researchers, other networks and networking technologies were being pursued: USENET, based on a UNIX communication protocols; BITNET (Because It's Time NETwork), started as a cooperative network at the City University of New York; NSFNET, initiated by the U.S. National Science Foundation (NSF); NSINET, developed by NASA; CSNET (Computer Science NETwork), developed by a group of computer scientists and some university. By that time Internet was an essential tool for communications, however it also began to create concerns about privacy and security in the digital world and new words, such as "hacker" or "cracker" were created.

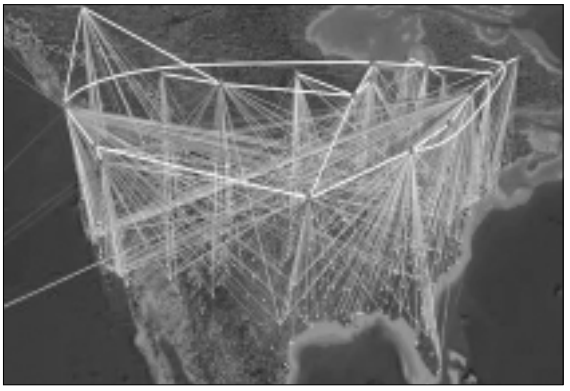

Figure 2: A visualisation of the Internet traffic in north America. The colored lines represent virtual connections from the network sites to the backbone [NCSA].

In 1990 ARPANET ceased to exist while the country already connected to NSFNET were 28 with ca 300.000 hosts. The NSFNet soon connected to the CSNET, which linked Universities around North America, and then to the EUnet, which connected research facilities in Europe.

Tim Berners-Lee, researcher at CERN of Geneva, noticed that many people were having difficulties in sharing information due to a range of different network information retrieval protocols and a range of workstation types with widely varying display capabilities. For this reason he proposed an Internet-based hypertext system which would have linked together behind a single and easy-to-use interface the various information spread around the Internet. He produced a WWW browser-editor which reads HyperText Markup Language (HTML) documents from Uniform Resource Locator (URL) addresses: i.e. the Web was born [Berners-Lee, T., 1990].

In the next years the Internet Society (ISOC) was founded (1991); the World Bank goes on-line (1992); Mosaic, the first commercial graphical Web browser was released by Eric Bina and Mark Andreesen (1993); "Yahoo" (Yet Another Hierarchical Officious Oracle) was invented by two PhD students from Stanford University (1994); NSFNET reverted back to a research project and left the Internet in commercial hands. And in 1995, The Federal Networking Council (FNC), in consultation with the leadership of the Internet and Intellectual Property Rights Communities, unanimously passed a resolution defining the term Internet [FNC Resolution, 1995]. Figure 1 shows a brief history of the Internet, from its origin to our time. As the Internet celebrates its 30th anniversary, the military strategies that influenced its birth become historical footnotes. Approximately 500 million people (in almost 250 countries around the world) were already connected to the global net and the traffic on it expanded at a 340% annual growth rate. The number of computer hosts approached 100 million and the Internet passed from a Cold War concept to the Information Superhighway. All

the rest is no more history: as new generation will grow up accustomed to communicate using a keyboard, life on the Internet will become an increasing important part of our life.

2.2 How Does the Internet Work?

Since 1969, the Internet has grown from four host computers in U.S. to millions of computer worldwide. However, even if nobody owns the Internet, it is monitored and maintained in different ways. There are organisations that define how we use and interact with the Internet. The ISOC, Internet Society [ISOC], oversees the formation of the policies and protocols. The World Wide Web Consortium [W3C, 2004], created in 1994, tries to lead the World Wide Web to its full potential by developing common protocols that promote its evolution and ensure its interoperability. The Internet Corporation for Assigned Names and Numbers [ICANN, 2004], a non-profit corporation formed in 1998 to assume responsibility for the IP address space allocation, protocol parameter assignment, domain name system management and root server system management, all functions previously performed under U.S. Government contract by IANA (Internet Assigned Number Authority) [IANA, 2004] and other organisations. They all assume responsibility for technical function, provide reliable information about the Internet and develop interoperable technologies (specifications, guidelines, software and tools) to lead the Web to its full potential as a forum for information, commerce, communication, and collective understanding.

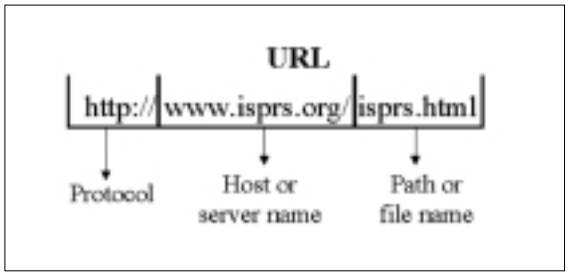

Figure 3: An Internet address (or URL) subdivided in its main parts.

In general, all the machines on the Internet can be divided in two types: servers and clients. Those machines that provide services (like Web servers or FTP servers) to other machinesare servers. And the machines that are used to connect to those services are clients. When a html page is requested to a server, the browser forms a connection to a Web server, requests a page and receives it. In detail (Figure 3), the browser breaks the URL into 3 parts: the protocol ("http"), the server name ("www.isprs.org") and the file name ("isprs.html"). The browser communicated with a domain name server (DNS) to translate the server name "www.isprs.org" into an IP numerical address, which it uses to connect to the server machine. The browser then forms a connection to the server at that IP address on port 80 and following the HTTP protocol, it sends a GET request to the server, asking for the file "http://www.isprs.org/isprs.html". The ISPRS server then sends the HTML text to the browser, which formats the page onto your screen.

This big network is design in a way that each information can reach its destination using many different paths. When the information is sent through the network, it is split into tiny packets and each packet use a different path to reach its destination. When all the packets reach the destination, they are regrouped to form the original information. If one packet does not reach the destination, the receiving site asks for another copy of this packet. The routes covered by the Internet information are not always the shortest ones, but usually the fastest one (Figure 4).

2.3 Internet Domain

A domain is a name which identify a web site on the Internet. Domain names have always two or more parts, separated by dots, e.g. 'www.commission5.isprs.org'. The part on the left is the most specific ('commission5'), the part on the right the more general ('isprs'). The extension .org identifies the kind of domain and together with the previous generic part, they are often called Top-Level Domains (TLD). There are two types of top-level domains:

- Generic Top-Level Domains (gTLDs), created for use by the Internet public. The most common generic TLD, available since 1984, are: .COM (Commercial), .EDU (Educational), .GOV (US Government), .INT (International Organisations), .MIL (US Dept. of Defence), .NET (Networks), .ORG (Organisations). On November 2000, ICANN passed a resolution to add seven new generic top-level domains. These new generic Top-Level Domains (gTLDs) are: .BIZ (Business Organisations), .MUSEUM (Museum Organisations), .NAME (Personal), .INFO (Open TLD), .PRO (Professionals as Accountants, lawyers, and physicians), .AERO (Air-transport industry), .COOP (Cooperatives). These were activated in 2001 and 2002. Four of them (.biz, .info, .name, and .pro) are unsponsored while the other three (.aero, .coop, and .museum) are sponsored.
- Country Code Top-Level Domains (ccTLDs), created to be used by each individual country. The Country Code

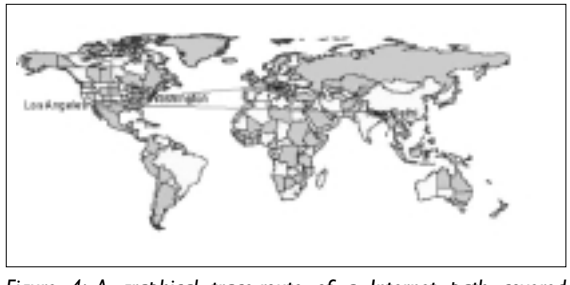

Figure 4: A graphical trace-route of a Internet path covered between a server in Switzerland and the server hosting ISPRS Commission 7 in India. The request passes through US as faster route compared to a Middle East route. Source: [VisualRoute].

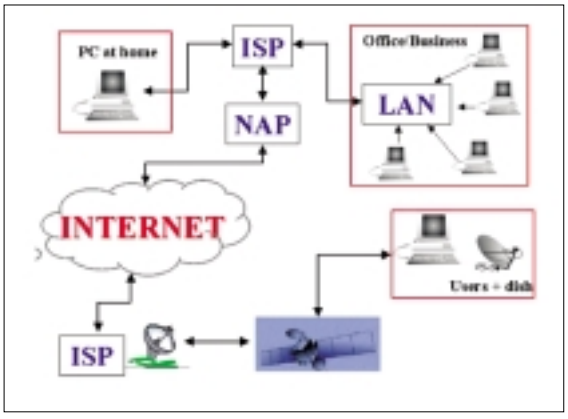

Figure 5: The Internet connection from a home or office computer using wired or satellite mode.

TLD are designed to be assigned to each individual country: it, .fr, .uk, .jp, .ch, .co, .er, They almost follow the ISO 3166 standard that provides codes for the names of countries and dependent areas, even if there are some exceptions. The ISO codes EH (Western Sahara), KP (North Korea), TL (East Timor), CS (Serbia and Montenegro) and AX (Aland Islands), although theoretically available as ccTLDs have never been assigned and do not exist in DNS. On the other hand, eight ccTLDs are currently in use despite not being ISO two-letter codes, namely AC (Ascension Island), GG (Guernsey), IM (Isle of Man), JE (Jersey), SU (Soviet Union), TP (East Timor), UK (United Kingdom) and YU (Serbia and Montenegro). As April 2004, there are 243 country code domains (see [IANA] for an updated list). CcTLD managers, who are also responsible for the operation of the domain, develop the rules regarding who is entitled to domains the ccTLD. But in some cases, anyone in the world can acquire a domain in the ccTLD list, like in the case of Armenia (.AM), Austria (.AT) Cocos Islands (.CC), Germany (.DE), Niue (.NU), Samoa (.WS), Tonga (.TO), Tuvalu (.TV) and Turkmenistan (.TM). This allows domains names like I.am, start.at and go.to.

In addition to gTLDs and ccTLDs, there is a special TLD, .ARPA, which is used for technical infrastructure purposes. ICANN administers this domain name in cooperation with the Internet technical community under the guidance of the Internet Architecture Board. According to some Internet statistics, the maximum number of characters in one component of a domain name is 63 while the average number of characters in a domain name is 11.

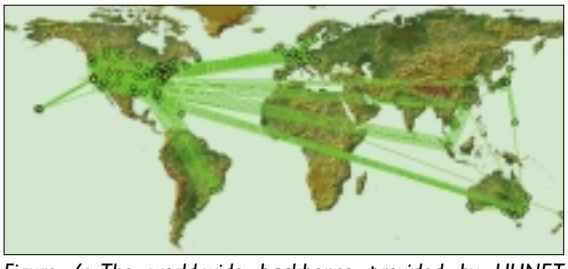

Figure 6: The world-wide backbones provided by UUNET [UUNET].

2.4 Wired Internet Connection

The network allows all the computers to communicate with one another and to send and receive data through a network of transmission lines (Figure 5).

A home computer is usually linked to the Internet using a normal phone line and a modem that talks to an Internet Service Provider (ISP). A computer in a business or university is usually connected to a Local Area Network (LAN) inside the business through a higher-speed connection, like ADSL, ISDN. Usually switches are also used, to provide the different nodes of a company's LAN different connection. The LANs are then attached to an ISP. ISP can be connected to bigger ISP or, using high-bandwidth connections, directly to NAPs (Network Access Point) through communications networks called 'backbones'. The backbones are provided by companies such as AT&T, GTE, IBM, MCI, Netcom, Sprint or UUNET and consist of high-speed links in the T1, T3, OC1 or OC3 ranges (Figure 6). Backbones around the world are connected through world-wide fibre-optic lines, undersea cables or satellite links.

In this way, every computer on the Internet is connected to every other computer on the Internet all over the world.

The Internet connections can be divided in low, medium and high-bandwith. As reported in Table 1, old modems were very common in the 70's and they were considered high-speed connection (<10 Kbps). Actual modems operate between 14.4 Kbps and 56.6 Kbps, with mild success, at least in one direction. They are very common for Internet connections at home. Recently there has been a lot of effort to develop a higher speed connection for residential users and small office by using an Integrated Services Digital Network (ISDN). ISDN operates at a minimum speed of 64 Kbps on normal copper phone line. For this reason, it is equally available to home and business customers and provides a huge improvement in access speed at only a fractional increase in cost. Data are transmitted in a digital format and the "Integrated" part of ISDN's name refers to the combining of voice and data services over the same wires. A T1 connection is a form of digital, leased private line, which means that a company can lease a point-to-point circuit at a flat rate with a telephone company. A T1 connection allows using the line in the form of 24 channels, running at 64 Kbps each. T1 runs on fibre optic or copper wires. ADSL (Asymmetric Digital Subscriber Line) uses a common phone line and can transfer data using a particular modem with a maximal speed of 6 Mbps. ADSL is getting very common, it does not require new wiring and the phone line for voice call can

	Connection	Speed	Time
Low Bandwidth	Old modem	2400 bps	≅ 1 hour
	'Home' modem	< 56.6 Kbps	≅ 4 min.
Medium Bandwidth	ISDN	64 Kbps	≅ 2 min.
High Bandwidth	T1, HDSL2	1.5 Mbps	≅ 5 sec.
	ADSL	6 Mbps	≅ 1.3 sec.
	T3, OC-1	45 Mbps	≅ 0.2 sec.
	B-ISDN	155 Mbps	≅ 0.05 sec.
	OC-XX	> 1 Gbps	< 0.01 sec.

Table 1: Mostly used Internet connections with respective speed and approximately time for downloading the same document.

be used even if a Internet connection is still open. The word Asymmetric is used because these modems send data faster in one direction than they do in another. ADSL (and in general DSL technology) exploits the 'extra capacity' of copper wires to carry the information, without disturbing the voice conversation and matching particular frequencies to specific tasks. Following ADSL, the speed jumps to T3, OC1 (Optical Carried level 1) and to the newer version of ISDN, called Broadband ISDN (B-ISDN) which can run at 155 Mbps. Many people who have cable TV can now get a high-speed connection to the Internet from their cable provider. Cable modems compete with technologies like ADSL and, unlike these, its performance doesn't depend on distance from the central cable office. Another new type of Internet connection can be realised using satellite. Satellite connection can reach a download speed up to 10X faster than dial-up connection and work using normal antenna for Sat-TV.

Despite all these name and speeds, the connection is still a problem for many Internet users: many ISPs that should maintain the "backbones" for an entire nation still work with medium bandwidth connections. And this fact can create many 'stall' problems for local users or for persons who wants to view HTML documents from these countries but has to fight with download speed of 20 Kbps!

2.5 Satellite Connection

As Internet traffic continues to grow world-wide at exponential rates, many Internet Services Providers (ISPs) are facing the problem to keep high-speed connections for their users. The satellite connection between a Network Access Point (NAP) and the Internet backbone can solve this problem. In fact, Internet satellite connections, started at the end of the '90, can assure Internet access whatever the traffic. Moreover, it doesn't matters where the customers are as satellite communication has can deliver bandwidth exactly where and when it is required, without geography and local infrastructure limitations. The satellite connection does not use telephone lines or cable TV systems and, depending on the user's location and requirements, is the best method for skip or extend the terrestrial fibre optic network. In particular, the satellite service is aimed for ISPs or businesses located in areas poorly served by the wired Internet infrastructure. It is the case of the central Asia of Africa, where it could be the (high-speed) transport medium for informationand data (Figure 7).

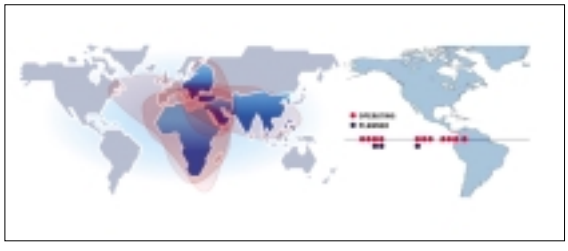

Figure 7: SkyVision World Coverage Map [Sky-Vision] (left). Ses Americon Internet satellite fleet [SES Americon] (right).

There are two ways to have an Internet satellite connection: the first possibility is to perform a connection using the same dish that allow you to receive the satellite television; this solution requires you to have an ISP for a dial-up or cable modem for the data you send to the Internet. The second possibility to have a satellite Internet connection is to use a two-way satellite dish (upload and download). Upload speed is about one-tenth of the500 kbps download speed. Cable and DSL have higher download speeds, but satellite systems are about 10 times faster than a normal modem. The dish must have a clear view to the south, since the orbiting satellites are over the equator area. Moreover, like satellite TV, trees and heavy rains can affect reception of the digital signal.

Global satellite capacity isn't being used fully. There is enough satellite capacity in the sky to meet the health and education objectives and requirements of every country on earth.

The use of satellite resources for Internet Backbone and other Internet related applications would improve the connections and the capacities of many domains, in particular in developing countries.

2.6 Wireless Internet

Wireless simply means the use of radio-frequency spectrum to transmit and receive voice, data, and video signals for communications.

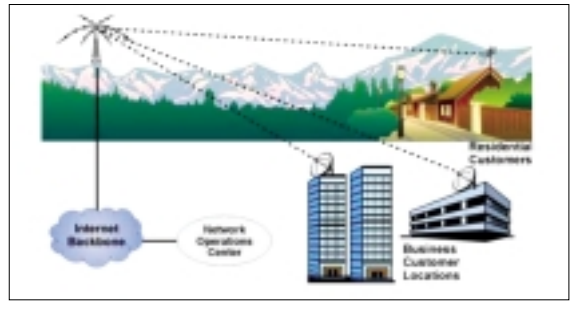

Figure 8: Wireless Internet connection. Source: [Logical Net's].

Regarding wireless Internet, we have to distinguish between laptops and mobile devices (like cell-phone or PDAs). The latter use Wireless Application Protocol (WAP) to access the information on the web. A web site accessible with mobile devices is created with text-only or with low-graphics version and it is generally written in Wireless Markup Language (WML). Only the new generation of PDAs allow the full access to HTML pages [ThunderHawk, 2004]. During the transmission, the data is sent in HTTP form from a web server to a WAP gateway. This system includes the WAP encoder, script compiler and protocol adapters to convert the HTTP information to WML. The gateway then sends the converted data to the WAP client on your wireless mobile device.

Laptops with wireless Internet connection can have Internet access through a Wireless Internet Service Provider (WISP) organization, e.g. an Internet provider that allows subscribers to connect to a server at designated access points (called 'hot spot') using a wireless connection such as Wi-Fi (short for "wireless fidelity"). Wi-Fi is the common term for a high-frequency wireless local area network (WLAN). The Wi-Fi technology is rapidly gaining acceptance in many companies as an alternative to a wired LAN.

The WISPs offer high-speed communication and allow subscriber computers to access the Internet and the web from anywhere within the zone of coverage (several km) provided by the server antenna.

A wireless Internet connection is usually faster than cable or DSL mode, the user is always-on connection and he has the freedom to move around without losing the connection.

2.7 Services on the Internet

The World Wide Web is often identifies with the Internet, but it is only the most known part of it. Inside the Internet 'live' many other services developed to facilitate the sharing of information through the net. In the following, the main and mainly used services are shortly described.

FTP: the File Transfer Protocol (FTP) is a common format for transmitting and moving data (files) on the Internet.
GHOPER: a system that pre-dates the World Wide Web for organising and displaying files on Internet servers.
TELNET (and SSH): a terminal emulation program used to connect to remote Internet servers.
E-MAIL: short for electronic mail, it is a transmission of electronic messages over networks.
NEWSGROUP (or mailing list): a very big number of people that receive simultaneously an e-mail.
USENET: it is an international network of newsgroups, which are discussion forum that cover many interest groups.
ICQ: it stands for "I-see-you" and it is a revolutionary, user-friendly Internet tool to communicate with other people in real time. It includes the IRC (Internet Relay Chat), system developed in the late 80's as a virtual meeting place where people from all over the world could meet and talk.
WORLD WIDE WEB: it is the most known and used part of the Internet where the users look for information, read articles or see animations.

2.8 Firewall

A firewall is a system or group of systems that enforces an access control policy between two networks. The actual means by which this is accomplished varies widely, but in principle, the firewall can be thought of as a pair of mechanisms: one that exists to block traffic, and the other that exists to permit traffic. Some firewalls place a greater emphasis on blocking traffic, while others emphasize permitting traffic. Probably the most important thing to recognize about a firewall is that it implements an access control policy. If you don't have a good idea of what kind of access you want to allow or to deny, a firewall really won't help you. It's also important to recognize that the firewall's configuration, because it is a mechanism for enforcing policy, imposes its policy on everything behind it. Administrators for firewalls managing the connectivity for a large number of hosts therefore have a heavy responsibility.

2.9 The information on the Web

One of the main problems of Internet users is where to find the right information they are looking for in the less time. Since the 80's, special websites have been created to help the users finding all the information hidden in million of web pages. These sites contain research systems that work with different mechanisms and can be divided in search engines and online directories. Another common resources used to stored information are the Internet "Yellow Pages" Books, which list Internet addresses by categories and can be found in computer and bookstores.

2.9.1 Internet Search Engines

Internet search engines are special web sites designed to help people find information stored on other sites. Before the Web became the most visible part of the Internet, there were already search engines in place to help people find information on the Net. Programs with names like "gopher" and "Archie" kept indexes of files stored on servers connected to the Internet, anddramatically reduced the amount of time required to find programs and documents. Early search engines held an index of a few hundred thousand pages and documents and received maybe one or two thousand inquiries each day. Today, a top search engine will index hundreds of millions of pages and responds to tens of millions of queries per day. There are differences in the ways various search engines work, but they all perform three basic tasks (Figure 9):

1. they search the Internet or select pieces of the Internet, based on keyword;
2. they keep an index of the words they find and where they are;
3. they allow users to look for words or combinations of words found in that index.

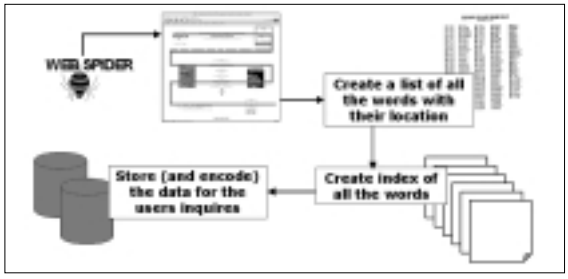

Figure 9: The tasks performed by a good search engine.

To find information on the hundreds of millions of Web pages that exist, a search engine employs special software robots, called spiders or crawl, to build lists of the words found on Web sites. When a spider is building its lists, the process is called Web crawling. In order to build and maintain a useful list of words, a search engine's spiders have to look at a lot of pages. When a typical search engine spider looks at an HTML page, it took note of the words within the page and also where the words were found. Words occurring in the title, subtitles andother positions of relative importance were noted for special consideration during a subsequent user search. Each spider takes different approaches but they are always crawling, because of the constantly changing nature of the Web.

These different approaches usually attempt to make the spider operate faster, allow users to search more efficiently. Once the spiders have completed the task of finding information on Web pages, the search engine must store the information in a way that makes it useful. Most search engines store more than just the word and URL. An engine might store the number of times that the word appears on a page and might assign a "weight" to each entry. Each commercial search engine has a different formula for assigning weight to the words in its index. This is one of the reasons that a search for the same word on different search engines will produce different lists, with the pages presented in different orders.

Searching through an index involves a user building a query and submitting it through the search engine. The query can be quite simple, a single word at minimum. Building a more complex query requires the use of Boolean operators that allow you to refine and extend the terms of the search. Each query is analysed and searched in the database of the system. The result of the research is a collection of URL with an associate score (determined by the number of times the search criteria is found in each page), and it is displayed in order from the highest score to the lowest. Some of the most popular search engines are Google (http://www.google.com), Altavista (http://www.altavista.com), Yahoo (http://www.yahoo.com), HotBot (http://www.hotbot.com), Lycos (http://www.lycos.com), Excite (http://www.excite.com), MSM (http://search.msn.com/). Some of these search engine entries present also a main menu organised with directories that can help a user in his research. Elsevier Science has developed a powerful Internet search tool called Scirus (http://www.scirus.com). Scirus distinguishes itself from existing search engines by concentrating on scientific content only and by searching both Web and membership sources (articles, presentations, reports). It enables scientists, students and anyone searching for scientific information, locate university sites, and find reports and articles in a clutter-free, user-friendly and efficient manner. Furthermore there are sites, called meta crawler, that use at the same time more search engines to search for a query, as Mamma (http://www.mamma.com), Metacrawler (http://www.metacrawler.com), Search Engine Guide (http://www.searchengineguide.com/).

The qualities of a good search engine web site should be fast answer to the queries, user-friendly, often updated, it should have an advanced research options and a nice display of the results. Few years ago, the search engines were not able to spider all the net and a part of it were hidden to the Internet users. Today this "Invisible Net" is very small as the search engines are more powerful, their databases are often updated and they can recognise also non-text files such as pdf, postscript and other formats.

2.9.2 Online Internet Directories

They are webpages where the information are stored and displayed to the users in thematic channels or categories. Each link is listed with a short description and its URL and these lists can be updated automatically or manually. It is also possible to search inside the web site as a normal search engine. Useful URL are Galaxy (http://www.galaxy.com/), Yahoo (http://www.yahoo.com), the WWW Virtual Library (http://www.vlib.org/), the Educational Virtual Library (http://www.csu.edu.au/education/library.html), the Earth Science Portal (http://webserv.gsfc.nasa.gov/ESD/). The Earth Science Portal is a searchable links directory together with a web crawler search engine that spans all the web-based information of the NASA Earth Sciences Directorate. AllConferencesNet (http://www.allconferences.net/) instead provides interesting links for all kind of events. It is a directory focusing on conferences, conventions, trade shows, exhibits, workshops, events and business meetings. This is a unique search directory that serves users looking for specific information on conference or event information.

2.10 Educational Resources on the Web

The possibility to find scientific articles, reports, journals or entire books on the Web is very high. These electronic documents contain nothing different in comparison with the same text and picture of the paper version, except some occasional hyperlink. They are quickly disseminated on the net and everybody can read them. Real e-zines or e-journal have no paper equivalent and are not always free. A big problem of electronic documents is they are not permanent and they can be lost from the permanent record, as subject to changes in positions and unpre-

dictable removal. Instead document on paper or electronic format (CD-ROM) are not transient and can be available and legible for many years, in particular the paper one, which do not require special equipment or knowledge to be read. Therefore to preserve for a longer period also the Internet publication, a timely and active intervention at all stages is required. Educational resources on the web are without limits. A general database of educational material is provided by the "Gateway to Educational Materials" project (http://www.thegateway.org), a consortium effort created to provide easy access to the substantial, but uncataloged, collections of educational materials available on various federal, state, university, non-profit, and commercial Internet sites. Another Internet portal full of resources of relevance to faculties, students, and research staff at the university level is Infomine (http://infomine.ucr.edu/). It is a huge database including electronic journals, electronic books, bulletin boards, listservs, online library card catalogues, articles and directories of researchers and many other types of information. More specific resources in Remote Sensing, just to mention few good links, are provided by NASA (http://rst.gsfc.nasa.gov), ASPRS (http://research.umbc.edu/~tbenja1), CCRS (http://www.ccrs.nrcan.gc.ca/ccrs/learn/learn_e.html) and CEOS CD-ROM (http://ceos.cnes.fr:8100/). Concerning articles, publications and presentations available on the net, they can be easily found using a powerful search engine or through Citeseer (http://citeseer.ist.psu.edu/), a scientificdigital library.

2.11 E-Learning

E-learning is the education via Internet, network or standalone computer. E-learning uses electronic applications and processes to teach and learn as the network enables easily transfer of skills and knowledge between users. E-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV and CD-ROM.

An e-learning web sites collection is provided by the University of Leicester (http://www.le.ac.uk/cc/rjm1/isp/ele.html).

2.12 Internet Growth and Its Statistics

It is very difficult to determine how many users and how many domains or hosts are on the net, besides making guesses and estimates. There are many companies that do surveys to estimate the number of users, but we can consider the numbers presented in these surveys to be fairly good estimates of the minimum size of the Internet. And often the results are also in disagreement. Moreover the geographical location of an Internet host is somewhat problematic since a host need not to be located in the country which correspond to its ccTLD; and gTLD has never an explicit geographic designation (e.g. ISPRS, with the server in Zurich, the Headquarter in London and the

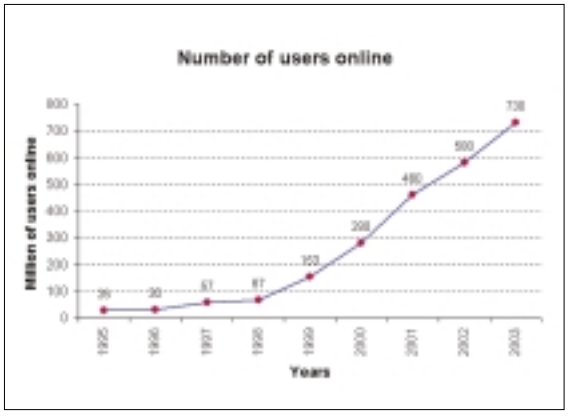

Figure 10: Internet growth represented by the number of Internet hosts. Source: [ISC, NUA].

President in Sidney!). For these reasons is not possible to determine the exact size of the Internet, where host are located or how many users there are.

The growth of the available information can be estimated from the number of registered host (e.g., a computer or machine with a unique IP address on a network). According to the Internet Software Consortium [ISC, 2004], the number of registered hosts states 80,000 in January 1988, 1.3 million in January 1993, 16.1 million in January 1997 and 109.7 million in January 2001 (Figure 10). Internet hosts include network elements such as routers, Web servers, mail servers, workstations in universities and businesses, and ports in modem banks of Internet Service Providers (ISPs). The number of hosts is considered one of the most accurate measures of the size of the Internet, even if their distribution is concentrated mainly in the most delevopded countries (Figure 11).

In 1997, the OCLC Office of Research started a project aimed at answering fundamental questions about the Web, like how big is it? what does it contain? how is it evolving? The project's objective was to develop and implement a methodology for Characterizing the size, structure, and content of the Web, making the results available to both

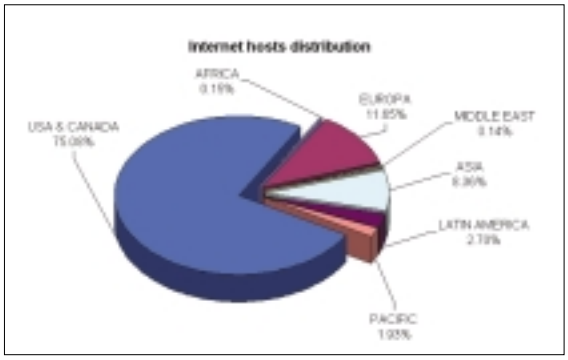

Figure 11: Distribution of Internet hosts. Source [ITU].

the library community and the public at large. The strategy adopted for characterizing the Web was to harvest a representative sample of web sites, and use this sample as the basis for compute an estimate and make an inference about the Web [O'Neill et al., 1997]. According to OCLC, the web sites can be divided in three categories: (1) public, sites that provide free and unrestricted access to all or at least a significant portion of its content; (2) private, sites whose content is intended for a restricted audience; the restriction can be explicit (e.g., fee payment or authorisation) or implicit (obvious from nature of content); (3) provisional, sites in transitory or unfinished state (e.g., "under construction"), and/or offers content that is, from a general perspective, meaningless or trivial. In the most recent survey (2002) of the OCLC Web Characterization Project [OCLC, 2004], the web contains 9.04 millions of web sites (with 8.7 millions of unique websites, i.e., the count is adjusted to account for sites duplicated at multiple IP addresses). The growth of unique web site between 1998 and 2002 is ca 231%. OCLC found that 15.5% of the web sites provides information services, 14.2% provides professional, scientific and technical services, 11.8 retail trade and 6.6% provides educational services.

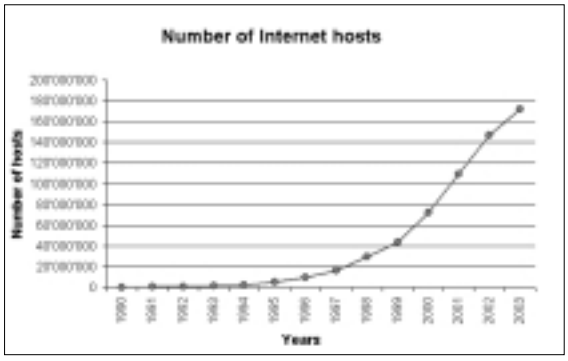

Figure 12: Internet growth represented by the number of users online. Source [ISC, NUA].

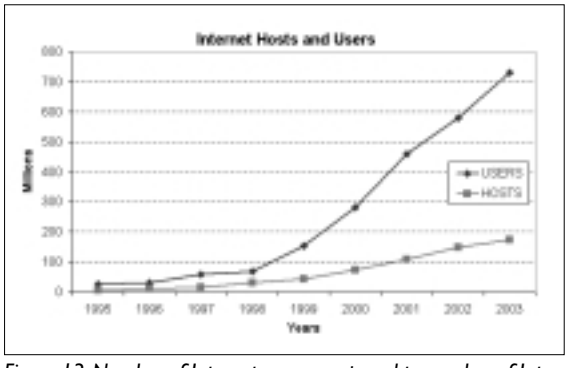

Figure 13: Number of Internet users compared to number of Internet hosts. Source: [ISC, NUA].

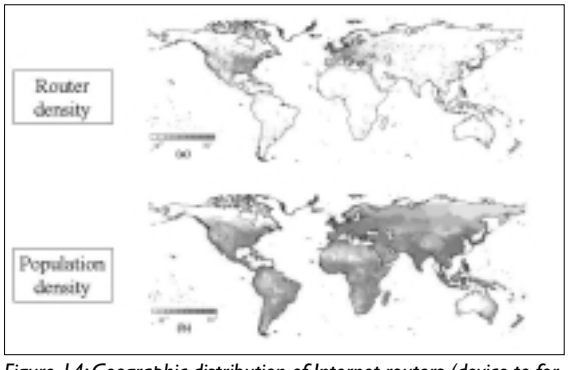

Figure 14: Geographic distribution of Internet routers (device to forward data along networks) against the global distribution of population as in 2001 [Yook, S. et al., 2001].

	Max %	Min %
Africa	11.2 % (Seychelles)	0.01% (Liberia, Congo)
Asia	59.5% (Hong Kong)	0.11% (Bangladesh)
Pacific	54.8% (Australia)	2.58% (Vanuatu)
Europe	69.8% (Island)	0.34% (Albania)
Middle East	36.8% (UAE)	0.05% (Iraq)
Canada & USA	59.1% (USA)	39.7% (Bermuda)
Latin America	34.1% (Aruba Island)	0.42% (Haiti)

Table 2: Percentage of users online according to the differentparts of the world. Source: [NUA].

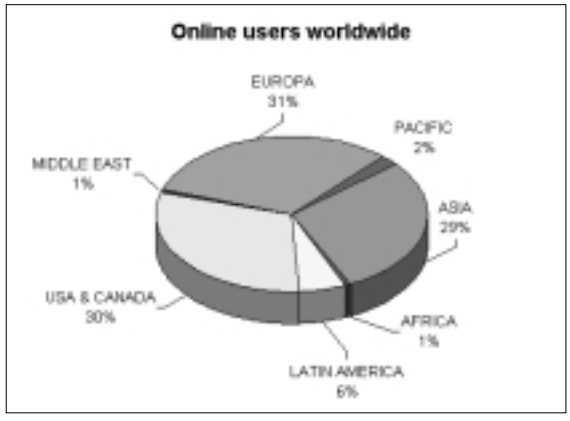

Figure 15: World-wide online population. Source: [NUA].

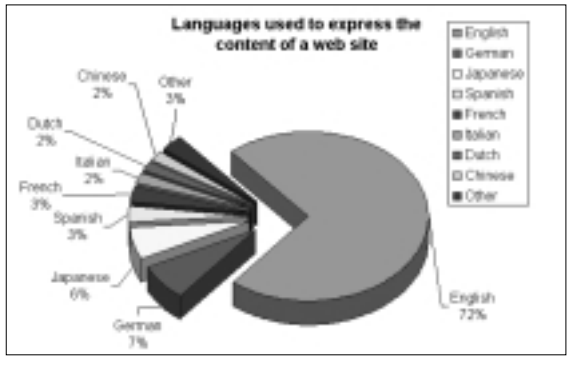

Figure 16: Languages used in the web sites. Source: [OCLC].

Considering the million of users online (Figure 12), the number of people is constantly increasing. In 1995 the Internet population was only 16 million people (app. 0.35% of the world population) while at the middle of 2003 there were more than 730 million people online (11.5% of world population) [NUA]. The number is expected to increase again in the next years and a CIA (Computer Industry Almanac) document reports that in 2007 there will be more than 1400 millions, with 56% of wireless users [CIA].

Comparing the number of users and host (Figure 13), in 2003 there was an average of 4.2 users per host. With the high quality of service in the United States, there are approximately 1,5 Internet users per host, whereas in some developing there are more than 100 Internet users per host!

Despite these number which are just great estimates of the real values, it is widely expected that the Internet population and the number of domains will continue to growth, at least for other few years. But the presence and the access to the Internet is not well distributed in all the country (Figure 14 and Figure 15). As reported by Nua [NUA], the top 10 countries account more than 80% of the world-wide population; moreover, as shown in Table 2, there are country with 0.01% of the country population who has an Internet access while there are European country with more that 60%.

Considering the demographics of the Internet users, different sources report an average age of the users around 38 years old, with a percentage of female users of 35% and male users of 65%. Furthermore, the Internet usage habits state that 93% of the users use a web browser more than once a day, for personal information (75%), work (65%), education (60%), shopping (50%), while 28% of the users buy online once a month. Moreover, 35.8% of the online population has English as native language, 14.1% Chinese, 9.6 Japanese and 9% Spanish [GR]. Considering the content of the websites (Figure 16), English language is the most used (72%), followed by German (7%) and Japanese (6%) [OCLC].

2.11 The SPAM Messages

"In a single day of May 2003, No. 1 Internet service provider AOL Time Warner (AOL) blocked 2 billion spam messages from hitting its customers' e-mail accounts. Microsoft (MSFT), which operates No. 2 Internet service provider MSN plus e-mail service Hotmail, says it blocks an average of 2.4 billion spams per day" [Business Week Magazine].

SPAM messages or 'bulk e-mails' are becoming one of the most critical problem for anyone who receives e-mails. They are annoying messages containing advertisements and unwanted information that every day fill our mailbox.

The name comes from "SPAM (Shoulder Pork and hAM, SPiced hAM) Luncheon Meat", canned ham produced by Hormel Foods [SPAM, 2004]. For many users, the history of SPAM is very short, but according to some persons, the first SPAM was sent on May 1978, during the Arpanet period, inviting people to a reception. The term got really popular in 1994, when two messages with subject "Global Alert for All: Jesus is Coming Soon" and "Green Card Lottery - Final One?" were posted to every single newsgroup on USENET, the world's largest online conferencing system at that time. There were several thousand such newsgroups, and each one got the advertisement. Soon people called it SPAM and the word started to be used for these kinds of unwanted and multiple posted messages [Templetons, 2004].

Spammers use software to extract names and e-mail addresses automatically from newsgroups or chat rooms; moreover program called spambots spider the web looking for the @ sign, that represents an e-mail address. The largest of these companies are able to send billions of spam messages per day. Spam filtering software is available on the market to stop unwanted e-mails. They search keywords like "viagra", "sex", "win", etc., in the text or subject of the e-mails and stop them. Unfortunately these filters can sometimes delete messages that we really want to receive.

The strongest war against spam messages is the elimination of e-mail address: then, if you want to send an e-mail, you have to fill out an online form. Many business companies and the White House of the United States itself, were forced to use this way.

3 ISPRS on the Internet

The International Society for Photogrammetry and Remote Sensing is a non-governmental organization devoted to the development of international cooperation for the advancement of photogrammetry and remote sensing and their applications. The Society operates without any discrimination on grounds of race, religion, nationality or political philosophy. It was created in 1910 as International Society for Photogrammetry (ISP), under the leadership of its first President, Eduard Dolezal. After 70 years of functioning under its original name, the Society changed its name in 1980 to the International Society for Photogrammetry and Remote Sensing (ISPRS). Since 1994, ISPRS is online, inserted in the global network to provide information about its activities. In 1996, an ISPRS Working Group (WG VI/4) was established especially for the Internet, and was chaired by Tuan-chih Chen (1996-2000).

3.1 ISPRS Homepage

The ISPRS homepage has turned out to be one of the most important components of ISPRS communications. It provides up-to-date information about the society and links its the various activities.

The first html pages regarding ISPRS where inserted on the Internet by Andre' Streilen in December 1994, on a server hosted at ETH Zurich, under the URL

http://www.geod.ethz.ch/isprs. In September 1999, with to the reservation of the international domain name 'isprs.org', all the information were moved to a meaningful URL and nowadays all different ISPRS activities can have an Internet address ending on the suffix 'isprs.org'. After a short period in T.U. Delf, in September 2000 the ISPRS server moved back to ETH Zurich where it is actually hosted.

In April 2004, all the information regarding ISPRS are listed in ca 700 HTML pages with approximately 25'000 lines of code; moreover there are ca 1000 PDF files, i.e. a total of ca 2 GB of data available.

3.2 ISPRS Publications

The publications of ISPRS are divided in seven categories: The International Archives of Photogrammetry and Remote Sensing and Spatial Information Sciences, The ISPRS Journal of Photogrammetry and Remote Sensing, the ISPRS Highlights, the Annual Report, the Silver and Blue Book and the ISPRS Brochure.

An updated list of the International Archives is available at http://www.isprs.org/publications/archives.html, with links to the online proceedings.

Full articles published in the ISPRS Journal are instead available at Elsevier Science web pages back to 1965 (http://www.elsevier.nl/locate/isprsjprs). Online access to full text articles is available to those readers whose library has subscribed to ISPRS Journal via ScienceDirect Digital Collections, or has a current print subscription to ISPRS Journal and has registered for ScienceDirect Web Editions.

3.3 Educational Resources and Job Opportunities through ISPRS Website

The ISPRS educational page tries to collect the wide gamma of educational material and software for Photogrammetry, Remote Sensing and GIS available on the Internet (http://www.isprs.org/links/tutorial.html).
It is not a complete list, but some pointers are listed about:

- Free software, in particular from CATCON, the Computer Assisted Teaching contest organised by WG VI/2 (http://www.isprs.org/catcon). The main objective of the CATCON contest is to promote the development and dissemination of multimedia products, educational information and simulation packages for computer assisted teaching. In general, material submitted by contestants should be non-commercial and provided free of charge for not-for-profit use.
- Education, training, research and fellowship opportunities in Remote Sensing, GIS and its applications. (http://www.ltid.inpe.br/dsr/tania/Rsdir/). It is an educational Directory that has been developed in the period 1996-2000 as a task of ISPRS TCVI/WG1 on education and as part of the ISPRS Educational Opportunities Program. It is a first attempt to providing a comprehensive directory of education and training services in the remote sensing and spatial information sciences. The Directory was developed from an original document prepared some years ago by the UN Office of Outer Space Affairs in Vienna. In this directory it is possible to get information from all members states that are involved in Space Science. The information contained in this directory for each institution includes its areas of specialisation, the educational and research programmes offered, the facilities available, the prerequisite qualifications, financial information, fellowship opportunities and opportunities for international cooperation. This Directory is necessarily incomplete because of the difficulty in obtaining accurate and timely information about all education institutions around the world in a range of languages. Therefore education institutions are encouraged to provide their new or updated details of education and training programs in the remote sensing and spatial information sciences.
- Tutorials in Photogrammetry, Remote Sensing and GIS
- News about satellite missions and launches
- Glossaries and Acronyms used in Remote Sensing, GIS, Radar and Cartography
- Journals of Photogrammetry, Geodesy and Remote Sensing

Working Group VI/1 provides also a big database of education-related links, including training opportunities, online publications and journals, continuing education courses, educational institutions, free software, missions and instruments information (http://www.commission6.isprs.org/wg1/).

The ISPRS website contains also a list of job opportunities. The Employment Opportunities archives is a jobs listing intended to provide offers for people who are seeking an employment (http://www.isprs.org/job_opportunities/). Messages are posted via e-mail and last until when the position is taken. Employers and universities are encouraged to submit advertisement in the ISPRS archive.

Educational resources and job opportunities can also be found in the Academic Sites for Geomatic Engineering, maintained by Robert Kauper. It is a collection of links to international academic institutions that provide education in the field of Geodesy, Photogrammetry, Surveying, Cartography and GIS (http://www.lrz-muenchen.de/~t5831aa/WWW/Links.html).

3.5 ISPRS Events Calendar

The ISPRS Events Calendar (www.isprs.org/calendar.html) is one of the most important parts of ISPRS web pages. The Calendar contains a list of all ISPRS and Sister Societies (FIG, ICA, IAG, IHO, IGU, etc.) sponsored and co-sponsored workshops, symposia, tutorials, conferences, congresses, and other meetings. It also contains details of all international and national events on topics related to

the activities of spatial information, photogrammetry, remote sensing, geomatics, surveying, mapping, machine vision, image processing and similar areas. One of the purposes for this Calendar is to allow people of WGs, Commissions and Sister Societies to identify open dates or events, which they may link up with or avoid conflicting with. This Events Calendar was compiled manually by previous editors and contained some incorrect information, or missed some important events. The current Editor (2000-2004) has established an automatic system [Chen, 2002] to search the events information of geo-spatial information, photogrammetry, remote sensing, surveying, geomatics, and GIS on the Internet.

3.6 ISPRS Server Statistics

Since the beginning (1995), the ISPRS server statistics are available to analyse the interest of the community. The logfile of the Apache server is examined with Analog [Analog, 2004], a program that analyses servers' files. Figure 17 (upper) shows a monthly report of the number of requests to ISPRS server, in the period January 1995 - April 2004. The increasing interest of the community for the ISPRS homepage is evident. The graph gives a reasonable estimate of the use of the server as only the request for single HTML documents are counted and requests for images, graphics, icons etc. are not taken into account. Moreover these statistics refer only to requests made outside ETH domain, which excludes all the accesses during the maintenance of the documents. The data missing

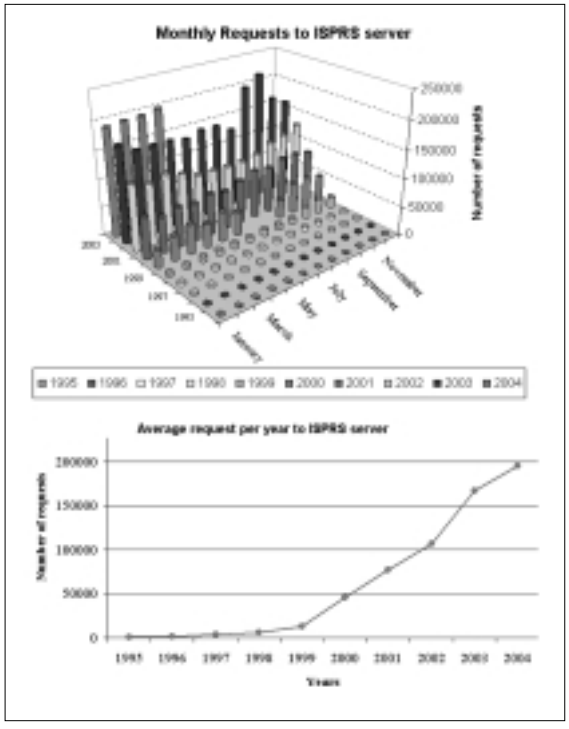

Figure 17: Monthly report (upper) and average requests peryear (lower) in the period January 1995-April 2004 on ISPRS server.

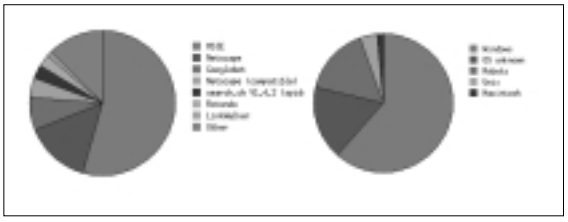

Figure 18: Most used browsers (left) and users operating systems (left) to access the ISPRS web site.

from the figure in the period July-August 2000 is due to the movement of the server from Delft to Zurich.

Figure 17 (lower) shows instead the average request per year. The steady increase of the use of the HTML documents over the years and especially after the registration of ISPRS domain is obvious.

In 1995 the average of monthly requests were 424, in 1998 the average was 5780 while at present ISPRS server has an average of 190 000 requests per month.

The different domain (~country) served at least one by the server were 160 (ca 65% of the registered country code domains); the distinct hosts served (~users) were ca 228 000 with an average of 20Mb of data transferred per day. More than 20 000 different organizations have contacted the ISPRS server with ca 4000 successful requests per day.

Another interesting statistic provided by Analog concerns the words and queries used in the search engines to find ISPRS and its related pages: between ca 30 000 search terms, the most used are remote, 'sensing', 'photogrammetry' and 'isprs'. Considering all the queries, the most requested are 'photogrammetry', 'isprs', 'remote sensing', 'International Archive of Photogrammetry and Remote Sensing', 'isprs journal of photogrammetry and remote sensing' and 'orange book'. The browser most used to find information related to ISPRS is Microsoft Internet Explorer followed by Netscape. The majority of the users (67%) has Windows as operating systems; thenUnix (Sun + Linux) and Macintosh (Figure 18). The information (directories) more requested contain the publications, the events calendar and the technical commissions while 73% of the consulted files are PDF articles.

4 Internet2 and NGI

As the Internet grows larger and more crowded, government, scientists, and universities are looking for new ways to send information quickly and powerfully. And for the next generations, many new technologies and developments inside Internet world are ready to be launch. In the future common operation and more interactive applications will be done at home, using an online computer. Two projects have grown out of these needs and are already working: Internet2 [Internet2] and the Next Generation Internet [NGI].
Internet2 is a consortium being led by over 180 universi-

ties working in partnership with high-tech companies and government to develop and deploy advanced network applications and technologies, accelerating the creation of tomorrow's Internet. Internet2 is recreating the partnership among academia, industry and government that fostered today's Internet in its infancy. The primary goals of Internet2 are to: (1) create a leading edge network capability for the national research community; (2) enable revolutionary Internet applications; (3) ensure the rapid transfer of new network services and applications to the broader Internet community. Internet2 is not a separate physical network and will not replace the Internet.

The NGI Program is a government project and has been successfully completed and Federal agencies. They are currently coordinating advanced networking research programs under the Large Scale Networking (LSN) Coordinating Group. More than a faster Web or e-mail, both new Internets should develop new and faster technologies to enhance research and communication, and it is expected that both projects will eventually improve the current commercial Internet. Moreover they will enable completely new applications for digital libraries, virtual laboratories, distance-independent learning and tele-immersion.

5 Conclusions and Outlook

After 35 years of innovation, data transferring and exchanging, will the Internet with its number of hosts and domain still grow? Which kind of operations or interactive application will we do with an Internet browser? Since 1969, the Internet has grown from a Cold War idea to a superhighway of information. Nowadays we are in the age of the Internet: people communicate, work and plan the holidays over the Internet. Schools use the Internet as a vast electronic library, with untold possibilities. Doctors use the Internet to consult with colleagues half a world away. And even as the Internet offers a single global village and it can create a second class citizenship among those without access. As a new generation grows up as accustomed to communicating through a keyboard as in person, life on the Internet will become an increasingly important part of life on Earth. There are still part of the world were the use of Internet has yet to grow substantially. These include much of the Asian part of Russia, parts of the Middle East and those part of South East Asia and Africa where it has politically repressed or were the infrastructure are still in development. In this area, satellite connections are really necessary. The absence of Internet from the life of a country is also a lack for the education of the people. Therefore it is expected a growing demand for satellite capacity and links from those parts of the world that may never have full access to international fibre such as most of central Africa. One of the mostly expected explosions is the use of via satellite connection also for residential users, while cable-modem is already common, in particular in US.

Many companies are already using the Internet for Sales, Advertising and Marketing while many web sites are specialised in on-line marketing (e.g. Ebay, Amazon).

It is estimated that the Internet will double in size every year while the WWW will double every 2 months. The World Wide Web and the e-mail service are the greatest success of the Internet. The WWW is an example of a system that started slowly but has grown to huge proportions. For many, it is the user friendly face of the information available on the Internet and has been at least partly responsible for the explosive growth of the Net. The Web, together with the search engines, provides efficient access to an increasing amount of information. But create archives of publications and data is not enough: they must be maintained, updated and managed in a way that users can easily discover and access.

The rapid growth and interest for the WWW introduced many innovations but it has embedded or amplified many problems like security concerns for commercial applications, bandwidth and server saturation, demand for faster access in particular for multimedia data, controlling access to certain types of data, protecting the work of authors (copyright issues), not enough IP addresses to meet the demands. The Internet has opened the access to information to everybody and has changed the way we see the world. But newer and more efficient protocols and ideas are needed to meet the demands for faster access to resources and to solve the problems mentioned before.

A part from any future technological development of the Net, the main source of the Internet remains the people, who use and contribute to make it always bigger. Everyday more people use an online computer to find information, learn, educate and communicate. We have to keep ourselves continuously up-to-date about all new developments and innovations of the Net to really exploit all its capabilities and possibilities.

ISPRS is online since 10 years. Many pages have been created and now there are approximately 2 GB of data available. ISPRS will remain inside the e-world, always improving its appearance.
The main board and the web master will continually strive to refine and expand ISPRS online material to provide always more information and services for its users.

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The Contribution of Earth Observation to Human Well Being

Keynote speech, ACRS, Chang Mai, Thailand, 22nd November 2004

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The paper introduces current intergovernmental and governmental initiatives to utilise the resources of Earth Observation to solve societal problems such as disasters, health and climate change. The areas recognised by the Group on Earth Observations (GEO) are presented and some examples given of how geo spatial data from a whole range of sources is being used to tackle these. Finally the role which international organisations, such as ISPRS and AARS, us discussed.

Introduction

Nobody doubts that there are serious threats to the population of planet Earth, many from physical phenomena brought about by changes to the environment caused by human activities. A list of these would include threats from weather, natural disasters (although some of these, such as earthquakes, are not new threats, or brought about by human activity), disease and loss of adequate water of food supplies. These threats have not escaped the notice of governments, and although there is discussion over who is responsible and what should be done, many governments have policies to tackle these problems. Of major interest to the remote sensing community is the ad hoc intergovernmental Group on Earth Observations (GEO) established by the first Earth Observation Summit in July 2003 which declared the need for "timely, quality, long-term,

global information as a basis for sound decision making". The second Earth Observation Summit in April 2004 agreed to a Framework which established the basic principles for preparing an Implementation Plan for a Global Earth Observation System of Systems (GEOSS). Other high profile activities have been the World Summit on Sustainable Development (WSSD) in Johannesburg which recognized the importance of Earth observation, and the forthcoming World Summit on Information Society (WSIS) in Tunis in 2005. In the Implementation Plan from WSSD specific mention is made of Earth Observation and GIS to "Promote the development and wider use of earth observation technologies, including satellite remote sensing, global mapping and geographical information systems, to collect quality data on environmental impacts, land use and land-use changes, ….". The plan also calls for support to countries, particularly developing countries, in their national efforts to collect data, use satellite and remote-sensing technologies for data collection and to access, explore and use geographic information. All of these intergovernmental initiatives come on top of the on-going activities of the United Nations, CEOS and IGOS, (The Integrated Global Observing Strategy) and ICSU and the efforts of international societies such as ISPRS, ICA, FIG.

The paper sets out to review some of these activities and to address the issue of how organisations such as AARS and ISPRS can contribute to them. Such discussion must go alongside the technological developments which have occurred in the past 10 years or so. We have seen much more Earth observation data become available and the convergence of the nature and application of satellite data with airborne data, so that either could be used in the generation of Digital Elevation Models, (DEMs), for example, or for mapping. The advances in Geographical Information Science (GIS) and associated GIS software, and of Global Navigation Satellite Systems (GNSS), have helped to make geo spatial information a major source of data for government, commerce and industry.

The Problems

The GEOSS 10 Year Implementation Plan recognises nine areas of Societal Benefit from Earth Observation. These are listed in Table 1.

Societal benefit area	Issues and observations covered	GEOSS outcomes adding to the existing efforts in this area
Disasters: Reducing loss of life and property from natural and human induced disasters	Wildland fires, volcanoes, earthquakes, landslides, subsidence, floods, coastal hazards, tsunamis, ice hazards, extreme weather, pollution events	Coordinated systems for monitoring, predicting, mitigating, and responding to hazards are operating at local, national, regional and global levels. Earth observations are enhanced and better integrated, blending in situ measurements with airborne and satellite remote sensing, and with diverse socio-economic data and maps. Gaps are filled in organization, technology and capacity. Disaster information is disseminated more timely and accurately.
Health: Understanding environmental factors affecting human health and well being	Nutrition, water quality, air quality, UV-B, hot and cold weather, disease vectors, health statistics	Earth observations contribute significantly to the continued improvements in human health in all parts of the world. Satellite and in situ data are integrated with health census data, and models are developed. Availability of appropriate environmental data to the health community is improved, creating a focus on prevention.
Energy: Improving management of energy resources	Weather-related variations in energy demand and supply; risks to energy infrastructure; renewable resources; pollution and greenhouse gas emissions	Governments further their economic and social agendas with environmentally responsible and equitable energy management. Improved coverage, usefulness and access to weather information by energy sector better match supply and demand of energy and reduce risks to energy infrastructure. Through coordinated observations, inventories of greenhouse gases, pollutants, and renewable energy potential are improved.
Climate: Understanding, predicting, mitigating and adapting to climate variability and change	Climate system variables (e.g. temperature, moisture, winds, gas composition etc) in atmosphere and oceans, on land and ice	Enhanced understanding of climate facilitates sustainable economic growth without perturbations to the climate system. Access to information of past and current climate conditions, variability and extremes is facilitated. Essential systems are maintained and key geographical gaps are filled. Implementation of new observing systems is promoted. Integrated climate products are generated, using data assimilation.

Water: Improving water resource management through better understanding of the water cycle	Precipitation, soil moisture, stream flow, lake and reservoir levels, snow cover, glaciers and ice, evapotranspiration, groundwater, water use	Integrated water management is supported by bringing together observations, prediction and decision support systems. A joint framework for water planning and a capacity building plan for developing countries are in place. Emerging observation needs are identified. International research programs and global treaty bodies are better coordinated.
Weather: Improving weather information, forecasting and warning	41 weather variables observed in situ and from space, needed for accurate and timely short and medium term forecasts	Every country will have the severe weather event information needed to virtually eliminate loss of life and reduce property damage. Initialization of forecasts is improved through better coverage and quality of observations. Capacity in developing countries to deliver essential observations and use forecast products is improved. Needs are better communicated across a wide range of users and observing systems.
Ecosystems: Improving the management and protection of terrestrial, coastal and marine resources	Extent of major ecosystems, functional attributes (greenness, NPP etc), disturbance regimes, ecosystem change drivers	Methodologies and observations are available on a global basis to predict changes in ecosystem condition and identify unsustainable uses. Ecosystem observations are better harmonized and shared. In situ data are better integrated with satellite observations. Data assimilation models for ecosystems and a framework for validating satellite observations are developed. Spatial and topical gaps are filled. Continuity is ensured for observing carbon, nitrogen, canopy properties, ocean color and temperature.
Agriculture: Supporting sustainable agriculture and combating desertification	Crop production, livestock and fishery statistics, food security and drought projections, agricultural area, degradation indices, nutrient balances, farming systems, land cover change	A truly global mapping and information service for poverty and food monitoring enables sustainable development and international planning. National and international capacities to use earth observation data in agriculture and fisheries and a seamless system for delivering observations to users are developed. Spatially explicit socio-economic data is integrated with agricultural, forest and fishery data. More comprehensive, validated, and harmonized land cover, land use and degradation products are made available.
Biodiversity: Understanding, monitoring and conserving biodiversity	Area and condition of ecosystems, distribution and status of species, genetic diversity in key populations	A high-quality, timely, and comprehensive global biodiversity observation system unifies many, disparate biodiversity observing systems. A platform is created to integrate biodiversity data with other types of information. Interoperability standards for biodiversity datasets are promoted. Taxonomic and spatial gaps are filled.
Common Supporting Information	Maps such as topography, infrastructure, land cover; and socio-economic data such as population, GDP, well-being indicators	Access to best-quality supporting information is facilitated. Interpretive data is integrated with observational data.

Table 1: GEOSS topics for implementation. (From Draft GEOSS 10-Year Implementation Plan, IPTT 301 0Z SHORT DOCUMENT FOR NEGOTIATION, 20 September 2004.).

This is a comprehensive summary of potential benefits; GEOSS still has to be formally approved and established, but this table provides a useful basis for discussion of the problems and the ways in which organisations can contribute. The use of the data listed in the table can be roughly divided into two types: that which can be used immediately by scientists, and professionals on the ground, for solving problems in an operational way, and those which are input to research into the causes and solutions of the problems, which includes the very important field of modeling applied to climate research and tectonic modeling, for example.

The next section will summarise some of the important international initiatives involved in the process some examples of how EO data can be used in now on the ground.

Some Examples

Three of the areas set out in table 1 will now be developed to demonstrate the importance of all areas of remote sensing and photogrammetry to the solution of these problems.

A large set of case studies has been put together by the CEOS Data Utilisation Group under the headings of:
- Land Applications
- Ice Applications
- Atmospheric Applications
- Ocean Applications
- Charters & Conventions

These can be found at: http://www.ceos.org/utilization/

Infrastructure
A very basic but essential requirement for tacking the problems is information on where the problem is located, what is there and how to get there. Existing mapping is frequently out of date, especially in less developed areas, but satellite images can provide up to date information. There are a number of initiatives in place to provide such data such as International Charter "Space and Major Disasters under which the space agencies provide data to the disaster management authorities; and the ESA ICEDS (Integrated CEOS European Data Server) with the aims to:
1. use Open Geospatial Consortium (OGC) technologies for map and data serving;
2. serve datasets for Europe and Africa, particularly Landsat TM and Shuttle Radar Topography Mission (SRTM) Digital Elevation Model (DEM) data;
3. provide a website giving access to the served data;
4. provide software scripts, etc., and a document reporting the data processing and software set-up methods developed during the project.

One of the major components of the latter is the Shuttle Radar Topography Mission data which includes a DEM with 90m spacing, of the landmass of the globe between 56°N and 60°S. This is a very valuable, homogeneous data set.

In developed countries up to date data might exist and national mapping organisations can provide this. In United Kingdom, for example, the Ordnance Survey has a 24 hour emergency response capability to government requests for data. Disasters can give an impetus to technology; again drawing an example from UK, the foot and mouth crisis in 2001 Demonstrated to government how useful GIS can be and the uptake of this in government departments has greatly increased since that crisis.

The provision of weather information is also critical in predicting hurricane and floods for example and we are now all familiar with satellite images of hurricanes determinedly heading for SE USA.

Disaster Management
The use of geospatial information for managing disasters is a key area in which earth observation already plays an important role, and in which we can also see the use of many different types of geospatial data. Table 2 is taken from the IGOS Geohazards report and show how different types of data re used to minter and manage ground instability events.

Required observations	Background monitoring/assessment	Crisis response
Characterise deformation with high accuracy and frequency (horizontal and vertical	Continuous GPS	Additional GPS stations
	Satellite, airborne and ground-based SAR interferometry	More frequent satellite tasking
	Other surveys e g leveling, laser scanning (terrestrial and airborne), aerial photography and high-resolution stereo satellite data, borehole inclinometers	More frequent occupation of all ground-based instrumentation
Map landslides, geomorphology, land-use, land cover, geology, structures, drainage network	Map existing features using high spatial resolution satellite and airborne imagery, aerial photography and geological and geophysical ground surveys	Over-flights to check extent and distribution of landslides
Topography/Elevation (incl slope angle, slope length, slope position)	High quality DEM from LiDAR, IfSAR, photogrammetry or high-resolution satellites	Rapid local update needed on how the landscape has changed
Soil strength parameters and physical properties (incl pore water pressures)	Geotechnical field logging and sampling, in-situ and laboratory test	More frequent observations
Climate Trigger: precipitation (rainfall, snow, magnitude, intensity, duration), temperature	Meteorological data field measurements Meteorological satellites data	Continuous recording
Seismic trigger: magnitude, intensity, duration, peak acceleration Decay of shaking level with source distance (source, propagation shaking and site effects)	Accelerometer network monitoring	Continuous recording

Table 2: Ground instability hazard observations most required and the best available observational systems. (From IGOS Geohazards Theme Report, 2004, ESA).

Another area of disaster management is flooding. Environmental protection agencies and insurance companies are collecting and using high resolution DEMs for this purpose. Airborne interferometric SAR (IfSAR) is particularly suitable for this purpose, giving an economic data source to cover large areas, and is often complemented by airborne LiDAR data to give more detail in critical areas. To take again an example from the UK, Intermap have covered the Britain with an IfSAR DEM with 1m vertical accuracy and the Environment Agency have collected LiDAR data over large areas which complements the IfSAR. Satellite data is widely used for monitoring flooding after it has taken place and can also be used to predict flooding by providing data to input to hydrological models.

Health

This is a relatively new area for Earth Observation data. Telemedicine and epidemiology is a of these fast developing early warning applications (Brachet et al, 2002). Environmental monitoring through EO from space and other non-EO space-based systems and services can dramatically help to develop and improve these applications. Increasing risks of epidemics, pandemics and diseases re-emergence (Malaria, Trypanosomiosis, Meningitis, Cholera, Tuberculosis or Hemorrhagic Fevers such as Dengue, Rift Valley Fever), increasing world population and its globally migration are many leading factors that have contributed to the development of specific health programme. The influence of several environment factors has been extensively studied. In co-operation with different partners from Europe and Africa, CNES set up a consortium and a programme of studies, validations and demonstrations of new satellite-based services, within education and medicine domains. In this context a Telemedicine programme was developed, aiming to set up a regional network for epidemics monitoring and allowing real-time recording and data exchange. Several countries in South America, West Africa and Asia are involved in this project.

The Role of Societies

It can be seen from the above discussion that space agencies and governments are taking the lead in establishing structures to make the optimum use of Earth observation data for the benefit of mankind. As members of international and regional scientific societies we need to ask whether we are playing a role and whether we should be doing more. We also need to ask whether our members want us to devote resources to this type of activity and whether the right people are already involved. ISPRS is represented on COPUOS, CEOS and ICSU and makes a contribution through discussions at meetings and through the advice of experts nominated by ISPRS. This has been done in the area of education and data policy for example. We are very limited by the resources available; in the past we have been generally unable to support experts to attend meetings. Currently ISPRS is part of the ICSU GeoUnions group which has identified a number of areas which the unions related to earth science of various types. We are seeking to demonstrate that interdisciplinary science can be harnessed to solve problems. The areas identified are hazards, health, groundwater, desertification and cities and megacities. These are clearly important topics, which fit well with the GEOSS themes, and experts from the Unions could have a significant impact, but before anything can be done funding is needed, and like ISPRS, the other unions have only limited resources, as does ICSU at the moment. The question then has to be asked: should ISPRS funds be invested in a scientific project to support research into this cross cutting themes.

Conclusions

It can be concluded from this brief review that inter government activity support Earth Observation and that there are many examples to show that EO can help solve some of the problems which face the people of our planet. The outstanding question is what international societies can contribute, and where funding can come from, if they wish to participate in these activities.

References

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