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**Author(s):**

Remondino, Fabio; Chen, Tuan-chih

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## ISPRS AND INTERNET: HISTORY, PRESENCE AND FUTURE

Fabio Remondino <sup>(1)</sup>, Tuan-chih Chen <sup>(2)</sup>

<sup>(1)</sup> Webmaster, ISPRS

Institute of Geodesy and Photogrammetry  
Swiss Federal Institute of Technology, ETH Zurich, Switzerland

E-mail: fabio@geod.baug.ethz.ch

<sup>(2)</sup> Events Calendar Editor, ISPRS

Professor

China Institute of Technology, Taipei, Taiwan

E-mail: profchen@ms13.hinet.net

### Commission VI

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### ABSTRACT:

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 introduced.

### 1. INTRODUCTION

The Internet and the World Wide Web (WWW) have revolutionised computers and communications around the world like nothing before and can be considered one of the greatest inventions of our time. The Internet is at once a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location. Sometimes called simply "the Net," it is a worldwide system of computer networks or a network of networks in which users at any one computer can get information from any other computer or talk directly to users on other computers. It was conceived by the U.S. government in 1969 and was first known as the ARPANet with the aim to create a network that would allow researchers to "talk each other" from different universities. Today, the Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people. For many users, electronic mail has practically replaced the postal service for short written transactions and this service is the most widely used application on the Net. Live written conversations with other computer users are also available using chats and more recently Internet hardware and software allows real-time voice conversations and broadcasting real-time images or video (web cam). The most widely used part of the Internet is the World Wide Web (often abbreviated as WWW or called "the Web"). Its outstanding feature is the hypertext, a method of instant cross-referencing and displaying information. Using the Web, we have access to millions of pages of information all over the world. Other services widely used are FTP, e-mail and telnet. Using this Net, we have changed the way to do business, communicate, entertain, retrieve information, and even educate ourselves and in the future, this phenomenon will be the major data sharing system for all the people in the world.

The goal of this paper is not to address all the aspects of Internet but to give a general overview of the global network, over its history, its services and its growth. Then we also described how ISPRS is inserted in this network and which initiatives are taken to present the society to the worldwide public.

### 2. THE INTERNET AND THE WWW

In this section a brief history of the Internet, from its origin till the 90's is presented. Then some brief but useful descriptions of Internet word, available services and tools to find information are provided. The last part reports some statistics about the growth and the development of the Net.

#### 2.1 History of Internet and WWW

The precursor of the Internet is called ARPANet (Advanced Research Projects Agency Network). It was developed in the late 60's by the US Department of Defence as an experiment in wide-area-networking that would have survived a nuclear war. In the autumn of 1969 the first ARPANET computer was connected to a node at the UCLA University and by the end of the year, the network already included four computers. 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 in various parts of the USA. During the 1980's, the Internet was still considered to be a temporary system designed for the research world while the TCP/IP data transmission protocol was adopted as the official network protocol by the U.S. Department of Defence. At the same, other networks and networking technologies were being tested in other parts of the world (USENET, BITNET, NSFNET, NSINET, EUNET). In the next years, Internet started to be an essential tool for

communications (e-mail) and new words, such as "hacker" or "cracker" were created. In 1990 ARPANET ceased to exist while the other networks started to connect each other to create a larger Net. In the same year, 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 protocols and a range of workstation types [Berners, 1990]. 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 read HyperText Markup Language (HTML) documents from URL addresses: i.e., the Web was born.

In the next years the Internet Society (ISOC) was founded (1991); the World Bank went on-line (1992); Mosaic, the first commercial graphical Web browser was released (1993); the first search engine, "Yahoo" (Yet Another Hierarchical Officious Oracle) was invented (1994); The Federal Networking Council passed a resolution defining the term Internet (1995) [FNC, 1995].

As the Internet celebrates its 30th anniversary, the military strategies that influenced its birth become historical footnotes. Nowadays, approximately 500 million people (in almost 240 countries around the world) are already connected to the global Net and the traffic on it expands at a 340% annual growth rate [NUA, 2002]. The number of computer hosts is more than 140 million and the Internet has passed from a Cold War concept to an Information Superhighway.

## 2.2 Internet definitions

Nowadays it is very common to read and hear words like Server, Host, Protocol and so on. But maybe we are not very familiar with the right meaning. Before going into details regarding the Internet, a short list of important terms, which does not cover all the aspects of the Net, is presented:

**Client:** a software program used to contact and obtain data from a server software program on another computer; each client works with a specific server program and each server requires a specific kind of client. A *web browser* is a specific client software used to locate and display web pages. When a computer is used to connect to the Net it is also a client. Other well-known example is the e-mail client software user to retrieve, read and send e-mail messages.

**DNS (Domain Name System):** an Internet service that translates domain names (i.e. human-readable words) into IP addresses (i.e. machine-readable numbers). Domain names are alphabetic and almost easy to remember; but the Internet is based on numerical IP addresses. Therefore DNS service must translate the name into the corresponding IP address. For example, the domain name `www.isprs.org` might translate to `129.132.26.2`.

**Domain name:** the unique name that identifies an Internet site.

**Host:** every computer or machine on a network that is accessed by a user working at a remote location.

**IP address (Internet Protocol Number):** an identifier for a computer on a TCP/IP network. It has four groups of numbers separated by dots, with values between 0 and 255. Every machine on the Internet has a unique IP number.

**ISP (Internet Service Provider):** an institution that provides access to the Internet (usually for money).

**Protocol:** an agreed-upon format for transmitting and moving data (files) between two devices. Common networking protocols are *FTP* (File Transfer Protocol), *HTTP* (HyperText Transfer Protocol), *TCP/IP*, *Telnet*, *POP3* and *SMTP* (used for e-mail), *Gopher*.

**TCP/IP (Transmission Control Protocol/Internet Protocol):** the suite of communications protocols used to connect hosts on the Internet. TCP/IP was originally designed for the UNIX operating system but today is available for every major kind of operating system.

**Server:** (1) a computer with high performances that runs critical software applications (i.e. Mail server, Web server, Firewall). (2) A software that provides the implementation of the server part of a communication protocol (i.e. HTTP, FTP, Telnet). A *Web Server* is a software running on a computer that delivers web pages via the HTTP protocol. In order to be accessible from clients running on a different computer, a web server is connected to a TCP/IP network and has an IP address and possibly a domain name.

**URL (Universal Resource Locator):** a way to identify pages on the Internet. It is made up of three parts: the first part defines the data transfer method or protocol (`ftp`, `mailto`, `telnet`, `http`), the second part generally gives the address of the computer where the desired service is located, the last part contains the internal reference on the server in question.

**Web page:** an HTML document on the World Wide Web. Every Web page is identified by a unique URL.

## 2.3 How does the Web work?

In general, all the machines on the Internet can be divided in two types: servers and clients. Servers are all those machines that provide services (like Web servers or FTP servers) to other machines. And the machines that are used to connect to those services are clients.

When an html page is requested to a server, the browser (Netscape, MSI Explorer) forms a connection to a Web server, requests the page and receives it. More in detail, 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 is used to connect to the server machine. The browser then forms a connection to the server at that IP address and following the "`http`" protocol; it sends a GET request to the server, asking for the file "`isprs.html`". The ISPRS server then sends the HTML text to the browser, which formats the page onto the screen.

This big network is designed 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.

## 2.4 Internet Domain

A domain name identifies a web site on the Internet and has always two or more parts, separated by dots, e.g. '`www.commission6.isprs.org`'. The part on the left is the most specific ('`commission6`'), 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:

1. *Generic Top-Level Domains* (gTLDs). Available since 1984, they are: `.com` (Commercial), `.edu` (Educational), `.gov` (US Government), `.int` (International Organizations), `.mil` (US Dept. of Defence), `.net` (Networks), `.org`

(Organizations). On November 2000, new 7 gTLD have been added. They are: .biz (Business Organizations), .museum (Museum Organizations), .name (Personal), .info (Open TLD), .pro (Professionals as Accountants, lawyers and physicians), .aero (Air-transport industry), .coop (Cooperatives). Some of them are already operative while the others will be follow later [IANA, 2002].

2. *Country Code Top-Level Domains* (ccTLDs). They are designed to be assigned to each individual country (it, .fr, .uk, .jp, .ch, .co, .er, ...). As of May 2002 there are 243 country code domains ([IANA, 2002] provides an updated list).

## 2.5 Services on the Internet

The World Wide Web is often identifies with the Internet, but it is only the best 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 mainly used services are shortly described.

- **E-MAIL:** short for electronic mail, it is a transmission of electronic messages over networks. Usually it is a message sent from one user to another. Combination of hardware and software that links together different types of networks ('gateways'), allow users on different e-mail systems to exchange messages. Online services and Internet Service Providers (ISPs) usually offer free e-mail service (Hotmail, Yahoo) and this has made the e-mail the most widely used communication tool on the Internet. When an e-mail is simultaneously sent to a large number of people, we speak about *mailing-list*. When the size of the mailing list is bigger, we should call it *newsgroup*. An international network of newsgroups is USENET, a discussion forum that cover many interest groups with more than 14,000 forums.
- **FTP:** the File Transfer Protocol (FTP) is a common format for transmitting and moving data (files) on the Internet. There are many FTP sites (shareware archives) where it is possible to connect anonymously (so called 'anonymous FTP') and download a large number of files
- **IRC:** Internet Relay Chat, a chat system developed in the late 80's. It is a virtual meeting place where people from all over the world can meet and talk; it consists of different groups of discussions on different channels. Small client program like mIRC allows you to "converse" interactively with other people by typing messages that are instantly sent to other chat participants. A new revolutionary chat is called *ICQ* (I-see-you), a user-friendly Internet tool used to communicate with other people in real time; you can chat, send messages, files, URL or play games.
- **TELNET:** a terminal emulation program used to connect to remote Internet host. The Telnet program enables to connect to a server on the network, log in and access its resources. You can then enter commands through the Telnet program and they will be executed as if you were entering them directly on the server console.
- **WORLD WIDE WEB:** it is the best known and used part of the Internet (also called WWW or Web or W3). All the information is distributed in hypertext format and a browser allows us to read all these information. The pages on the WWW can contain text, images, sound, software and movies. The majority of the text documents are written in HTML or new extension and reformulation of this language (XHTML, XML, CSS, PHP). Moreover some programming languages (Java, Flash) can create special effects inside the Web pages. The capabilities of a web browser can be extended with particular programs (Plug-in applications) to

play sound or video and to display particular documents. Common applications are Adobe Acrobat Reader (PDF files viewer), Apple QuickTime, Macromedia Shockwave, RealPlayer (animation and sound player), VRML viewers (3D visualization of Virtual Reality Modelling Language models).

## 2.6 The information on the Web

One of the main problems of the Internet is where to find the right information we 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 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.

### 2.6.1 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, programs like "Gopher" and "Archie" kept indexes of files stored on servers connected to the Internet. 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. All search engines perform three basic tasks:

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

To find information on the hundreds of millions of Web pages that exist, a search engine employs special software robots, called spiders or crawl. Each spider takes different approaches but they are always crawling, because of the constantly changing nature of the Web. Some of the most popular search engines are Google, AltaVista, Yahoo, HotBot, Lycos, Excite, MSM (the related links are listed in Appendix A). 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 only on scientific content and by searching both Web and membership sources (articles, presentations, reports in all possible format). It provides for scientific information, university sites, reports and articles in a clutter-free, user-friendly and efficient manner. Other useful web-sites are called Metacrawlers: they use at the same time more search engines to search for a query, providing more complete research; common Metacrawler are Mamma, Metacrawler, Search Engine Guide.

### 2.6.2 Online Internet Directories

They are webpages where the information are stored and displayed to the users in thematic channels or categories. Lists of links are listed with short descriptions and related URL. It is also possible to search inside the web as a normal search engine. Good directories are Galaxy, Yahoo, the WWW Virtual Library, the Educational Virtual Library, the Earth Science Portal (related links listed in Appendix A). 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 database. AllConferencesNet instead provides interesting links for all kind of events in the world. 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.

### 2.6.3 Educational resources on the Web

Educational resources on the web are without limits. The possibility to find scientific articles, reports, journals or entire books on the Web is very high (and easy). 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. On the other hand, real e-zines or e-journal have no paper equivalent and are not always free. A big problem of electronic documents is that they are not permanent and they can be lost from the permanent record, as subject to changes in positions and unpredictable removal. Instead documents on paper or in electronic format (CD-ROM) are not transient and can be available and legible for many years. Therefore to preserve for a longer period also the Internet publication, a timely and active intervention at all stages is required.

A general database of educational material is provided by the "Gateway to Educational Materials" project, a consortium effort created to provide easy access to the substantial, but uncatalogued, collections of educational materials available in various states, universities, non-profit, and commercial Internet sites [<http://www.thegateway.org>]. Another database is *Education-line*, a freely accessible database with full text of conference papers, working reports and electronic literature (from 1997), which supports educational research, policy and practice [<http://www.leeds.ac.uk/educol/>]. Furthermore, an Internet portal full of relevant resources to faculties, students, and research staff at the university level is *Infomine* [<http://infomine.ucr.edu/>]. It is a huge database including electronic journals, books, bulletin boards, listservs, online library, articles, 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, ASPRS, CCRS and CEOS CD-ROM.

Also ISPRS pages list some links to tutorials, journals, glossaries and news in the field of Photogrammetry, Remote Sensing and Geographic Information Systems while a bigger database of educational-related links is provided by WGVI/1.

## 2.7 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. Moreover the geographical location of 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 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 online.

The growth of the available information can be estimated from the number of registered host. According to the Internet Software Consortium [ISC, 2002], the number of registered

hosts was 80,000 in January 1988 while in January 2002 states 147.3 million (see Figure 1). The number of hosts is considered one of the most accurate measures of the size of the Internet and include all network elements such as routers, Web servers, mail servers, workstations in universities and businesses. In [Zook, 2000] is shown that in the last three years the number of hosts per domain is becoming smaller while the number of new domain is grown: this suggests that more businesses and organisations are establishing a personal internet presence with new domain name registration. Nevertheless, new analysis from Netcraft [Netcraft, 2002] shows that there has been a dramatic reduction in new domain name registrations, in particular gTLD. This shows how difficult is to manage Internet statistics. As May 2002, the largest domains are .com, .net, edu; the top three countries with the largest number of Internet hosts are USA, Japan, Canada; the countries with the largest number of host per capita are Iceland, Finland and Sweden; the fastest growing domain are .co, .pt, .su, .sg, .mx; the fastest internet growing country are India, Indonesia, Mexico [Telcordia, 2002]. OCLC [OCLC, 2002] gives instead some interesting numbers about the existing websites: at the end of 2001, there are ca 8.7 million websites world-wide, compared to 1.6 million in 1997.

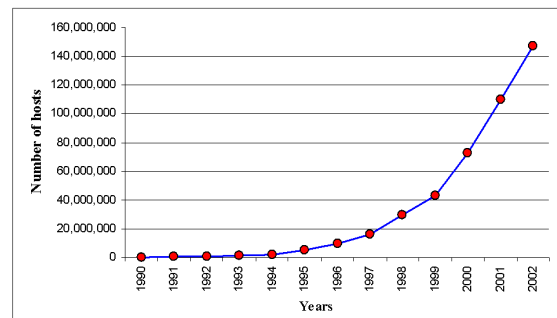


Figure 1: Internet growth represented with the number of hosts in the period 1990-2002. [Source: ISC]

Considering the million of **users** online (see Figure 2), the number of people is constantly increasing. In 1995 the Internet population was less than 30 million people (app. 0.35% of the world population) while in May 2002 there were more than 500 million people online (8.9% of world population) [NUA, 2002]. The number is expected to increase again in the next years and a CIA reports [CIA, 2002] gives a prediction for the next years: 'Over 765 million by the end of year 2005!' Comparing the number of users and host, in 2001 there was an average of 4.6 users per host. With the high quality of service in the United States there are approximately 2.4 Internet users per host, whereas in some developing countries such as China and India, there are more than 100 Internet users per host.

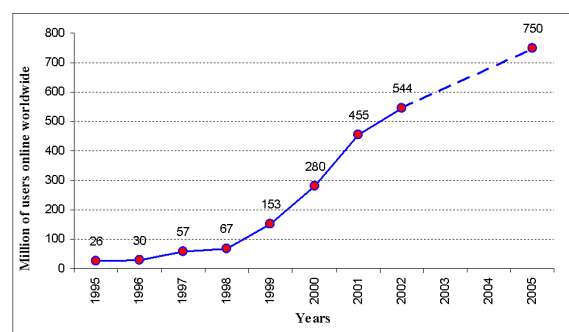


Figure 2: Number of users online worldwide. [Sources: NUA, CommerceNet]

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 grow, at least for another few years ([Telcordia, 2002] provides a very interesting real-time estimate of these growths). But presence and accesses to the Internet are not well distributed in all countries. As reported by Nua [NUA, 2002], the top 10 countries account more than 80% of the world-wide population; moreover there are country with less than 0.01% of the country population who has an Internet access while European countries have ca. 60%.

### 3. ISPRS ON THE INTERNET

In this section is described how ISPRS is inserted in the global network, the different representation and initiatives of to present it to the world-wide public and which technologies are used to improve and keep up-to-date the society web site.

#### 3.1 ISPRS Homepage

The ISPRS homepage has turned out to be one of the most important components for ISPRS communications. It provides information about the society and links its various activities. Since 1994, when the first ISPRS html pages was inserted on ETH server by André Streilein, the homepage is a very important reference point of the society, providing up-to-date information and links related to the various activities of the society. Thanks to the international reservation of the domain name 'isprs.org' concluded in September 1999, all these information can be found at a meaningful URL and, moreover, all different ISPRS activities can have an Internet address ending on the suffix 'isprs.org'.

In September 2000 the ISPRS server has been moved (back) to ETH-Zürich after a short period in T.U. Delft. As May 2002, there are about 500 HTML pages with approximately 160'000 lines of information available on the ISPRS web site, i.e. ca 130 Megabytes of data.

Considering ISPRS Commissions and WG, all TC have a personal homepage while only about 50% of the Working Groups provide information on their own webpages. Besides this fact, ISPRS WG VI/4 (1996-2000) created guidelines for preparation and maintenance of related webpages [Chen and Felkner, 1998] and basic downloadable template are available at <http://www.isprs.org/sample.html> with related logos and icons.

#### 3.2 ISPRS improvements

In April 2001, a search engine (provided by Google) has been introduced inside ISPRS 'Table of Contents'; a user can search for pages inside ISPRS server or inside the WWW. Moreover the first page of the web site has been updated already three times, the last time using a dynamic menu and providing direct links to the main publications of the society. Since March 2002, a program (provided by Seven-twentyfour Inc.) analyses ISPRS pages checking for broken links and internal errors. It is very useful, in particular for ISPRS educational pages, to keep all the links updated. Furthermore, it found out that ISPRS has 878 internal links, 721 external links to related web sites and 174 web sites have a link to ISPRS web pages.

#### 3.3 ISPRS Publications: Archives, Journals, Books and Reports

The publications of ISPRS are in seven categories: The *International Archives of Photogrammetry and Remote Sensing*, The *ISPRS Journal of Photogrammetry and Remote Sensing*, The *ISPRS Highlights*, The *ISPRS Annual Report*, The *ISPRS Organisation and Programs (Silver Book)*, The *ISPRS Member List (Blue Book)*, The *ISPRS Brochure*.

All existing stocks of the *Archives* prior to June 2000 is being offered for sale by RICS Books; Archives published from June 2000, volume XXX onwards (Hardcopies and CDs), are distributed by GITC bv.

The *ISPRS Journal*, the official publication of the Society, since two years can be read at Elsevier Science web pages (<http://www.elsevier.nl/locate/isprsjprs>) and full texts are 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.

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

In the last period, some ISPRS workshop organisers use to provide online the proceedings or the presentations of the events. Electronic documents are available e.g. from the International Workshop "Recreating the Past - Visualization and Animation of Cultural Heritage" or from OEEPE/ISPRS Workshop "From 2D to 3D - Establishment and Maintenance of National Core Geospatial Databases"; the related links can be found inside ISPRS educational links.

#### 3.4 Educational Resources and Job Opportunities through ISPRS web site

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, continuously checked and updated, are listed about:

- *Free software*, in particular from CATCON, the Computer Assisted Teaching contest organised by WG VI/2. Free packages for computer vision, GIS and RS data are also listed
- *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, GIS and computer vision.
- *News* about satellite missions and launches
- *Glossaries and Acronyms* used in Remote Sensing, GIS, Radar and Cartography.
- *Journals* of Photogrammetry, Geodesy and Remote Sensing.
- *Presentations and Proceedings* of ISPRS Workshops, Symposium or Congresses.

Anyone who wants to contribute to this list, please send links or information to [fabio@geod.baug.ethz.ch](mailto:fabio@geod.baug.ethz.ch)

Working Group VI/1 provides a bigger database of education-related links, including training opportunities, online publications and journals, continuing education courses, educational institutions, free software, missions and instruments information.

ISPRS web site also includes links to Job opportunities and Academic Sites for Geomatic Engineering:

- The *ISPRS Employment Opportunities archives*, a jobs listing, maintained by Mark R. Shortis, intended to provide offers for people who are seeking employment. Employers and universities are encouraged to submit an advertisement sending an e-mail to [isprsjobs@sunrise.sli.unimelb.edu.au](mailto:isprsjobs@sunrise.sli.unimelb.edu.au)
- The *Academic Sites for Geomatic Engineering*, maintained by Robert Kauper, is a collection of links to academic institution, which provide education in the field of Geodesy, Photogrammetry, Surveying, Cartography and GIS.

### 3.5 ISPRS Events Calendar

The ISPRS Events Calendar [[www.isprs.org/calendar.html](http://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. The Calendar is published in the quarterly ISPRS bulletin, ISPRS Highlights, and regularly updated on the ISPRS Home Page by the webmaster. 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 avoidance of conflicting with other events externally and definitely internally is a major responsibility of ISPRS. The calendar is published to encourage other Sister Societies to do likewise. It is important to cover events, which are on the interdisciplinary boundaries of ISPRS so that all Commissions and WGs are aware of who and how they can interface with related Commissions, WGs, and Sister Societies.

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. The system is using the state-of-the-art technique of searching engine and programming tools for web pages and Internet server. The following software, operating system, programming languages, and programming tools have been used: Microsoft

Windows 2000 Server, Microsoft SQL Server 2000, Microsoft .NET Web N-tiers, IIS, Microsoft Office XP, Dynamic HTML, XML/SOAP, JAVA Script, VB Script, CGI, ASP, PHP, Delphi, etc.

### 3.6 ISPRS Server statistics

Since the beginning of 1995 ISPRS server statistics are available to analyse the interest of the community. The logfile of the Apache server is examined with Analog, a program that analyses servers files. In Figure 3 are shown a monthly report of the number of requests to ISPRS server, in the period January 1995-May 2002.

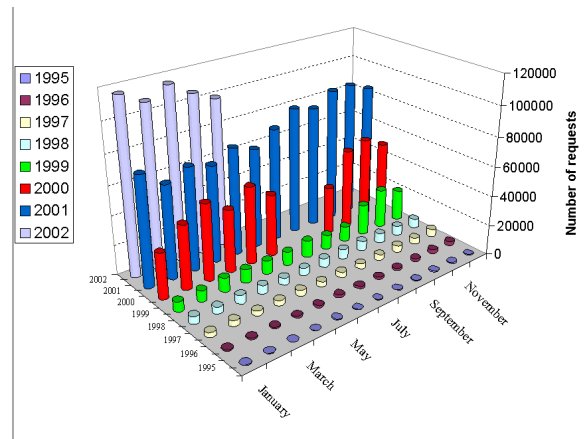


Figure 3: Monthly request on ISPRS server in the period January 1995 - May 2002.

An increasing interest of the community for the ISPRS homepage is evident: the steady increase of the requests over the years and especially after the registration of ISPRS domain is obvious. Figure 3 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 from figure 3 in the period July-August 2000 is due to the movement of the server from Delft to Zurich. In 1995 the average of monthly requests were 424, in 1998 the average was 5780 while at present ISPRS server has an average of 80000 requests per month (see Figure 4). The different domain (~country) served at least one by the server were 133 (ca 55% of the registered country code domains), while the distinct hosts served (~users) were ca 37000 with an average of 20Mb of data transferred per day.

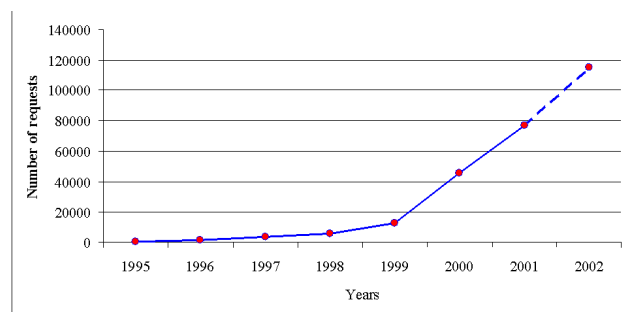


Figure 4: Average request per month on ISPRS server in the period 1995-2002

An interesting statistic concerns the words and queries used in the search engines to find ISPRS and its related pages: between 7000 words, the most used are remote (9%), sensing (8%), photogrammetry (7%), isprs (5%). Considering all the queries, the most used are 'photogrammetry', 'isprs', 'remote sensing', 'orange book', 'International Archive of Photogrammetry and Remote Sensing'. The browser most used to find information related to ISPRS is Microsoft Internet Explorer (59%), followed by Netscape (27%). The majority of the users (77%) has Windows as operating systems; then Unix (7%) and Macintosh (1.5%).

#### 4. CONCLUSIONS AND OUTLOOK

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? All these queries are still open and interesting questions.

Within 30 years, the Internet has grown from a Cold War concept to survey a nuclear attack to a superhighway of information. Nowadays we are in the age of the Internet: people communicate, work, do shopping, move money and plan the holidays over the Internet; schools use the Internet as a vast electronic library, with untold possibilities. The Net has opened the access to information to everybody and has changed the way we see the world. As a new generation grows up accustomed to communicate through a keyboard, life on the Internet will become an increasingly important part of life on Earth. But the Internet can even create a second-class citizenship among those without access. Infact there are still part of the world where 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 where the infrastructure are still in development. And this is also a lack for the education of the country. 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 much of Africa. The use of satellite resources for Internet backbone and other new Internet related applications [Internet2, 2002] would improve the connections and the capacities of many domains. One of the most expected explosion is the use of satellite connection [IVS, 2002] also for residential users, while cable-modem is already common, in particular in USA. It is estimated that the Internet will double in size every year and the World Wide Web will double every 2 months. Many companies already use the Internet for sales, advertising and marketing and within the next 2-3 years 50% of all commerce will be conducted online [Ntoko, 1999].

Inside the Internet, the World Wide Web can be considered the greatest success. It is an example of a system that had humble beginnings and 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 recent explosive growth of the Net. The Web, together with the search engine, 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.

However, the rapid growth and interest for the WWW has introduced 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. Therefore newer and more efficient protocols and

ideas are needed to meet the demands and to solve the problems mentioned before.

Apart 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 will remain inside this big e-word improving its appearance and always providing more information to its users. We will continually strive to improve and expand ISPRS online services, using the new available technologies and services. You could help us telling what is appreciated or which improvements you would like to see in the homepage.

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## APPENDIX A.

### *Search Engine, Online Directories and Metacrawler:*

- 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/>
- Mamma: <http://www.mamma.com/>
- Metacrawler: <http://www.metacrawler.com/>
- Search Engine Guide: [www.searchengineguide.com](http://www.searchengineguide.com)
- Galaxy: <http://www.galaxy.com/>
- WWW Virtual Library: <http://www.vlib.org/>
- Educational Virtual Library:  
<http://www.csu.edu.au/education/library.html>
- Earth Science Portal: <http://webserv.gsfc.nasa.gov/ESD/>
- AllConferencesNet: <http://www.allconferences.net>

### *Educational Material:*

- Gateway to Educational Materials:  
<http://www.thegateway.org>
- Infomine: <http://infomine.ucr.edu/>
- NASA: <http://rst.gsfc.nasa.gov>
- ASPRS: <http://research.umbc.edu/~tbenja1>
- CCRS: [www.ccrs.nrcan.gc.ca/ccrs/eduref/educate.html](http://www.ccrs.nrcan.gc.ca/ccrs/eduref/educate.html)
- CEOS CD-ROM: <http://ceos.cnes.fr:8100/>
- Educationline: <http://www.leeds.ac.uk/educol/>
- ISPRS Educational material:  
<http://www.isprs.org/links/tutorials.html>
- ISPRS WGVI/1: <http://www.commission6.isprs.org/wg1>
- ISPRS Proceedings online:  
[http://www.isprs.org/publications/online\\_proceedings.html](http://www.isprs.org/publications/online_proceedings.html)

### *Job Opportunities:*

- ISPRS archives: <http://www.sli.unimelb.edu.au/isprs/mail-archives/index.html>
- Vision Science, training opportunity:  
<http://www.visionscience.com/vsTraining.html>

### *Research and Teaching:*

- Academic Sites for Geomatic Engineering: <http://www.lrz-muenchen.de/~t583101/WWW/Links.html>
- Academic Institutions in imaging:  
[http://www.precisionimages.com/gate\\_ac2.html](http://www.precisionimages.com/gate_ac2.html)
- University and College all over the world:  
<http://www.mit.edu:8001/people/cdemello/univ.html>