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Planetary Cartography: Current Activity and New Ideas

The idea of including a new direction in ICA cartographic research, towards the mapping of planetary bodies, was raised by Russian cartographers at the seventeenth International Cartographic Conference (ICC) held in Barcelona in 1995. Members from Germany, USA and Canada supported the proposal. A working group was formed and a full Commission on Planetary Cartography was approved during the 1999 Ottawa conference.

Limited Activities

One of its major goals is the harmonisation of international planetary cartographic efforts. This does not mean a 'homogenisation' of planetary maps, where everything looks the same, but rather the fostering of free interchange of ideas and information amongst all national efforts incorporating some aspects of planetary cartography, along with free access to planetary cartography information within all nations. A biennial survey of resources and needs relating to planetary mapping activity was first carried out in 1996.

Analysis has shown that many countries would like to contribute to such activity. However, governmental activity is limited, and the private sector is busy with terrestrial mapping.

Multilingual Maps

The intention of the Commission was to initiate and lead efforts towards a series of multilingual planetary maps. The names on these were to be given in Latin, but other information was to be printed in different languages. Further ideas were to compile a Glossary of Planetary Cartography, and to develop GIS with various planetary databases. These three activities still form the basis of the Commission's work, taking place within a framework of international co-operation and with active support from ICA. Multilingual maps for the Moon,

Mars, Venus and Mercury, each in five languages (English, German, French, Spanish and Russian) have been published. Other countries have joined this project, and further publication of these multilingual maps in Hungarian, Polish, Czech, Bulgarian and Croatian has been undertaken in Hungary, with the close co-operation of specialists in those countries. The future development of these maps will also cover mapping of other Solar System bodies, such as Phobos and Deimos (moons of Mars) and the moons of more distant planets.

Proposed Textbook

The first version of a multilingual glossary of planetary cartography terms



Members of ICA Commission on Planetary Cartography meeting held in A Coruña, Spain, July 2005. Chair Kira Shingareva (Russia) seated left; co-chair Jim Zimelman (USA) standing fourth from left.

was discussed at the twenty-second ICC in 2005, as was construction of a Specialised Planetary Cartography database, led initially by Commission members in Russia, Germany, Canada and Hungary. This will contribute to an electronic version of the Atlas of Terrestrial Planets and Their Moons (paper copy published in 1992) and to a wider GIS named the Electronic Solar System (ESS). Future work may also address the role of planetary cartography in development of the geography of extraterrestrial territories: compiling and printing of a proposed textbook entitled *Geography of Extraterrestrial Territories* is considered an output of this activity. 🌐

Kira Shingareva, Moscow State University for Geodesy and Cartography, 4 Gorokhovskiy per, 103064 Moscow, Russia



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History of Colonial Cartography

The idea of a Working Group (WG) on the History of Colonial Cartography came up in 2003. During the ICA Conference in Durban, South Africa, a group of delegates felt that sufficient interest existed in the colonial cartography of the nineteenth and early twentieth centuries to justify the formation of an interdisciplinary WG. Not only is this period considered the 'second age of exploration' but it also constituted the formal foreign dominance of most continents and the beginning of the cartographic unveiling of those territories. The WG exists separately from the ICA Commission on the History of Cartography and has its own terms of reference. The current chairperson is Prof. Elri Liebenberg of South Africa (elri@worldonline.co.za) and co-chair is Dr Imre Josef Demhardt of Germany (demhardt@t-online.de).

The main aims of the WG are to promote and encourage the study of colonial mapping during the period from about 1800 to 1950. It will do this by establishing a database of interested researchers, encouraging co-operative activities, holding a minimum of one meeting per annum to monitor and discuss recent research work, and publishing research findings in accredited international journals. For practical reasons, the WG decided to focus on two alternating research subjects. For the period 2003-2007 Sub-Saharan Africa has been identified; Australasia has been chosen for the period 2005-2009. Members are encouraged to devote their attention to these two areas and as part of its current research programme the WG also intends to compile regional bibliographies of publications relevant to the history of colonial cartography during the nineteenth and early twentieth centuries.

Members of the WG featured prominently at the recent International Cartographic Conference in La Coruña, Spain (9th to 16th July 2005) and the International Conference on the History of Cartography in Budapest, Hungary (17th to 23rd July 2005). In La Coruña the History of Colonial Cartography was one of the conference themes and the WG was allocated three technical sessions. In

Budapest members of the WG participated in a number of conference themes.

Dr Demhardt played an important role in promoting WGs aims when he curated the exhibition *Der Erde ein Gesicht geben: Petermanns Geographische Mitteilungen und die Anfänge der modernen Geographie* (Giving a face to the globe: Petermann's 'Geographische Mitteilungen' and the beginnings of modern geography). This ran in Gotha, Germany from 23rd June to 9th October 2005. The exhibition mainly drew on the Perthes Collections, which are the most complete publisher's archives, map collections and geographical library for



A new map of Africa by John Cary, 1805; the interior of the continent is still 'cartographically empty' and needs to be 'filled in'.

study of the nineteenth and early twentieth centuries, next to the collections of the Royal Geographical Society.

For 2006 the WG plans a Regional Workshop on the mapping of West and Central Africa, to be held in Yaounde, Cameroon in June, and a Symposium in August hosted by the University of Utrecht in The Netherlands. The theme of the Symposium will be 'Old Worlds - New Worlds' and participation will be open to cartographers, map historians, historical geographers, map librarians and map collectors. More particulars and an accompanying Call for Papers will be published on the WG website: www.histcolcarto.org.

Elri Liebenberg, Emeritus Professor of Geography, University of South Africa, Pretoria

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Flattening the Globe

The Commission on Map Projections was founded just two years ago within the International Cartographic Association (ICA). As the first international organisation dedicated to small-scale geographic map projections, it may be surprising such a body took so long to come together. Yet that it happened at all is also surprising in some ways. Though a fundamental element of maps, map projections generally command little attention even in cartographic circles, much less among the public at large. Historically, those researching map projections have tended to work alone, mainly because there are so few of them. Everything a practising cartographer really needs to know about map projections can generally be condensed into a few pages in a textbook, so it would be fair to ask whether the topic merits a dedicated body.

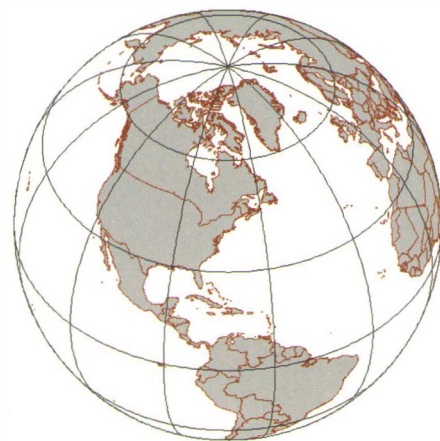
On the other hand, despite the ready availability of basic projection knowledge we find projections rampantly misused. The field has weathered political controversies. Rapid advances in computing power have opened up new projection techniques and better practical ability to analyse projections. As surveys of celestial bodies increase in number and detail, projection techniques suited to less-regular bodies become crucial. Along with these challenges come more efficient vehicles of communication that allow researchers to seek each other out, disseminate their knowledge and collaborate to solve the old and new problems of mapping and education about map projections.

Several organisations concerned with large-scale projections already exist for geodesists. This commission complements those efforts by concentrating on small-scale projections more relevant to cartographers. We propose to consolidate and co-ordinate, advance and disseminate knowledge of small-scale map projections amongst map-projection researchers, professional and occasional cartographers and the public at large.

Our first projects, designed to support further endeavours, are to:

- build a glossary of terminology relevant to map projections and their research
- recommend names for map projections
- update and expand a bibliography of map-projection research
- build a website to disseminate the products of the commission.

Because these projects are collaborative and our membership is distributed all over the world, we have chosen to use an internet collaboration tool called a 'wiki' to collect, edit, and annotate material. We will then publicise it in some final form; an example of a vastly larger (and more chaotic!) wiki project is the well-known Wikipedia found at www.wikipedia.org. Any member is invited to help develop the content. The Geography Department at University



Advances in computer technology have opened up new techniques for small-scale geographic map projections.

of California at Santa Barbara currently hosts our website and wiki site. While we as yet have no substantial content posted publicly, our website can be seen at www.csiss.org/map-projections/.

Daniel R. Strebe, founding chair, ICA Commission on Map Projections, e-mail: dstrebe@mapthemantics.com



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Relationships with Others

A Web-sourced definition of Memorandum of Understanding (MoU) is "a written document executed by the parties which establishes policies or procedures of mutual concern. It does not require either party to obligate funds and does not create a legally binding commitment." Learned societies in the fields of science and technology inevitably have areas of common interest, either as part of their constitution, or over some shorter time period when issues of mutual significance are addressed by more than one society. In addition, such societies may find that statutory, government and commercial agencies are also interested in particular topics of common concern.

ICA is no exception. As one of a number of geomatics-oriented associations, it has joined the Joint Board of Geospatial Information Societies (JBGIS). Specialised links with particular organisations within the Joint Board have advanced the agenda of co-operation in specific areas. For example, the MoU signed in January 2004 between ICA and the International Hydrographic Office (IHO) confirmed a "commitment to the work of the joint FIG-IHO-ICA International Advisory Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers." Themes of mutual interest identified in the MoU signed by FIG and ICA in September 2001 included:

- geographic information and its management and standardisation
- topographic and hydrographic mapping
- special applications of positioning and navigation to mapping and GIS
- internet-publishing of maps
- history of mapping and cartography
- education and scientific research
- role of under-represented groups in international organisations
- transfer of management and technology to developing countries.

There are issues common to all the bilateral MoUs to which ICA has put its signature. Each organisation recognises the other as an "international organisation with many complementary activities ser-

ving similar professional constituencies." This naturally allows for "maintaining and increasing of the opportunities of scientific, technical and professional, as well as academic and educational, exchange between their members, through a continuing programme of co-operation leading to mutual sharing of knowledge and expertise to the advantage of both organisations." This covers information exchange about meetings and possible joint sponsorship of activities.

ICA has recently expanded its range of MoUs. In March 2004, Sergio Camacho-Lara (director of the United Nations Office for Outer Space Affairs) signed an agreement with ICA specifically to tackle issues such as supporting developing countries, promoting space-supported systems and increasing awareness of the use and applications of global navigation satellites. Such applications in early warning and disaster management were recognised and soon brought into focus by the December 2004 tsunami. Further MoUs have been signed with a



ICA president Milan Konecny and general secretary of the Pan American Institute of Geography and History Santiago Borrero sign the MoU between their organisations.

trans-national governmental body, the Pan American Institute for Geography and History based in Mexico City, and with an academic research grouping, the Geographical Information Systems International Group, based in Genova, Italy. In each MoU international organisations have pledged to co-operate to drive forward activities in geomatics. 🌐

David Fairbairn



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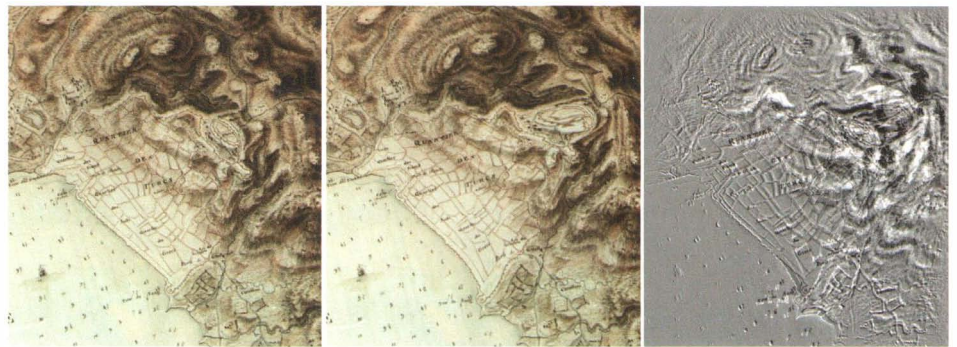
- Robert B. McMaster, University of Minnesota, USA

ICT in Heritage Research

ICA has recently approved the formation of a new Working Group (WG) on Digital Technologies in Cartographic Heritage. The philosophy behind the group is simple but challenging: to study the possibilities afforded by modern digital Information and Communication Technologies (ICT) in observing and using our rich cartographic heritage. In doing so, the long history of cartography and maps, a very important and continual component of world cultural heritage, acquires a new dimension and broadens its audience considerably.

Current international policies and projects relating to cultural issues (for


So the new WG has been proposed not only to organise the field of cartographic heritage, but also to stimulate cartographic dialogue between humanities and sciences. This will involve various topics: the humanities and technological issues relating to the transformation of early maps, atlases, globes and other cartographic documents into digital form. Also cartometric and thematic research on old maps using digital tools, and digital methods for the preservation and restoration of old maps, atlases and globes. Digital assistance for the work of map curators, including networking, archiving, retrieval and virtual libraries will also be addressed, as will access by users to cartographic heritage, including use of the internet. Enhancing



A late 18th-century map of Thessaloniki (left): stretching to best-fit modern coordinates (centre) and image of residuals (right).

example EU initiatives on digital heritage) need young researchers familiar with contemporary technologies. However, the actual investigations have to bring together two worlds of cartography; one dealing with its humanistic component and involving learned and literate historians, the other addressed by scientists and engineers of cartography concerned with everyday practice and cartographic technologies. This distinction has historical roots in the earliest definition of 'cartography', when *cartographe* (French) meant the 'historian of maps' and *cartographer* (English) was the 'mapmaker'. Further back in history still, ambiguity arose from the differing conception of 'writing the earth' (in Greek *γραφειν την γην*, where *γραφειν* means both the textual and the graphical description) as expressed by Eratosthenes, Strabo and Ptolemy.

ICT in teaching and diffusing the history of maps to the general public will be a further topic.

We have initiated a WG website (www.maplibrary.gr/ica_heritage) and organised the First International Workshop on Digital Approaches to Cartographic Heritage, to be held in Thessaloniki, Greece, on 18th and 19th May 2006. This event is sponsored by the Museum of Byzantine Culture at Thessaloniki and the new international Web journal *e-Perimetron* on sciences and technologies relating to the history of cartography and maps (www.maplibrary.gr/e_perimetron). 

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Ob Merita Egregia*

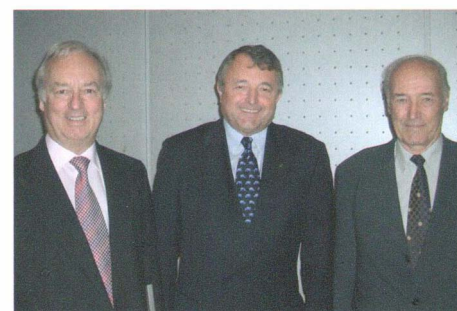
Amongst the awards instituted by the International Cartographic Association (ICA) is the Carl Mannerfelt Gold Medal. First awarded in 1980 to the 'dean of European cartographers' Prof. Imhof of Switzerland, this medal is the highest honour in world cartography, commemorating the founder of the ICA, Prof. Mannerfelt of Sweden. Two new recipients were awarded the medal in 2005, joining a select band of only eight other individuals: this award is highly prized and not bestowed lightly. The two most recent and deserving recipients are Prof. Ernst Spiess (Switzerland) and Prof. David Rhind (UK), both of whom received the acclaim in A Coruña last July of the International Cartographic Conference, accepting their medals from the ICA President, Dr Milan Konecny.

Each was also honoured by their home cartographic societies. The Autumn Conference (Herbsttagung) of the Swiss Society of Cartography in November 2005 included a session devoted to the life and work of Prof. Spiess (see website below). His achievements, as summarised in the ICA citation, include 'contributions in topographic mapping, atlas production, technological advancement, and to effective teaching and research.' In 1974, at the Institute of Cartography at ETH Zurich, he introduced one of the first digital cartographic computer systems, which became a basic tool for advanced scientific work on map production, thematic cartography and map projections, and also adapted and extended Bertin's 'Graphical Semiology' to modern thematic cartography. It was fitting that, after laudation by ICA secretary-general Prof. Ferjan Ormeling, a review of the professional life of Prof. Spiess was given by Prof. Lorenz Hurni, once a student of his and now himself director of the Institute of Cartography.

The British Cartographic Society (BCS) honoured Prof. Rhind at its Fellows Meeting in February 2006, and again the formal tribute was given by a former student of the recipient, Dr Seppe Cas-

settari, now president of BCS. Currently vice-chancellor of the City University, London, Prof. Rhind has an extraordinary record of public service with a range of UK committees and organisations, along with a lifelong international commitment to the science of geographic information handling. His cartographic pedigree was honed at the world-leading Experimental Cartography Unit in London in the 1970s, and came to the fore in his subsequent academic career and his enlightened leadership of the British Ordnance Survey during the 1990s. His ICA citation further describes him as 'a keen thinker within the field, in recent years concentrating on the position and role of cartography in the Information (or Knowledge-Based) Society.' He is also a member of the Editorial Advisory Board of this magazine.

The website for more information regarding Prof. Spiess is at www.cartography.ch/archiv/2005_herbsttagung/galerie/galerie.html.



David Rhind, Milan Konecny and Ernst Spiess at the presentation of the ICA Mannerfelt Medal in A Coruña, July 2005.

A range of other awards (ICA Honorary Fellowships and Diplomas for outstanding service to ICA) are occasionally conferred on individuals who have contributed to the development of cartography and the prominence of ICA. ICA is proud of those listed under 'ICA Awards' at www.icaci.org.

David Fairbairn

* This is the inscription on the ICA Mannerfelt medal, an approximate translation being 'for outstanding merit'.



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Early Warning and Risk Management

Disasters and hazards cause loss of life and property and create social and economic disruption. Exogenous (floods, drought, storms, landslides and avalanche), endogenous (volcanism and earthquakes) or anthropogenic (collapse of structures, desertification, fires, accidents etc): all have impact. New concepts of disaster management focus on risk management rather than the impossibility of complete hazard prevention. Maps are important for the whole risk-management process; for knowledge, to make decisions, to communicate information and to raise awareness.

Working Group

ICA has decided to form a Working Group on Early Warning and Risk Management whose broad objective is to explore and co-ordinate how cartography can be used to rapidly prepare and produce simple, standardised and informative maps for use in tackling natural and manmade hazards. The Group's first activity was to organise two sessions on Early Warning and Risk Assessment during the 2005 International Cartographic Conference in A Coruña. Terms of Reference have been agreed:

- provide leadership in the development of concepts and standardisation of early warning for hazard, risk and vulnerability mapping and cartographic modelling
- promote the use of remotely sensed and other geospatial data and various analysis techniques for early warning and risk management by organising workshops
- promote capacity building, quality mapping and cartographic modelling for early warning and risk management through topic-related publications
- participate in and contribute to global initiatives, for instance through the maintenance of a website
- promote hazard, risk and vulnerability mapping for risk management and communication
- develop mechanisms and networks for exchange of information among relevant stakeholders.

A further landmark is formation of the University Network for Disaster Risk Reduction in Africa (UNEDRA). This came into being during a workshop held at Makerere University, Kampala, Uganda in September 2005, organised by ITC and local geographers within the framework of the United Nations University Programme on Disaster Risk Information Management (www.itc.nl/unu/dgim/unedra/default.asp).

Other activities of the Working Group include development of a Web-based course on hazard mapping and modelling, providing a curriculum for university instructors teaching courses at undergraduate and graduate level. The course in progress is listed on the US Federal Emergency Management Agency's (FEMA) useful resources website (www.fema.gov/about/training/emergency.shtm). Of interest too was the 2006 Chicago meeting of the Association of American Geographers, where several sessions addressed disaster management, notably the role of mapping in the aftermath of Hurricane Katrina.



Dr Wilber Ottichilo, chair of the Working Group on Early Warning and Risk Management.

The group is currently developing its website (www.rcmrd.org/Ica_web/ica-main.html). It is also exploring funding mechanisms to promote workshops and publications, organising a workshop on Risk and Vulnerability Mapping and Modelling for Emergency Managers in October 2006 in Nairobi and preparing a publication for the next ICA conference to be held in Moscow in August 2007. The group welcomes suggestions on website design and content, along with comments on our activities, and is keen to promote participation from all continents. 🌐

Chair: Dr Wilber Ottichilo, e-mail: ottichilo@rcmrd.org and co-chair: Dr Ute Dymon, e-mail: udymon@kent.edu

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Use and Users of GI

It will be no news to you, readers of GIM International, that there is a growing interest in use, users and usability within the realm of geo-information acquisition, processing, management and dissemination. The ICA has responded to this by establishing a new Working Group on Use and User Issues. Some thirty people interested in this met during the ICA conference in A Coruña, Spain on 13th July 2005 and agreed on the following terms of reference for the period 2005-2007.

- ◆ Set up an on-line bibliographical database. The main categories in this bibliography are the user, usability (user-centred design and methods and techniques of evaluation/testing) and improvement of user abilities.
- ◆ Set up a forum on the Web to exchange knowledge and information.
- ◆ Set up a database of individuals working on or with expertise in the various use and user issues and denote it with keywords to stimulate exchange of information.
- ◆ Foster publications on use and user issues in cartography and geo-information processing and dissemination.
- ◆ Organise a workshop or seminar in 2006.
- ◆ Promote sessions on use and user issues at ICC 2007 in Moscow, August 2007.

Although the Working Group operates under the umbrella of the International Cartographic Association, the subject of study is certainly not just map use. The scope is much broader: it also includes use, users and usability of, for instance, hardware, software and information systems, interfaces, geographic data and databases.

In the meantime, work has started on:

- establishing a dynamic mailing list of people interested in contributing to the activities of the Working Group; if you want to be added to it, email to address below

- designing a website <http://kartoweb.itc.nl/icawguse/>
- categorisation required for bibliographical database tested by asking WG members to submit key references
- organising a seminar; of several options the Annual Symposium of the British Cartographic Society appeared the most realistic opportunity for hosting a seminar: 7th to 10th September 2006 in Manchester, UK and the organisers have reserved half a day for presentations on use and user issues, arranged with the help of the Working Group
- arranging other ad hoc meetings at other conferences and symposia (e.g. Association of Polish Cartographers (Wrocław, 23th to 25th November 2006); GICON 2006 (Vienna, 10th to 14th July 2006); Intercarto 12 (Berlin, 28th to 30th August 2006); GIScience (Münster, 20th to 23rd September 2006)).



Dr van Elzakker, chair, Working Group on Use and User Issues.

If you are interested in the activities of this new ICA Working Group, please contact ITC, Department of Geo-Information Processing, P. O. Box 6, 7500 AA Enschede, The Netherlands, e-mail: elzakker@itc.nl



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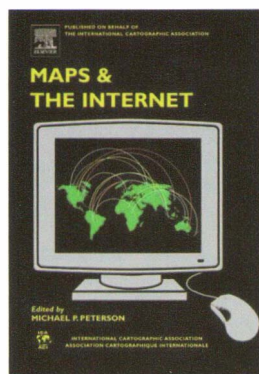
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New Map Medium Education

In the midst of a map-consumer delivery revolution, the ICA 'Maps and the Internet Commission' formed in 1999 continues its work analysing, developing, communicating and educating regarding this new medium. In doing so it makes use of a combination of conferences, symposiums and hands-on workshops. Meetings have served to promote innovative research and the exchange of information associated with the distribution of maps and spatial data via the internet. Commission meetings since 2000 have

focused on identifying key issues and defining a framework for research. Initial work culminated in the 2003 publication of *Maps and the Internet*, released as a 450-page paperback in 2006 (search at www.elsevier.com). Work on the second volume of the book is currently underway.



The commission has also held workshops throughout the world to promote the exchange of information about internet mapping among an international audience. These workshops, in either lecture or hands-on format, address the different methods of bringing maps and associated data to the internet and are arranged with the help of the host institution. Workshop instructors are commission chair Michael Peterson (<http://maps.unomaha.edu/workshops/>) or

co-chair Dr Georg Gartner of the Technical University of Vienna in Austria.

Different formats are used for the workshops. Some have been as short as a half or full day, while others have been as long as a week. Some have been presented as a lecture providing an overview of cur-



Workshops presented by Michael Peterson and Georg Gartner.

rent internet mapping technology, while others have been hands-on sessions with computers, to provide actual training in how the various programs are used. Some have been given to audiences of over a hundred while others have had as few as ten. The specific format chosen for a workshop depends on the facilities available and the needs of the organisation. Workshop format also influences the topics covered, which include some combination of the following: client-server architecture, P2P protocol, thin vs. thick clients, raster-file formats, vector-file formats, map scanning and digitising, Linux operating system, GIS tools, MapServer, interactive maps, animated maps, 3D and virtual reality, Web publishing, JavaScript, XML, GML, scalable vector graphics, and Asynchronous JavaScript and XML (AJAX).

Contact the commission chair at mpeterson@unomaha.edu if you would like to become a corresponding member of the commission and receive updates on commission activities. Please contact either commission chair or co-chair Georg Gartner at georg.gartner@tuwien.ac.at if you would like to arrange a workshop.

Michael P. Peterson, University of Nebraska at Omaha



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History of Cartography

The ICA Commission for the History of Cartography forms a scientific community dealing with the development of cartographic ideas, theory, methods, design, and technology of map reproduction, as well as with advances in Geographical Information Systems and their applications in cartography. We are currently concentrating on topics essential to the understanding of recent cartography, recognising that cartographic practice and traditions do vary among different countries and cultures. Many of these topics are closely related to the ongoing History of Cartography project (www.geography.wisc.edu/histcart/index.html), which is currently tackling volumes Four (Cartography in the European Enlightenment) and Six (Cartography in the Twentieth Century). We have a strong intention to connect activities of our Commission with the project through its director, Dr Matthew Edney.

Aside from contributing to such activities, Commission members focus on the following topics. Field surveys: manuals and instructions, reports, tables of symbols, theoretical publications (including chapters in geographical books), textbooks, and materials for compiling geographical descriptions during or after the surveys. Small-scale (cabinet) general and thematic cartography: published and manuscript works on map compilation using different source materials, instruments, and techniques, publications and writings on map projections and their use, and historical works on map generalisation. And use of maps: instructions for professionals (cartographers, geographers, and others) and ordinary consumers, geographers' writings and remarks on the matter. The intention is to compile a research tool for scholars in the form of annotated bibliographies of published and manuscript works on these topics for each country.

To progress with these ideas and projects the Commission actively participates in research meetings and conferences

at which members can promote their work. In 2005, both the main ICA Conference held in A Coruna and the International History of Cartography Conference in Budapest provided opportunities for the majority of members to meet. In Budapest a symposium was held on the 'History of Reconnaissance Field Surveys'. Continuing addressing the topics listed above, the Commission is organising a symposium entitled 'Development of Ideas and Methods in Cartography (eighteenth to twentieth centuries)' to be held during the Kaliningrad 'Intercarto - InterGIS 12, Sustainable Development of Territories' to take place in August/September 2006. This symposium will be supported by



Commission chair Prof. Postnikov (right) and other participants at the International History of Cartography Conference, Eotvos Lorand University, Budapest, in July 2005 (Photo: Peter van der Krogt).

the Russian Academy of Sciences S.I. Vavilov Institute of the History of Science and Technology and the Institute of Geography, and by the Moscow State University Department of Geography.

Preparations are also underway for the usual Commission meeting associated with the next ICA Conference, to take place in Moscow in August 2007, at which much of our research will be presented in the form of publications and presentations.

Professor Alexei Postnikov, Russian Academy of Sciences Institute of History of Science and Technology, 1/5 Staropanskiy St., Moscow 109012, Russia, e-mail: apostnik@ihst.ru

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Mapping the World of Standards

The ICA Spatial Data Standards Commission, active since 1991, is one of ICA's most productive commissions. It has addressed a number of specific issues since its formation, including transfer formats, national standards and metadata. Its most recent publication is the book *World Spatial Metadata Standards* (Elsevier 2005, ed. H. Moellering, ISBN: 0-08-043949-7).

In collating this book the Commission has developed an exhaustive set of scientific and technical characteristics by which every spatial metadata standard in the world can be assessed and understood. It has also addressed profiles, operational subsets of a main metadata standard usually applied to a specific thematic spatial data subset such as satellite imagery, geology, biology and demography.

Every facet of the metadata characterisation process had to be completely understood so that the characteristics could be specified and understood by later users. Thus Commission members devoted three years to assessing their own national/international metadata standard and the standards of other organisations in order to ascertain how most effectively to specify these scientific and technical characteristics. The characteristics were also field-tested.

The result is an exhaustive, internationally agreed set of twelve broad primary-level characteristics, along with 58 secondary and more than 278 tertiary characteristics. Also included are Obligation Parameters specifying whether a characteristic is Mandatory, Conditional or Optional. No single national or international standard possesses all

of these characteristics, but they have been specified and tested to facilitate understanding of individual metadata standards, and to assist in comparison.

This book represents many years of work, with more than fifty authors throughout the world analysing each spatial metadata standard in its native language. In addition to an explanation of the meaning and definitions of metadata terms and characteristics used in the book, a set of regional summary chapters provide help for the reader in understanding the standards

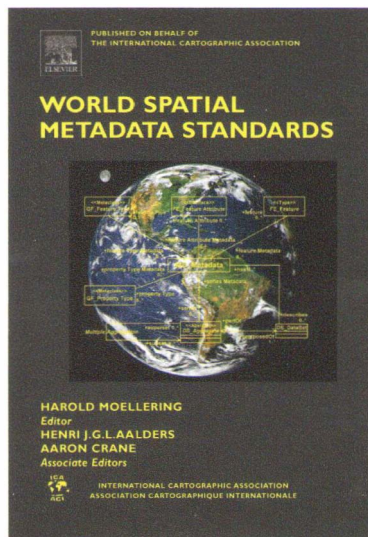
milieu for each continent. The largest part of the book contains 22 chapters, each written by an active Commission member and offering an assessment of every major national and international spatial metadata standard in the world. Each also contains representative subject-matter profiles derived from a major standard. There is a large graphical matrix presenting these 22 spatial

metadata standards by seventy of the most important characteristics. This table is an ideal start for any process of standards evaluation.

It should be noted that this book has been purposely designed to serve as a companion working volume to the Commission's 1997 book, *Spatial Data Transfer Standards* (Pergamon, eds. H. Moellering & R. Hogan, ISBN: 0-08-042433-3).

More information on the new book and on the work of the ICA Standards Commission can be found at the public website: <http://ncl.sbs.ohio-state.edu/ica>.

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Geospatial Analysis and Modelling

The development of GIS and cartography can be characterised as *information rich* and *knowledge poor*. That is, the amount of geospatial information collected using geospatial technologies, including remote sensing, global positioning systems and digital mapping technology, has been growing rapidly, whereas geospatial knowledge or 'useful information', for decision making in terms of real-world problem solving is rather limited. Terabytes of geospatial information in the form of satellite imagery, aerial photos and maps have been integrated into Google Maps and Google Earth so that ordinary people using a decent internet-connected home computer can zoom from space right down to street level and easily pinpoint their individual houses. Yet these services are considered information providers rather than knowledge suppliers. Current GIS still lack relevant tools for uncovering geospatial knowledge in various forms of patterns, structures, relationships and rules.

The new International Cartographic Association (ICA) Working Group on Geospatial Analysis and Modeling aims to co-ordinate research on these topics to uncover geospatial knowledge from geospatial information. That is, to transfer geospatial information, which is massive, complex, incomplete and uncertain in nature, into the geospatial knowledge that can directly guide decision making and real-world problem solving. Through organised activities we hope to network cartographers, geospatial information scientists and other researchers in developing new models and modelling for the creation of geospatial knowledge. The following topics give a flavour of the analysis and modelling we refer to:

- cartographic modelling (map overlap and map algebra)
- quantitative geographic analysis such as spatial autocorrelation and modifiable area unit problem
- time-geography modelling (temporal modelling)
- individual-based modelling (cellular automata and agent-based modelling)

- small-world modelling (topological analysis and network modelling)
- qualitative reasoning (topological relationships, direction reasoning and fuzzy modelling)
- spatial data mining and knowledge discovery
- visual data mining and analysis.

With the working group we plan to organise a series of workshops and seminars and to publish research findings in various formats: proceedings, special issues, and books. The first ICA Workshop on Geospatial Analysis and Modeling (www.hig.se/~bjg/ica/workshop/) was successfully held in Vienna, Austria in July 2006 as a pre-conference workshop associated with the conference GICON 2006. The workshop attracted about thirty participants, half of them speakers whose presentations were organised into six sessions including temporal modelling, agent-based modelling, spatial-data mining way-finding, and spatial network modelling. We are



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currently guest-editing a special issue of the international journal *Computers, Environment and Urban Systems* by selecting a set of the best papers following a peer-review process.

If you are a researcher working on one of the above topics and are interested in the working-group activities, please feel free to contact us via the working-group website at www.hig.se/~bjg/ica/.

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