EuroSDR

Annual Report 2008

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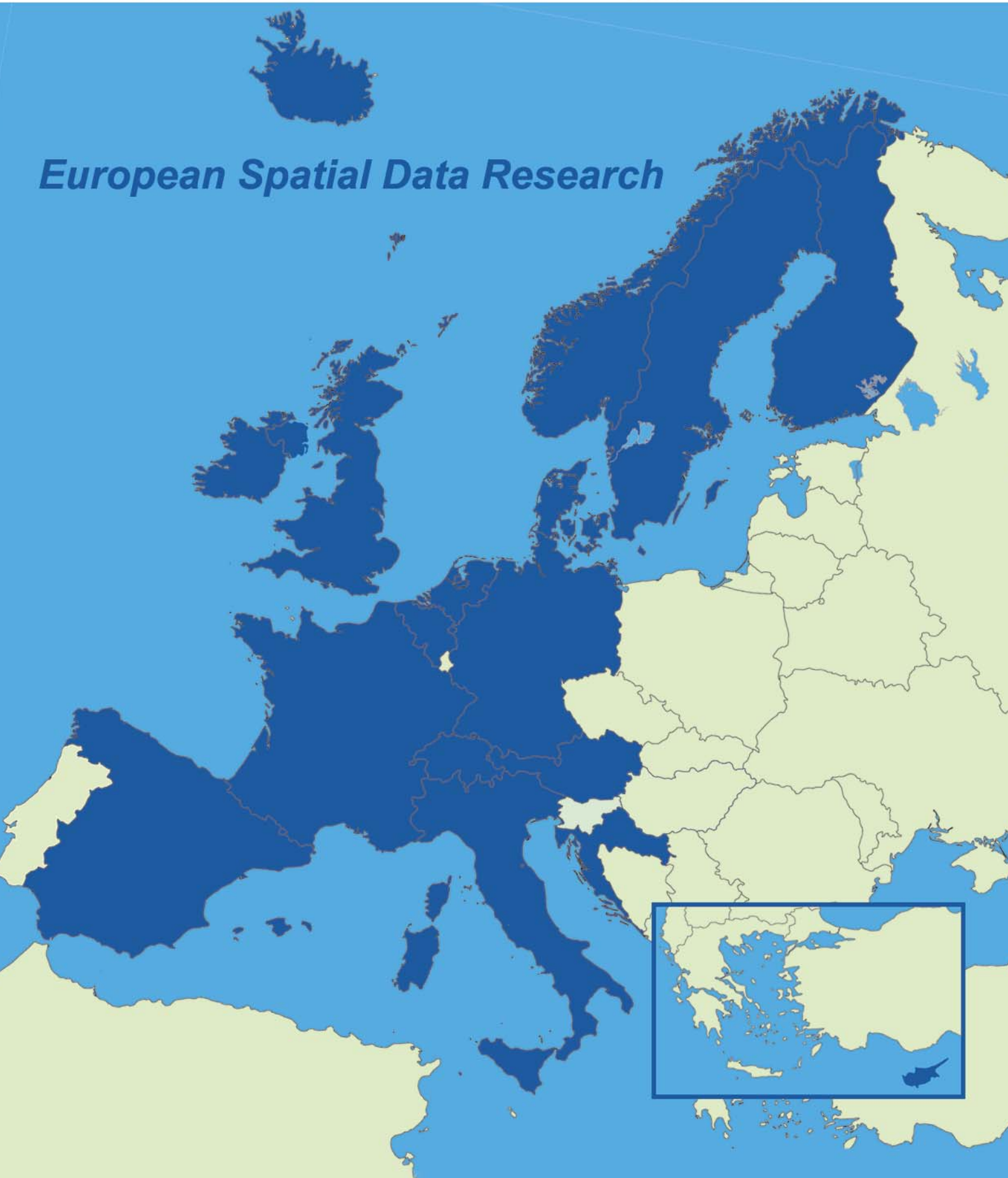

About EuroSDR

EuroSDR is a pan-European organisation established by International Treaty, as OEEPE, in 1953 in Paris in accordance with a recommendation passed by the Council of the Organisation for European Economic Co-operation. The spatial data research interests of European countries are represented through the membership in EuroSDR of national organisations from their production and research sectors.

The result is a network of delegates, from European Geographic Information organisations and research institutes, effectively and practically addressing Europe's spatial data research requirements.

Collaborative research projects address the acquisition, management and delivery of spatial data and services while international workshops and courses, in collaboration with related organisations, address key issues in a timely and focussed manner.

Our Member States and their Prime Delegates (2008)

Austria	Michael Franzen	Bundesamt für Eich- und Vermessungswesen (BEV)
Belgium	Ingrid Vanden Berghe	Nationaal Geografisch Instituut - Institut Géographique National
Croatia	Željko Hećimović	Hrvatski Geodetski Institut
Cyprus	Christos Zenonos	Department of Lands and Surveys
Denmark	Joachim Höhle	Aalborg Universitet
Finland	Risto Kuittinen	Geodeettinen Laitos
France	Jean-Philippe Lagrange	Institut Géographique National
Germany	Dietmar Grünreich	Bundesamt für Kartographie und Geodäsie
Iceland	Magnús Guðmundsson	Landmælingar Íslands
Ireland	Colin Bray	Ordnance Survey Ireland
Italy	Carlo Cannafoglia	Ministero del l'Economia e Finanze
Norway	Jon Arne Trollvik	Statens Kartverk
Spain	Antonio Arozarena	Instituto Geografico Nacional
Sweden	Anders Olsson	Lantmäteriet
Switzerland	Francois Golay	Ecole polytechnique fédérale de Lausanne (EPFL)
The Netherlands	Jantien Stoter	ITC, Enschede
United Kingdom	Malcolm Havercroft	Ordnance Survey of Great Britain

Our Vision is to be **the European research platform** for National Mapping and Cadastral Agencies, Academic Institutes, the Private Sector, Industry and User Groups on issues related to the implementation of technology developments with respect to optimising the provision (collection, processing, storage, maintenance, visualisation, dissemination and use) of reference information (data serving as a spatial framework for organisations involved in monitoring, management and development) in a Geoinformation Infrastructure (GI) context.

Contents

Further information on all articles in this report can be requested from the EuroSDR Secretariat at admin@eurosdr.net

Message from the President

Antonio Arozarena Villar

In my new role as President of EuroSDR, I would like to thank the representatives of the member states together with the previous President, Mr Stig Jönsson and the Executive Team, for their cooperation and support in this new mission.

In 2008 we adopted a new EuroSDR logo in keeping with our vision of excellence in European cooperation. A further significant development was the signing of a Memorandum of Understanding between EuroSDR and EuroGeographics aimed at closer collaboration between both organisations. Further details of the Memorandum are included in this publication.

The ISPRS Congress in Beijing provided an opportunity for ISPRS and EuroSDR to meet with a view to developing future shared activities, reporting and cooperation. This meeting included both Presidents and Executive Teams, as well as most of the Chairmen of Scientific Commissions. I am totally convinced that this new era of cooperation with ISPRS will develop more effectively our EuroSDR mission in the areas of observation and spatial information.

Future activities, to be conducted within GMES, will represent a major challenge and opportunity, where research and development related to national needs for harmonization and integration of different territorial databases, will have consequences that will provide greater cohesion among European States.

In this regard, the new constellation of satellites for observation and surveillance for the territory, sea and atmosphere, which will be launched by ESA and the rest of the different national initiatives in Europe together with other international programs, lead to a new era of information. Therefore, we could emphasize the aspects related to the spatial resolution and frequency, allowing us to obtain more accuracy in the prediction and assessment issues and in general more knowledge of the territory.

Since the adoption of the INSPIRE directive last year, the interoperability of processes (harmonization of information, integration, quality control, production processes, etc.) has become one of the most important areas for us. EuroSDR, in this regard, should have an important and decisive role, in close liaison with other organizations, in order to give the European Community a real answer, as well as a powerful impetus for the resolution of the most important issues in this area.


Antonio Arozarena Villar
President
EuroSDR

The integration of public and private sectors in all the different activities of our lives is not only desirable but necessary. Regarding this, EuroSDR has been a model to follow, due to our close relationships across all sectors. As a consequence, this allows us to lead research and development projects in a collaborative manner, and to face large-scale initiatives in the field of spatial information, which will satisfy the expectations placed on the National Mapping and Cadastral Agencies (NMCAs).

Similarly, we must also analyse and review ways to increase profits for the NMCAs and for society, such as:

- Increase efficiency in the processes of diffusion and dissemination.
- Establish a clear and direct relationship with programs and projects for research and development in all member states.
- Promote a global view of our activities and merging into global agendas, such as GEO/GEOSS, UN/Sustainable Development, Global Dialogue (Technical), and so on.

Finally, I would like to recall two important developments within our organization in 2008. Firstly, I would like to express on behalf of EuroSDR our welcome to Iceland as a new member, wishing them a very successful and fruitful stay with us. Secondly, we regret that from now on we will have lost two close collaborators within EuroSDR due to the retirement of our colleagues Prof. Joachim Höhle of Denmark and Prof. Günter Nagel of Germany. I would like to thank them very much for their contribution, mainly for their excellent work, cooperation and friendship.

In my opinion the next era for EuroSDR will be characterized by a significant period of collaboration between different institutions and the organizations of all member states, which will enable us to find new working relationships and especially better results for everyone.

I hope that this edition of the Annual Report encourages and helps to promote the development and integration of our community and in particular participating member countries.

Message from the Vice-President

Christian Heipke

2008 started off with two interesting workshops: **EuroCOW** (the International Calibration and Orientation Workshop) was held in Barcelona and attracted a large number of participants discussing the performance of digital airborne cameras and the like. **Geosensor Networks** was the topic of a Workshop held in Hannover in February in conjunction with ISPRS. This innovative topic with presentations from many different disciplines generated many lively discussions providing much food for thought to all attendees.

During our two annual meetings in Oslo and Cardiff we continued to develop our research goals set out by the rolling research plan. The projects *New Platforms* and *Detection of unregistered buildings for updating 2D building databases* were finalised during 2008 and will be published in the official EuroSDR series very soon. Thanks to the project leaders **Jurgen Everaerts** from VITO, Belgium and **Nicolas Champion** from IGN-France and all participants. Both projects generated relevant new knowledge and were thus very successful. Projects started during the last twelve months include an *INSPIRE atlas of implementation methods, Radiometric aspects of digital imagery, Road environment mapping using vehicle-based laser scanning, Registration Quality: Towards integration of photogrammetry and laser scanning and imagery*. They provide clear evidence of the novel ideas discussed in EuroSDR cycles.

Our series of keynote presentations during the annual meetings continues to attract major speakers of the profession. In May we had **Simon Kay** from JRC in Ispra with us to discuss the use of geoinformation for the common agricultural policy of the European Union. For a considerable number of years JRC has been running a programme to provide aid to farmers in the EU and to check on their claims for support. This work is of course based on geoinformation, and on remote sensing in particular. The presentation convincingly demonstrated the high level of operational activity and interoperability obtained at JRC in this area, which is of course one of the larger and more influential ones in Europe. Another topic of the highest relevance was treated by **Alain De Taeye**, the founder of Tele Atlas during our meeting in October. He spoke about the current status and future of car navigation, mentioning up-to-date information as the key aspect for tomorrow's success. The way forward, he explained, and indeed the only possibility to obtain daily revision will be through integrating the tracks recorded and provided by drivers to their neighbours on the road. Both talks were extremely interesting and very well received; they were followed by breakout sessions on the same topic, thus linking the two new items on the meeting agenda.

I would like to once again thank everybody involved in EuroSDR research activities. The active participants, the project leaders, the organisers of workshops and my colleagues in the Executive Team have all contributed to the common success. Without such voluntary work an organisation like EuroSDR could not exist. In particular, I would like to thank **Keith Murray**, who stood down as Chairman of Commission 4 during 2008 after various terms in office, interrupted by the EuroSDR presidency 2004-06. Besides his many initiatives in Commission 4, Keith has also been our key figure in the connection to INSPIRE and on European Spatial Data Infrastructures. I am sure that Keith, who has also contributed to the autumn 2008 EuroSDR meeting in Cardiff, will keep in contact with EuroSDR and will continue providing advice to the organisation. Keith's place has been taken by **Ulf Sandgren** from Lantmäteriet in Gävle, Sweden. Welcome, Ulf, to the organisation, and welcome also to **Magnús Guðundsson**, the prime delegate from Iceland. **Iceland** is the youngest member of our organisation and joined in 2008.

For 2009 we look forward to another interesting year. In February, EuroSDR will be present at the Map World Forum in Hyderabad, India. Apart from this, new projects are being initiated, a number of workshops will be organised and, of course, EuroSDR will have its two annual meetings, in France in May and in Finland in October. 2009 will also mark the end of my term in office. Thus this will be the last annual message I have the privilege to write. Let me just say that I feel glad and honoured to have had the opportunity to serve EuroSDR in the capacity of vice-president, and that I have enjoyed every minute of working for the organisation.

We are all looking forward to an interesting year, and I hope all our readers join us in turning our challenges once again into success stories.

Sensors, Primary Data Acquisition and Georeferencing *Michael Cramer*

Detailed analysis of the accuracy performance of the new digital airborne sensors and their later validation and certification is an ongoing topic of major concern in the photogrammetric community.

EuroSDR Commission 1 activities in 2008 have focussed on the thorough analysis of such digital imaging systems. Since geometric performance was previously analysed in the framework of the EuroSDR Digital Camera Calibration network, the main focus is now on the new medium format sensors and radiometric performance testing. These technology driven projects are aligned with the certification activities towards future methods and a process for independent and reproducible quality assurance and system validation.

Digital airborne data acquisition in operational production environments seems to have become more and more established. Some national mapping agencies have already decided to exclusively use digital airborne sensors. Still the current systems are continuously modified. This for example can be seen from the development from Leica Geosystems ADS40 to ADS40 second generation and now to the new ADS80 or the Vexcel Imaging Ultracam starting as Ultracam-D then Ultracam-X and now Ultracam-Xp. These system enhancements include both refinements in systems hardware and sensor related processing software. Additionally new sensor systems such as medium format based multi-head configurations which, in terms of terrain coverage per image and swath width, are already comparable to the so-called large format systems like DMC and Ultracam. Furthermore, less standard sensor geometries like (multi) oblique view cameras or panoramic systems are available, some of them using unconventional platforms for imaging. It has to be seen, if this last group of systems will also play a role in mapping applications.

Medium Format Digital Cameras Medium format cameras seem to have become of relevance for mapping applications. Thus, a project on **Medium Format Digital Cameras**, led by Dr. Görres Grenzdörffer, Rostock University, Germany, continued in 2008 when the report of the first project phase was delivered. It included principal information on today's medium format technology, with categorizations and comparison with large format systems. Some of the current system examples were presented. [Grenzdorffer 2008] Compared to large format cameras the digital sensors of medium format cameras have undergone a strong and steady increase in resolution, see Figure 1 (only single camera heads considered for medium format here).

New technologies will increase the number of pixels even further, in addition to the design of multiple camera set-ups.

Within the more empirically oriented second phase of this project the performance of representative medium format systems is being analysed from laboratory investigations and empirical test flights.

Radiometric Aspects of Digital Photogrammetric Images With the advent of the digital airborne cameras the simultaneous acquisition of panchromatic and multi-spectral image information has become standard in operational environments. Based on the extended radiometric capabilities remote sensing applications are of increasing interest even for airborne sensors. In order to analyse the radiometric performance of new digital sensors a new project was initiated in 2008 under joint leadership of Dr. Eija Honkavaara and Lauri Markelin from the Finnish Geodetic Institute (FGI), Finland and Dr. Roman Arbiol from the Institut Cartographic de Catalunya (ICC), Spain. This project focuses on:

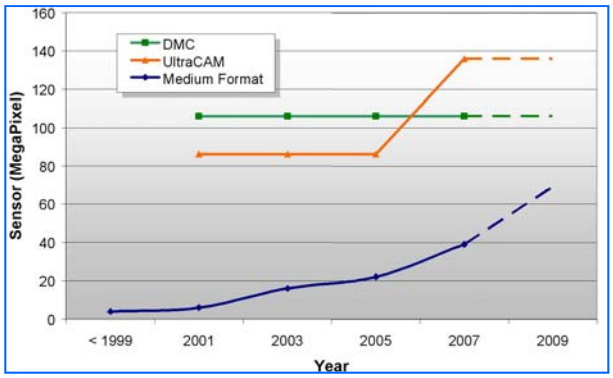

Figure 1. Development of footprints of large format cameras and medium format cameras

- knowledge improvement on radiometric aspects of digital photogrammetric cameras,
- review of existing methods and procedures for radiometric image processing,
- comparison and sharing of operative solutions through a comparison of these techniques on a same test data set,
- analysis of the benefit of radiometric calibration and correction in different applications (classification, quantitative remote sensing, change detection etc.).

(Continued on page 7)

(Continued from page 6)

– Within the first phase a report will be compiled to present the methods themselves. This is based on literature research and a questionnaire to sensor manufacturers, image providers, and image users. In the second phase the performance of sensor systems from empirical flights will be analysed. State-

Figure 2. New geometrical resolution and reflectance reference targets in the FGI Sjökulla airborne sensor systems test site

of-the-art, radiometrically-controlled image materials for the empirical part of the project have already been collected. Specially designed reference targets, as shown in Figure 2, are necessary to provide control to sensor's radiometry.

National mapping agencies, camera manufacturers, software developers, mapping companies and research organisations are all welcome to participate. Please see http://www.fgi.fi/EuroSDR/ for project details and progress.

European Digital Airborne Camera Certification – EuroDAC² Certification of new digital camera systems is a hot issue worldwide today. This is driven by the increased use of such systems for operational projects including mapping applications for national mapping agencies. Simultaneously, standards on digital airborne imaging systems are being developed and in some cases already presented to the public. Still the final processes to validate and certify the different digital sensor systems, each with individual system layout, in a most efficient and objective way are not yet defined. In close co-operation with the USGS quality assurance plan the EuroDAC² initiative has proceeded on the development of such certification strategies. This includes the definition of processes and also recommendations of test site layouts for empirical test flights. Please follow the status and most recent steps from http://www.ifp.uni-stuttgart.de/eurosdr/index.html. Any expert interested in any of the ongoing Commission I projects is cordially invited to participate!

Grenzdörffer, G. (2008): Medium format digital cameras - a EuroSDR project, International Archives of Photogrammetry and Remote Sensing IAPRS 27(B1), pp. 1043-1050, Pro-ceedings 21. ISPRS Congress, Beijing 2008.

EduServ6 - *Kevin Mooney*

EduServ6, the sixth round of the annual EuroSDR short distance elearning courses, began in March 2008 with a two-day seminar, hosted by The University of Applied Sciences in Stuttgart under the direction of Prof. Dr. Eberhard Gülch. The four courses then ran consecutively between March and June 2008. The courses offered were:

– **Geometric performance of digital airborne cameras** (March 10 – March 20) Hosted by University Stuttgart with course leaders Dr. Michael Cramer and Mr. Dirk Stallmann
– **Laserscanning for 3D City Models** (March 31 – April 11) Hosted by the Finnish Geodetic Institute with course leader Prof. Dr. Juha Hyyppä
– **Mapping from SAR** (April 14 – April 25) Hosted by TU Berlin with course leader Prof. Dr. Olaf Hellwich
– **CityGML** (May 19 – May 30) Co-hosted by Technical University Berlin and University of Gävle with course leaders Prof. Dr. Thomas Kölbe and Prof. Dr. Anders Östman

Forty students from seventeen countries attended the pre-course two-day seminar from 6th to 7th March in Stuttgart, where they received course material and background in the topic necessary to commence the courses. The picture shows students listening to a pre-course seminar presentation.

Image Analysis and Information Extraction

Juha Hyyppä

A number of projects continued in 2008 within Commission 2

The project **Detection of Unregistered Buildings for Updating Databases**, chaired by Nicolas Champion, IGN, France, initiated at the end of 2005, was completed in 2008 and the final report is under review and will be published in early 2009. The aim of this EuroSDR project was to verify the feasibility of detecting building changes in a 2D database. Significant efforts in National Mapping and Cadastral Agencies (NMCAs) are now devoted to the update of such

Evaluation of change detection in Lyngby test site.

databases. Since the updating is generally carried out manually, the updating process is time-consuming and expensive and thus development of semiautomatic systems is of high interest. In the project, four change detection methods were tested and compared with three different data sets incorporating aerial, satellite and LiDAR data. Digital Surface Models and orthophotos were generated from aerial and satellite data. The results obtained showed high potential for high resolution aerial images in the change detection process but the number of false alarms generated by all the methods was and is still too high. With satellite data, the completeness was lower than that of aerial images and the obtained correctness rate was definitely too small to consider an operational solution based on satellite imagery. The LiDAR data proved to be the most promising data sources, even though original point data was not applied in the project. One of the most interesting outcomes of the project concerns the analysis of the failures and achievements of the methods; the project clearly shows that all the methods succeeded and failed at the same locations, which implies that the impact of quality of the input data is more crucial to the change detection process than the applied method.

Juha Hyyppä
Chairman
Commission 2

The project **Radiometric Calibration of ALS Intensity**, chaired by Juha Hyyppä and Sanna Kaasalainen, FGI, and Wolfgang Wagner, TU Wien, continued in 2008. The objective of the project is to develop a feasible, cost-effective technique for NMCAs and value-adding companies to carry out intensity or backscatter cross-section calibration and to evaluate together the proposed approach.

The sub-objectives include:

- development of a practical calibration method,
- practical tests of FGI and TU Wien on ALS calibration and
- tests of NMCAs and value-adding companies on the proposed approach.

Calibration permits precise measurements and may allow accurate measurements. Precision relates to the relative calibration of the measurement while accuracy relates to the absolute calibration. If the calibration permits repeatable measurements, the system has good relative calibration. If the measurements not only are repeatable but also are absolute, they are said to be accurate. Relative calibration of ALS intensity means that measurements from different altitudes, incidence angles and dates are comparable for the same system. The methods for relative calibration reducing the effect of physical measurement parameters on the obtained intensity have already been demonstrated in the project.

Absolute calibration of ALS intensity means that the obtained corrected value of intensity describes the target properties and corresponding values obtained from various sensors are directly comparable. In Wagner et al. (2006, 2008) the absolute calibration of full-waveform ALS is depicted. In Kaasalainen et al. (2005, 2008) it was shown that artificial tarps as well as gravel can be successfully applied in absolute calibration. The problems with absolute calibration are the extra costs. Experimental work has been carried out to find practical sources (e.g. natural targets, such as gravels) for absolute calibration. The effect of the moisture in gravels on recorded ALS intensity has been studied. A test for calibrating the national Digital Elevation Model is currently planned.

Since the backscattering characteristics of LiDAR measurements may be characterized using different physical quantities (for example, BRDF, biconical

(Continued on page 9)

(Continued from page 8)

reflectance, diffuse reflectance, cross section, backscatter coefficient) it is important to agree on standards and to be clear on how the calibration was performed. The lack of standardization of reflectance terminology and products has become a considerable source of error. In the case of small-footprint airborne laser scanning, the cross-section σ [m^2] and the backscattering coefficient γ [m^2m^{-2}], which is defined as the cross-section normalized with the cross-sectional area of the incoming beam, could be the preferred quantities for describing the scattering properties. Further work is needed in this kind of standardization.

The final project report (scheduled for late 2009) will include written recommendations as to how the intensity information could be further calibrated.

An example of relatively calibrated intensity image of

Road Environment Mapping Using Vehicle-based Laser Scanning (VLS) This project continued in 2008 under the joint chair of Juha Hyyppä, FGI and Hannu Hyyppä, TKK, Finland. It aims at promoting and collecting algorithms and applications of using vehicle-based laser scanning and imaging. In 2009, data will be distributed to open algorithm and application development for academic bodies. The quality and accuracy of 3D models derived using vehicle-based laser scanning will be analysed, and a comparison made of quality delivered by the partners. The aim is to provide NMCAs with the basic knowledge of vehicle-based laser scanning and its possibilities and to write a book on state-of-the-art on VLS. The project has eight partners.

The final project of Commission 2, **Registration quality – towards integration of laser scanning and photogrammetry** is chaired by Petri Rönnholm, TKK. It aims to evaluate the quality, accuracy, and feasibility of automatic, semi-automatic or manual registration methods for finding relative orientation between aerial images and laser scanning data. The sub-objectives are: to determine the kinds of registration methods available or under development; by how much the registration methods differ in performance and accuracy; and by how much the image resolution and laser scanning data density affect the registration accuracy and to see if it is possible to make robust relative orientation of laser data and images in urban areas without using ground information. Currently, the project team is gathering potential participants and acquiring and preparing data for the project. An area from Espoonlahti (Finland) has been selected as the test site. Eleven universities or companies have expressed their interest towards this project from Germany, Sweden, Finland, Austria, Spain, France, Iran, and Canada.

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Wagner, W., Ullrich, A., Ducic, V., Melzer, T., and Studnicka, N., 2006. Gaussian decomposition and calibration of a novel small-footprint full-waveform digitizing airborne laser scanner. ISPRS Journal of Photogrammetry & Remote Sensing 60:100-112.

Wagner, W., Hyyppä, J., Ullrich, A., Lehner, H., Briese, C. and Kaasalainen, S. 2008. Radiometric Calibration of Full-Waveform Small-Footprint Airborne Laser Scanners. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Vol. XXXVII (B1), Beijing 2008, 163-168.

Point cloud obtained with FGI-built ROAMER system.

Kaasalainen, S., Ahokas, E., Hyyppä, J. and Suomalainen, J. 2005. Study of surface brightness from backscattered laser intensity: calibration of laser data. / IEEE Geoscience and Remote Sensing. Letters, /*2* (3):255-259.

Kaasalainen S., Hyyppä H., Kukko A., Litkey P., Ahokas E., Hyyppä J., Lehner H., Jaakkola A., Suomalainen J., Akujärvi A., Kaasalainen M. and Pyysalo, U. 2008 Radiometric calibration of LIDAR intensity with commercially available reference targets. IEEE Transactions on Geoscience and Remote Sensing, in press.

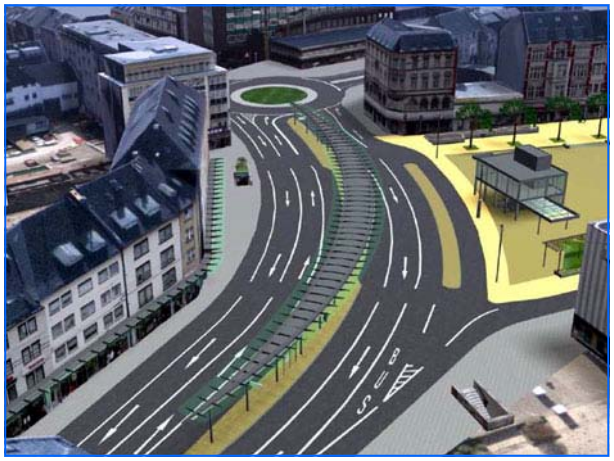
Production Systems and Processes

André Streilein

In 2008 practical progress for production systems in the field of digital photogrammetry was less in the classical fields of production, but more in the usability and versatility of the data derived from such systems. Standardization and the enrichment of data, in order to support private companies and governmental organisations in the production and maintenance of core spatial databases, have been the key issues.

The **CityGML project** (project leader: Dr. Thomas Kolbe, Technical University Berlin, Germany) was finished and published within *EuroSDR Publication No. 54* . The **CityGML standard for city models** has gained world-wide attraction and was accepted by OGC as a new standard in August 2008. This project was introduced at the EduServ6 distance learning course in spring 2008. The EduServ6 CityGML course won the 1st prize of the CATCON contest on electronic teaching held at the ISPRS congress in Beijing, China.

The project on **Semantic Enrichment of 3D City Models for Sustainable Urban Development** (project leader: Claudine Metral, University of Geneva, Switzerland) focusses on the support and enhancement of the decision-making processes of cities in a sustainable perspective. Integration of urban



knowledge, 3D modelling, visualizations and simulations should happen in a way, so that urban decision makers and stakeholders will get a better understanding of the context and of the impact of their decisions.

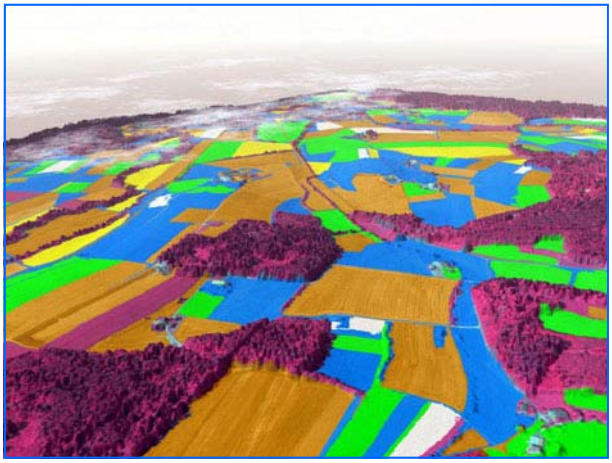
André Streilein
Chairman
Commission 3

This project was approved as the **new COST Action TU0801**. Currently there are fourteen member countries participating in the action. After a first meeting of the Management Committee a first workshop is planned from 27th to 29th April 2009 in Berlin.

The project on **Virtual Globes** (project leaders Prof. Dr. Stephan Nebiker, Basel, Switzerland and Prof. Dr. Eberhard Gülch, Stuttgart, Germany) deals with chances, challenges and opportunities of virtual globes and an evaluation of impacts on the geospatial industry. Within the framework of phase 1 a questionnaire was sent out to the EuroSDR members. The response indicated that there is a strong interest from the NMCAs in that topic and that the establishment of national 3D geodata portals is currently discussed within the member countries.

A new project on the **Retrieval of vegetation parameters from digital aerial sensors** was proposed in 2008. Digital aerial cameras have the potential for high spatial, temporal and spectral resolution image acquisition. Hence digital aerial sensors are, in principle, suitable for remote sensing classification methods and techniques. Potential applications are detailed and accurate monitoring of crop types (agricultural subsidies), operational retrieval of vegetation parameters, detection of areas with crop stress within fields, conclusions about local soil quality and its change, information retrieval for the application of fertilizers and pesticides or harvest prediction (flight date critical). This has to be investigated with a wider scope and diversity of aerial sensors.

A number of interesting activities are planned for 2009, namely; 3D National Landscape Models; Best



practice in aerial triangulation and production of orthophotos from old/ancient photographs; and Use of Web2.0 Communities for updating national databases.

Data Specifications

Ulf Sandgren

"*If the Lord Almighty had consulted me before embarking on Creation I would have recommended something simpler*" (Alphonso X, 1221-1284)

Alphonso X was a Castilian monarch who ruled as the King of Castile, León and Galicia from 1252 until his death. He established Castilian as a language of higher learning, founded universities (Salamanca and Toledo) and earned his nicknames "el Sabio" (the Wise or the Learned) and "el Astrólogo" (the Astronomer) through his own prolific writings.

Judging by the quotation above, it also seems likely that he could have been involved in geodata modelling and development of data specifications. Over the years it has always been a big challenge for cartographers – and later also specialists in geodata – to make a model of the real and complex world that can be used as a basis for many different purposes. This is the area of activity of EuroSDR's Commission 4 and 2008 saw activity on a number of fronts.

INSPIRE

A comprehensive effort to develop generic specifications supporting interoperability between countries and between different application areas has been carried out during 2008 within the INSPIRE Drafting Teams (DT) on Data Specifications and the Thematic Working Groups (TWG) set up to develop draft Implementing Rules for the data themes being included in Annex I of the Directive. Several EuroSDR members have been deeply involved in this work. I have myself been a member of the TWG on Transport networks and the work has been led by my predecessor as chairman of this Commission, Keith Murray.

EuroSDR and SDI

A task force, which was set up in 2007, with the aim to recommend the actions that EuroSDR should take to further develop its role in facilitating the development of INSPIRE and the European SDI finalised its report in April 2008. The report gives a good overview of global and European SDI activities and clarifies the role of EuroSDR.

Generalisation

Jantien Stoter of ITC continued to lead an investigation and comparison of applications and methods that support generalisation of geodata. During the autumn the mapping agencies undertook a structured assessment of the outputs.

Production Partnership Management

Proceedings of a workshop, which was held in November 2007, on Production Partnership Management were published in July 2008 (*EuroSDR Official Publication No. 54*). An important outcome of the workshop was a discussion paper on how to develop efficient processes for partnership within handling of spatial information. This paper has now been used as the basis for an ISO standardisation initiative, coordinated by Antti Jakobsson from EuroGeographics head office.

Land and Marine Integration

An International Workshop on Land and Marine Information Integration was held in March 2007 (proceedings have been published in *EuroSDR Publication No. 52*). The workshop gave important knowledge about how to create better interoperability between land and marine spatial information. It had also been intended to set up a project (within eContentplus) to further develop this integration. For some time it seemed, however, that engagement with the hydrographic organisations was slow to bring the work forward, but during the autumn discussions have shown a much greater interest in working with these questions.

Multiple Representation

A project proposal on Multiple Information Representation and Consistent Logical Environment (MIRACLE) was set up for FP7 during 2008. The proposal achieved the minimum threshold scores described in the Rules for submission of proposals, and the related evaluation, selection and award procedures and the work programme. Unfortunately, the proposal was ranked too low on the priority list to allow it to be funded within the limits of the budgetary resources available. However, as the project should bring important knowledge to a problem which is more and more recognised, preparations for a new project proposal have been initiated.

Communication

Members of the Commission have been involved in a great number of conferences, seminars and workshops where issues within the work programme of the Commission have been presented and discussed. The Commission also contributed to a workshop "From National Mapping to Spatial Data Infrastructure" at the ISPRS Congress in Beijing.


Ulf Sandgren
Chairman
Commission 4

Network Services

Mike Jackson

Commission 5 activity in 2008 has remained focussed on developing a research platform and persistent test-bed capability for geospatial interoperability research, education and demonstration. This is a continuation of the initiative it launched jointly with AGILE and OGC in June 2007 and which has become known as the "PTB". The PTB activity is managed by a representative of each of the three organisations. During 2008 the representatives were (i) Prof. Mike Jackson (Centre for Geospatial Science, University of Nottingham, UK) for Commission 5, EuroSDR, (ii) Professor Michael Gould, (Centro de Visualización Interactiva, Universitat Jaume I, Spain) for AGILE and (iii) Chris Higgins, (EDINA, University of Edinburgh, UK) for OGC. In addition, and vitally for the Use Case developments described below, Dr Gobe Hobona, from the Centre for Geospatial Science (CGS), University of Nottingham acted as the PTB Project Manager.

The focus on a standards-based persistent test-bed and software platform for research, teaching and demonstration is relevant to the European SDI as defined by INSPIRE as well as other European and international programmes such as GMES and GEOSS. As a standards-based platform adopting a service-oriented and web-services based architecture it offers a potentially powerful basis for research group collaboration and by encouraging harmonisation and sharing of data and services it can aid both innovation and productivity in research and efficiency in the knowledge transfer process.

At a meeting in December 2007 in Stresa, Italy, (in conjunction with the OGC Technical Meeting) it was agreed that the first phase of the test-bed should be progressed through the development of a small number of discrete Use Case implementations. The services developed in these Use Cases would be published and made remotely accessible to participating members. Once these test-beds were successfully implemented and the concept of interoperability between member laboratories was demonstrated the next goal would be to start to link these with further Use Cases (i) to facilitate collaboration across organisations on SDI / INSPIRE related research challenges and (ii) to demonstrate increasingly rich application scenarios through the chaining of services from the first phase Use Cases. These Use Cases would also be developed to provide exemplars for teaching of students.

Mike Jackson
Chairman
Commission 5

Following the Stresa Meeting development, the following Use Cases were agreed:

– **UC08-001**: **"Unified portrayal of geospatial cross-border information"** by the Universität der Bundeswehr München and EDINA, University of Edinburgh. Contact Person: Chris Higgins chris.higgins@ed.ac.uk
– **UC08-002**: **"Discovery and Invocation of Schematization Services"** by the Centre for Geospatial Science (CGS), University of Nottingham and the International Institute for Geo-Information Science and Earth Observation (ITC). Contact Person: Dr Jerry Swan jerry.swan@nottingham.ac.uk
– **UC08-003: "Fog Monitoring and Information Service"** by Newcastle University and Universität Rostock. Contact Person: Dr Edward Nash edward.nash@uni-rostock.de
– **UC08-004: "Semantic Web Service Discovery and Execution"** by the University of Münster. Contact Person: Mohamed Bishr m.bishr@uni-muenster.de

A Wiki was established for publishing of the Use Cases and for general communication.

Development of these Use Cases took place through 2008. The results of the University of Nottingham and ITC test-bed were described in the November 2008 GEOconnexion International Magazine and a discussion of all four use cases in the context of other test-bed activity will be presented at the AGILE 2009 Conference in Hannover in June. In addition, a joint EuroSDR Commissions 4 and 5 and AGILE Workshop is to be held on 2nd June 2009 preceding the main AGILE 2009 conference at which the results of the PTB Use Cases will be further discussed together with subsequent progress and next steps.

A key objective in 2008 has been to achieve the goal of integrating the PTB activity more closely with European national and EU programmes and especially INSPIRE. Linked to this objective is the need to secure adequate financial under-pinning for the PTB initiative to support project-management and coordination of the current Use Cases and to allow future sustainable development. A significant development in the context of these objectives is the establishment of cross-linkages with two major new EU funded projects: -

(i) In July 2008, an EU FP7 Coordination and Support Action project "GEOSS, INSPIRE and GMES, an Action in Support" or GIGAS for short, commenced led by the Fraunhofer Institute for Computer Graphics at Darmstadt. GIGAS promotes the coherent and interoperable development of the GMES, INSPIRE and GEOSS initiatives through their concerted adoption of standards, protocols and open architectures. At a December 2008 PTB Management Meeting in Valencia, Professor Lars Bernard, University of Dresden, took on responsibility as the AGILE PTB representative. Professor Bernard/University of Dresden is also a partner in GIGAS which will investigate the role and con-

(Continued on page 13)

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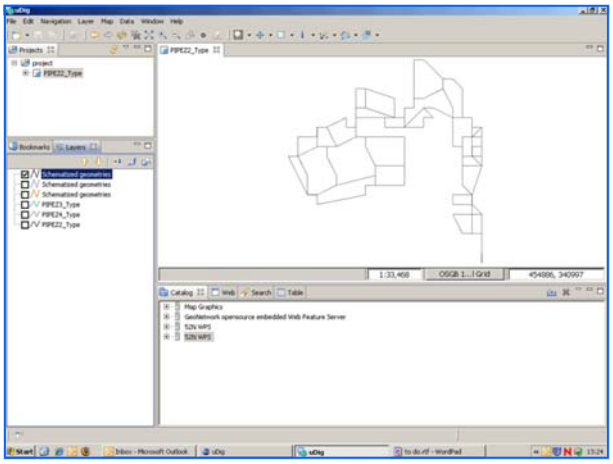
tribution of test-beds in aiding the harmonisation of INSPIRE, GMES and GEOSS. In a further strengthening of these links Johannes Brauner, University of Dresden, took on the PTB Project Management responsibility as of December 2008.

(ii) 2008 also saw the commencement of the EuroGeographics led European Spatial Data Infrastructure Network (ESDIN) EU eContentplus project. ESDIN aims to provide a bridge between the theory and the practice of the INSPIRE Directive towards implementation and usage of interoperable geographical data by "Spatially enabled Societies". EDINA is a member of the ESDIN consortium and through Chris Higgins and



Example from the Nottingham/ITC PTB Schematisation Use Case

the OGC University Working Group, the potential role of the PTB to assist the ESDIN objectives will be examined in the coming months.

2009, like 2008, looks set to be a busy year for Commission 5 (i) with the potential for increased engagement with major European projects and (ii) through joint initiatives with Commission 4, starting with the Workshop in Hannover in June. The Commission 5 programme is ambitious and will require continued cross-organisational support to succeed and still requires longer-term financing to ensure sustainability of the PTB initiative but the potential benefits to both the European research community and to long-term European SDI development justify the current Commission 5 focus. Ultimately, success in achieving the PTB objectives relies on the support and engagement of the member individuals and organisations. For those interested in participating in the Commission 5 programme please contact the Commission Chairman, Mike Jackson at mike.jackson@nottingham.ac.uk or, specifically to participate in the PTB test-bed activities, johannes.brauner@tu-dresden.de .

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Award for CityGML elearning course

Robert Kaden, a member of the Institute of Geodesy and Geoinformation Science (IGG), Technische Universität Berlin, was awarded the gold prize at the Computer Assisted Teaching CONtest (CATCON 5) competition during the ISPRS congress in Beijing in July 2008. The award was in recognition of his outstanding achievement in the development of a multi media elearning platform on CityGML.

In order to satisfy the demand for learning material on CityGML (a common information model for the representation of 3D urban objects), EuroSDR had organised the online elearning course on CityGML as part of its EduServ6 (April to June 2008) and EduServ7 (to take place from May 2009) series of short distance elearning courses. The course is offered cooperatively, by the Technische Universität Berlin, Germany and the University of Gävle, Sweden.

Our photo shows Robert Kaden (left) and Gerhard König (right) from the Institute for Geodesy and Geoinformation Science, Technische Universität Berlin following the award ceremony. Congratulations to all involved.

Memorandum of Understanding with EuroGeographics

EuroSDR and EuroGeographics have signed a Memorandum of Understanding aimed at enabling significant cooperation in areas of common interest to both organisations.

Our picture shows EuroSDR President, Stig Jönsson, and EuroGeographics Management Board member and former President, Dietmar Grünreich, signing the agreement at the 112th EuroSDR meetings in Oslo, Norway on 16th May 2008.

Both organisations have a common understanding that research and development is a basic and integrated part of Geographic Information and Spatial Data Infrastructures.

Spatial data research and transformation of research results to producers of geo-information is of vital importance for a successful implementation of the European Spatial Data Infrastructure (INSPIRE), Global Monitoring for Environment & Security (GMES), Galileo and its applications related to geo-information as well as other European initiatives.

For several years both organisations have worked together, for example, when arranging workshops and seminars on issues of common interest. By signing this agreement, both organisations state their intention to work even closer together in order to strengthen research activities and the transfer of research results of common interest while, at the same time, avoiding unnecessary duplication of work between the organisations and their members. The cooperation also includes joint communication activities destined both for professionals and policy makers.

EuroSDR's rolling research plan defines the framework within which EuroSDR research is performed. Its main purpose is to properly structure the work in the coming years, while leaving enough flexibility to be able to react to unforeseen developments. The rolling research plan is to be seen as a common platform of EuroSDR and EuroGeographics for research activities.

EuroSDR at ISPRS Beijing

A key event for EuroSDR during 2008 was certainly the ISPRS Congress in Bejing, held in early July barely one month before the Olympic Games. Not only could the participants witness the last preparations for the games, they also received a very good update on all issues related to photogrammetry, remote sensing and geographic information.

On being asked by ISPRS, EuroSDR was pleased to host a Special two-part session, on 7th July and 10th July 2008, entitled **From national mapping to a European and Global Spatial Data Infrastructure** and comprised the following ten presentations:

From Local to European SDI: - INSPIRING the next generation of spatial information in Great Britain. Keith Murray, Head of Geographic Information Strategy, Ordnance Survey Great Britain;
IGN Belgium - Quality and INSPIRE. Eric BAYERS, Director of PhotoTopography, IGN Belgium
TLM The Swiss 3D Topographic Landscape Model. William O'Sullivan, Swiss Federal Office of Topography swisstopo;
BKG's Contributions to National and European SDIs. Dietmar Grünreich, Bundesamt für Kartographie und Geodäsie, Germany;
The Danish Way to a National Spatial Data Infrastructure. Poul Frederiksen, National Survey and Cadastre, Denmark;
Spanish National Plan for Territory Observation (PNOT). Antonio Arozarena, Instituto Geográfico Nacional (IGN), Spain;
Integrated and Value-added Geo-spatial Information Services in the National Geomatics Center of China (NGCC). JIANG Jie, National Geomatics Center of China;
VisionMap A3 - Super Wide Angle Mapping System. Michael Pechatnikov, Yaron Vilan, Yuri

(Continued on page 15)

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Raizman, VisionMap Ltd.;

HUMBOLDT Project for Data Harmonisation in the Framework of GMES and ESDI: Introduction and Early Achievements. Paolo Villa, CNR-Institute for Electromagnetic sensing of the Environment (IREA), Milan, Italy;
SDI in two diverse contexts – Aceh & Australia: Differences and Similarities. Paul Harris, CEO NGIS, Australia.

EuroSDR was also pleased to be invited to coordinate ISPRS's third User Forum of the event entitled **'On-demand geo-spatial data updating, integration and web-based geo-spatial information service'** on 9th July 2008. Four presentations were delivered in a very well attended session:

Visibility of GEOSS in Africa. Olajide Kufoniyi, Regional Centre for Training in Aerospace Surveys (RECTAS), Ile-Ife, Nigeria;
INSPIRE and GMES - Towards an integrated European Geospatial Infrastructure. Dietmar Grünreich, Bundesamt für Kartographie und Geodäsie, Frankfurt, Germany;
Making the 3D Virtual Earth. Michael Gruber, Microsoft Photogrammetry, Graz, Austria;
Production Restructuring to Suit for On-demand Geospatial Data Updating. Li, Pengde, Shaanxi Bureau of Surveying and Mapping .

Presentations (pdf) available at:
http://www.eurosdr.net/km_pub/isprs2008/index.htm

In addition to all this we were very busy at our exhibition booth in the main hall, where comprehensive material was available on all aspects of the organisation.

A highlight for EuroSDR was a very productive meeting between the EuroSDR Executive team and the ISPRS incoming Commission Presidents on 10th July 2008 with a view to considering increased and more effective collaboration between the two organisations. The following points were noted:

- EuroSDR can identify projects important to the National Mapping Agencies and collaborate with ISPRS.
- Technology transfer from research to production is one of the main aims of EuroSDR.
- ISPRS can help in finding potential international project leaders and also in identifying potential projects.

- It was agreed that there should be formal communication between the two organisations including exchange of newsletters and points of contact.
- Each organisation should consider including ISPRS/EuroSDR collaboration as an agenda item at its appropriate meetings.
- It was noted that a clash of dates could occur for EuroSDR and ISPRS meetings so it was suggested that calendars should be circulated to avoid this issue.
- The possibility of an eastern European forum targeting national mapping agencies was discussed.
- The possibility of a meeting of all regional ISPRS members on the occasion of the ISPRS centenary celebrations was considered.

It was further agreed, in the short term:

- to exchange contact information and calendars,
- that each organisation should include ISPRS/EuroSDR collaboration as an agenda item at its appropriate meetings,
- to discuss future activities at Council/Steering Committee meetings, and
- to repeat the meeting in two years, perhaps at the ISPRS Centenary meeting in Vienna in 2010.

Iceland joins EuroSDR

Landmælingar Íslands (LMI), the National Land Survey of Iceland, was formally admitted as an Ordinary Member of EuroSDR at its 112th meetings in Oslo, Norway on 16th May 2008.

LMI will be represented in EuroSDR by Magnús Guðmundsson (its Managing Director) and Eydis Lindal Finnbogadóttir.

The National Land Survey of Iceland (NLSI) was founded in 1956 and has been under the auspices of the Ministry for the Environment since 1990. The Danish authorities undertook extensive work of surveying and map making in Iceland from around 1900-1956. The US Army acquired aerial photos of the country and made maps on a 1:50 000 scale which have served as the basis for the 1:50 000 GIS database in two separate projects, first during World War II and later from 1956 to 1961.

LANDMÆLINGAR ÍSLANDS

The NLSI has a collection of over 140,000 aerial photographs dating from 1937 to 2000. Until a new Act was passed in 2006 NLSI was the main publisher of travel maps in Iceland. The work of both acquiring aerial photographs and the publishing of maps was suspended in order to facilitate competition in the market. NLSI leads, on behalf of the Ministry for the Environment, the implementation of the EU INSPIRE Directive about Spatial Information in Iceland which will become law during the first semester of 2009.

The NLSI´s main tasks are:

- to advise the Ministry for the Environment in NLSI's operational fields and as regards policy making in land surveying and official basic mapping.
- the structure and maintenance of reference materials and accessible geodetic reference systems and height reference systems for the whole of Iceland.
- to take the initiative in the making and applying of standards in a geographic information system (GIS).
- to make, maintain and disseminate GIS database on a scale of 1:50 000 and on smaller scales.
- to provide access to data which the NLSI keeps or has in archive.
- to register and disseminate information about spatial data in Iceland.
- to engage in professional cooperation with universities, institutes, businesses and international organizations in accordance with the tasks of the institute.

New Appointments 2008

Ulf Sandgren begins his first term as Chairman of Commission 4 at 112th meetings in Oslo

Antonio Arozarena Villar begins his two year term as President of EuroSDR at 112th meetings in Oslo

112th Meetings in Oslo, Norway

On the occasion of the 112th EuroSDR gathering in Oslo, Norway from 14th to 16th May 2008, a public seminar was hosted by the Norwegian Mapping and Cadastre Authority that preceded the start of the EuroSDR Science committee meetings. It provided a fascinating insight into the level of success of the Norwegian Spatial Data Infrastructure development. Topics covered included:

Research at EuroSDR Christian Heipke, Leibniz Universität Hannover. Vice-President Research, EuroSDR
SMARTRAP, Distributed GIS for use in time of emergency Kyrre Jordbakke, Chief County Surveyor, Norwegian Mapping and Cadastre Authority
Blom show you where… Nils Karbø, CTO, Blom ASA
Precise Point Positioning for Airborne Applications Narve Schipper Kjørsvik, TerraTec AS, Norway
geoPolar – "a keyhole to the northern areas" Erland Røed, Norwegian Mapping and Cadastre Authority
'Norway digital' Building a sustainable National Spatial Infrastructure using strategic Alliances as the success Criterion John Naustdal, Norwegian Mapping and Cadastre Authority
Norwegian SDI - Implementation of New Public Services empowered by Geographical Information - some Norwegian Examples Erland Røed, Norwegian Mapping and Cadastre Authority
Our role as the National Distribution Service of Land and Mapping Information in Norway Kristian Strønen, Norway Land Information ltd.

Presentations (pdf) are available at:
http://www.eurosdr.net/meetings/112/index112.htm

113th Meetings in Cardiff, Wales

A public seminar, held on Wednesday 15th October 2008 in the Parc Hotel, Cardiff, Wales, was hosted by Ordnance Survey Great Britain and preceded the start of the 113th EuroSDR Science committee meetings. It provided a fascinating insight into the rich level of activity in Geographical Information in the United Kingdom including the following topics:

EuroSDR: a pan-European network for geospatial data research Christian Heipke, Leibniz Universität Hannover. Vice-President Research, EuroSDR
Ordnance Survey: Addressing our Stakeholders Needs Vanessa Lawrence CB, Director General and Chief Executive, Ordnance Survey Great Britain
UK Spatial Data Infrastructure [UK SDI] - current developments Keith Murray, Technical Director, UKSDI Programme, Department for Environment, Food and Rural Affairs UK
GI Industry Rob Walker, 2008 Chairman AGI - Association for Geographic Information
Olympics 2012 Steve Kemsley & Kathryn Mannooch, London Metropolitan Police
Geospatial Research at UCL Jeremy Morley, Dept. Civil, Environmental & Geomatic Engineering, UCL
Vernacular Geography Chris Jones and Florian Twaroch, Cardiff University
Presentations (pdf) are available at:
http://www.eurosdr.net/meetings/113/index113.htm

Vanessa Lawrence, Director General of Ordnance Survey Great Britain and Antonio Arozarena Villar, President EuroSDR

Organisational Matters

A number of changes in personnel occurred in 2008. Stig Jönsson (Lantmäteriet, Sweden) completed a successful two-year term as President of EuroSDR and was replaced in May by Antonio Arozarena from IGN Spain. Antonio has already represented EuroSDR at ISPRS Beijing, China and at the EuroGeographics General Assembly in Sibiu, Romania. Stig has also retired as prime delegate for Sweden and been replaced by his colleague Anders Olsson. A further change involving Sweden saw Ulf Sandgren (Lantmäteriet) appointed as Chairman of Commission 4 (Data Specifications) following the completion of Keith Murray's (OSGB) two-year term. Keith has also retired as prime delegate for the United Kingdom and been replaced by Malcolm Havercroft (OSGB).

Günter Nagel of LVG, Bavaria, retired as delegate for Germany in October and will be replaced by his successor in LVG, Klement Aringer. EuroSDR President, Antonio Arozarena, and Secretary-General, Kevin Mooney, were delighted to represent EuroSDR at Günter's retirement celebrations in Munich in October.

Both delegates from Denmark also retired in 2008, namely Joachim Höhle (Aalborg University) and Nikolaj Veje (KMS), Their replacements, Lars Bodum (Aalborg University) and Thorben Brigsted Hansen (KMS) will take up their appointments at the next EuroSDR science committee meeting in May 2009.

On behalf of EuroSDR, we would like to welcome our new personnel and sincerely thank all the retirees for their significant contributions to EuroSDR over the years and wish them the very best of luck in the future.

Financial Overview 2008 *(Subject to audit)*

Income		**Expenditure**	
Membership EuroSDR	66,500	Project Seed (1)	16,108
Membership OEEPE	20,000	Executive Team	10,386
		Secretariat	59,269
		Info. & Marketing	10,619
		ISPRS 2008	10,293
		Fees & Charges	245
Totals	**€86,500**		**€106,920**
Income Deficit	**€20,420**		

Notes:
(1) Allocated as project seed funding. Projects are largely financed by contributions from members and project participants.

Over 45 Years of EuroSDR Publications

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