

## ISPRS Society



### ISPRS 2008 Beijing

*Beijing's Capital Culture*

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A saying goes in China: If you want to understand modern Chinese history, you'd better visit Shanghai; if the latest 500 years' history of China, go to Beijing; if 5000 years' history of China, explore Xi'an, Shaanxi. This time, I will talk about Beijing.

Beijing as the capital of China, is a very important place for people to understand China. The capital's cultural life reflects China's complex history and its position in a rapidly changing world. As culture means everything, I can only introduce a small part of it.

#### Peking Opera

Peking Opera dates back to 1790 when four local opera troupes from Anhui Province came to Beijing to perform at the imperial court. The tour was successful and the artists stayed in Beijing. Over 200 years of development,



Peking Opera has been a unique art form. It includes singing, dancing, martial arts, musical arts and literature, similar to Western opera.

The four main roles in Peking Opera are "sheng", "dan", "jing", "chou". They are denoted by different markings in face

make-up. Apart from "sheng" and "dan", the different colors of the face are used for other roles, representing various characters and personalities. Therefore, the ability to read the face markings is a key to understanding the stories.

#### Calligraphy and Painting

Chinese calligraphy (or brush calligraphy) is regarded as the most abstract and sublime form of art in Chinese culture. Calligraphy is often thought to reveal one's personality vividly. Calligraphy demands careful planning and confident execution. Calligraphers have to conform to the defined structure of the words. Their expressions are often extremely creative. To exercise the imagination, but follow the laws and regulations of the craft, is calligraphy's principle virtue.

There are five major styles of calligraphy:

1. 'Zhuan' seal script;
2. 'Li' clerical script;
3. 'Kai' standard script;
4. 'Xing' semi-cursive script;
5. 'Cao' cursive script.

The origin of Chinese painting can be traced to the patterns carved, or drawn on bronze and pottery in prehistory. From the Han Dynasty (BC 206-AD 220), when paper was invented, Chinese painting began to develop into its present form.



Early paintings record religious iconography, such as the Buddha. During the Tang Dynasty (618-907 BC), the trend turned towards landscapes. The following dynasties revealed different characteristics: flower-and-bird paintings in the Song (AD 960-1279); ink figure paintings in the Yuan (AD 1271-1368); court paintings in the Ming (AD 1368-1644) and a revival of landscape painting and the introduction of Western-style painting in the Qing (1644-1911).

#### Acrobatics

The history of acrobatics in China can be traced back to the Neolithic period (more than 5,000 years ago). It is



believed that acrobatics grew from self-defense skills. Over time, acrobatics was developed into a performance art and became well-known worldwide through spread along the Silk Road.

The China National Acrobatics Troup, one of the best in the world, performs in Beijing all year round. Tourists may appreciate innovative, beautiful, thrilling and entertaining spectacular of acrobatics, without language barrier or cultural border.

### Architecture

Chinese architecture has a distinct and notable history, having made considerable achievements across many historical periods. In the process of its development, superi-



or architectural techniques and design were combined to make Chinese architecture one of the three great architectural systems.

The basic feature of Chinese architecture is rectangular-shaped units of space joined as a whole. Dominated by the principles of balance and symmetry, Chinese buildings include a main structure and the secondary structures as two wings on either side of the main structure. Another characteristic is a wooden structural frame with pillars, beams, and earthen walls surrounding the building on three sides. Beijing is a city with historical and modern Chinese architecture.

### Fengshui

Fengshui is mysterious to some people. In Chinese feng means the wind while shui means water. Fengshui is the ancient Chinese system of arranging objects in an environment to maximize internal harmony and the happiness of the people therein. It is not a religion, although some do consider it part of their religious practice. It is sometimes used to detect auspicious environments in the modern world, to find good building sites, to determine floor-plans of houses or simply a room layout.

The most important aspect of fengshui is 'qi,' the life force that flows in and around everything. Qi is the energy that must be able to flow well and smoothly. Following fengshui theory, human must improve his surrounding environment and be harmonious with the environment. Otherwise, people will suffer from the disharmony.

To have an idea about all aspects of the Beijing's culture, the best way is to come to it and feel it in person. In the master urban development plan of Beijing, Beijing's development will be under the theme "nation's capital, international city, cultural center and congenial city to live and work." In 2008, the Beijing's capital culture will be more rich and colorful.

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## Chiang Mai Council Meeting Minutes

*Council Meeting, Chiang Mai, 21st – 25th November*

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### Attendees

President	Ian Dowman (ID)
Secretary General	Orhan Altan (OA)
First Vice President	John Trinder (JT)
Second Vice President	Manos Baltasvias (EB)
Congress Director	Chen Jun (CJ)
Treasurer	Stanley Morain (SM)
ISPRS Webmaster	Fabio Remondino (FR) partly for the item 9.5

### AGENDA

1. Opening (ID)
  2. Approval of Agenda (ID)
  3. Review of previous Council Meeting in Istanbul (OA)
    - 3.1 Approval of minutes
    - 3.2 Matters arising from the minutes not covered in the agenda
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4. Policy Matters (ID)
  - 4.1 Council Responsibilities
  - 4.2 Statutes and Bylaws
  - 4.3 Web casting
5. Review of Technical Commissions proposals (ID)
  - 5.1 Formation of Working Groups
  - 5.2 Symposia
  - 5.3 Working Group Meetings
6. Review of Council Strategy (ID)
  - 6.1 Review of discussions in Istanbul
  - 6.2 Initiatives in Africa
7.
  - 7.1 Congress Plans (CJ)
  - 7.2 Congress Contract
8. ISPRS Membership (OA)
  - 8.1 Report on status of Ordinary, Associate, Sustaining and Regional Members
  - 8.2 Status of defaulting Members
  - 8.3 Recruitment
9. ISPRS Publications (OA)
  - 9.1 Journal
  - 9.2 ISPRS Bulletin, Highlights
  - 9.3 Archives
  - 9.4 Book Series
  - 9.5 Home Page
  - 9.6 Orange Book
  - 9.7 Silver Book
  - 9.8 Blue Book, database
  - 9.9 Brochure, Flyer, Poster and Banner
10. Financial Affairs (SM) (Fin Comm. Chair)
11. Foundation (JT)
12. ISPRS Committees
  - 12.1 ISAC
  - 12.2 IPAC
  - 12.3 CIPA
  - 12.4 ICORSE
13. Forthcoming Meetings (ID)
14. Relations with International and other Organizations (ID)
  - 14.1 CEOS
  - 14.2 United Nations
  - 14.3 ICSU
  - 14.4 IEEE
  - 14.5 GEO
  - 14.6 IUGG
  - 14.7 ION
  - 14.8 JBGIS
  - 14.9 GeoUnions

- 14.10 IPY
- 14.11 eGY
- 14.12 OICC

15. Review of Decisions and Actions on Council (OA)

16. Reports from Council (All)

17. Other Business

18. Next Council Meeting

19. Close

### 1. Opening

ID opened the meeting and thanked Shunji Murai for hosting the meeting. He welcomed the participants and stressed the importance of the discussions which would cover the setting up of working groups and the budget for 2005.

### 2. Approval of Agenda

The agenda was revised to add minor items. The revised agenda is that given above.

### 3. Review of Previous Council Meeting in Istanbul

#### 3.1 Approval of minutes of the Council Meeting in Istanbul 04

OA reviewed the minutes and they were accepted with minor changes.

#### 3.2 Matters arising from the minutes not covered in the agenda

There were no discussion items on this point.

### 4. Policy Matters

#### 4.1 Council Responsibilities

A list prepared for this purpose was discussed and with the input of the Joint Meeting's discussions the list was reviewed.

#### 4.2 Statutes and Bylaws

A brief oral report prepared by EB was discussed and it was decided that to invite Lawrence Fritz, as chair of the Honorary Members Committee, to prepare proposals for changing the Bylaws relating to Honorary members.

#### 4.3 Web casting

A brief report prepared by EB was discussed and it was noted that Web casting should be applied to

- Opening and closing ceremonies and
- Plenary sessions at the Congress,

Which some people cannot attend.

### 5. Review of Technical Commissions Proposals (ID)

#### 5.1 Formation of Working Groups

All TCPs had made some adjustments to the proposals made in September and which had been reviewed by Council. WGs in TC I-VI were largely complete subject to some minor adjustments to ToR's and officers. WGs in

TCs VII and VIII needed more work and this should be complete by 17th December. It was decided that any WGs without all officers and ToR's on this date would not be approved. The final ToRs and officers would be sent to OA who would compile them into the Silver Book. Those WGs which were complete are approved by Council and TCPs were authorised to inform WG Chairs accordingly and put the details on their website.

### 5.2 Symposia

A list of Commission Symposia is given in the attached document Annex 2. All symposia were approved subject to final dates from TCs IV,V,VI,VII, and VIII. The TCPs were instructed to proceed with the organisation.

### 5.3 Working Group Meetings

A list based on the TCPs proposals and prepared by OA was discussed. It was generally agreed that meetings on similar topics should be combined.

## 6. Review of Council Strategy

### 6.1 Review of discussions in Istanbul

The report prepared by ID was discussed and it was generally accepted, and the following actions agreed, OA to search for historical files (GA decisions, pictures etc) and in this context to put an advertisement in Highlights to ask people to send historical material to the Headquarters and/or to contact ITC for historical material.

### 6.2 Initiatives in Africa

EB gave a very detailed report about the Status of Geo-Sciences in Africa and proposals about the role of ISPRS in this continent. The following actions were agreed; to use the EIS newsletter for information transfer to Africa; to seek possibilities to organize workshops in this continent (possibly with FIG or IAG); to respond to Africa

GIS 2005 to organize sessions and discuss this possibility with TCPs.

## 7.

### 7.1 Congress Plans (CJ)

CJ gave a detailed presentation about the Congress Preparations and Council noted that the Chinese Society has set up a Committee for Congress Preparations and some officers have been assigned to specific tasks in the Committee. Council members noted that the Organizing Committee has set 3-11 July 2004 as the dates for the Congress, which is a good time interval before the start of the Olympic Games.

CJ raised the issue of having peer-reviewed papers at the Congress and Council members explained their opinions on pros and cons of this issue.

### 7.2 Congress Contract

The Congress contract submitted before the Istanbul Congress to the bidders for the 2008 Congress has been analyzed by the Chinese Member Association and CJ declared that they are ready to sign the contract. It was decided that CJ investigates the alternatives for the Third Party Liability Insurance and prepares the final version of contract, including group rates and sign it.

## 8. ISPRS Membership

### 8.1 Report on status of Ordinary, Associate, Sustaining and Regional Members

### 8.2 Status of defaulting Members

### 8.3 Recruitment

OA gave a report on the current status of memberships. According to the most recent decisions:

- 9 active, 2 inactive, a total of 11 AsM.



Meeting of the Council and TCPs in Chiang Mai.

- 85 active, 1 inactive and 6 suspended, a total of 92 OdM
  - 12 active, a total of 12 RgM
  - 58 active, 3 inactive, 13 stopped, a total of 74 StM
- According to this information there were 164 active, 6 inactive, 13 stopped and 6 suspended members.

Council approved admission of the following Sustaining Members:

- Erdem Emi (Turkey) Cat C
- Topol Software (Czech Republic) Cat D

The Council discussed the definitions used for the membership status in the database and they agreed that these definitions did not clearly express their status.

OA suggested inviting Rachel Peled and Prof. Ammatzia Peled to Istanbul in order to discuss membership status and the other problems about the database.

OA suggested collecting related information about the participants obtained from the ISPRS supported meetings and add them into ISPRS Database.

## 9. ISPRS Publications

### 9.1 Journal

EB gave a report about the ISPRS Journal, the newly appointed Editor-in-Chief, 1 the Associate Editors and a newly formed Journal Advisory Board. A list of potential members of the Editorial Board is added as Annex 3 to this minute. The Council pointed out the importance of the Journal in the academic world and emphasised that every measure should be taken to secure its quality and adequacy.

### 9.2 ISPRS Bulletin, Highlights

OA gave a report about the newly signed contract with the GITC for the production of the ISPRS Bulletin Highlights and the new policy of distribution of the Bulletin to the recipients. The Council Members expressed once again their concerns about the high costs for the hardcopy production and distribution. It was decided that; OA to investigate and report latest to the JM2005 about the future distribution policy of the ISPRS Highlights.

### 9.3 Archives

OA pointed out the necessity of using uniform guidelines in the preparation of Archives and explained the distributed example pages for the Workshop and Symposia Hardcopy Archive Cover Pages.

OA distributed the newly agreed Contract with GITC for Sale of Archives and drew attention to the fact that a certain number of hardcopy and CDs of the Archives should be sent to GITC after every ISPRS sponsored event.

### 9.4 Book Series

Noting the importance of the Book Series it was decided that the Book Series Editor should be replaced and Paul Aplin was nominated as Book Series Editor.

### 9.5 Home Page

OA and FR gave a brief report about the Home Page and OA explained that in the near future the outlook of the Home page will be the same as the publicity materials and there will be a coordinated work with ISPRS HQ and FR.

### 9.6 Orange Book

Noting the importance of the Orange Book it was decid-

ed that; CJ to update and prepare the new Authors' Guide and Presenters' Manual and distribute at JM2005 for discussion.

### 9.7 Silver Book

Noting the importance of the Silver Book for the management of Society it was decided that OA to prepare in the early 2005 the Silver Book and distribute.

### 9.8 Blue Book, database

As the Blue Book is a management device of the Society it was left to OA to publish it in the coming years.

### 9.9 Brochure, Flyer, Poster and Banner

OA gave a brief explanation about the newly published Brochure, Flyer, Poster and new Banners of the Society.

## 10. Financial Affairs (SM)

ID noted that the Chair of the Financial Commission had been invited to attend the meeting but at the last moment had been unable to come because of illness.

SM introduced the budget for 2005 and was commended for the clear presentation of the information. SM noted that most benefit could come from chasing arrears from StMs. Council discussed the proposals and made the following decisions:

- It would be necessary to have deficit budget in 2005,
- Approved €17500 as a one off payment for production of an ISPRS video
- Approved a SwFr200 000 no interest loan for 3 years, to the ISPRS Foundation.

## 11. Foundation (JT)

JT gave a summary of development relating to the Foundation since the Congress. There had been little activity. Council had already discussed a donation/loan to the Foundation and approved a loan of SwF200 000.

It was decided that all Council members to make comments on adding a surcharge to ISPRS events to JT by the end of January

## 12. ISPRS Committees

### 12.1 ISAC

ID and OA had met Armin Gruen in Zurich and discussed the future of ISAC. It was agreed that the number of representatives from each constituency be reduced from 5 to 4 and also that the Chair should obtain advice from non-members of ISAC when appropriate.

ISAC should be involved in decisions at an earlier stage, and maybe invited to Council Mtgs which involve science issues. It was also important that Council react to advice and acknowledge input.

### 12.2 IPAC

Ray Harris had advised Council that no changes were required in membership except to replace Alain Baudoin as he is now a TCP. Gerard Begni was approved as a replacement.

### 12.3 CIPA

It was agreed that Yutake Takase from Japan be invited to be the ISPRS representative on the CIPA Board.

#### 12.4 CORSE

There were no new issues for ICORSE but it was noted that TCVII and TCVIII would be attending the ISRSE programme committee in St Petersburg and that several members of Council would attend the Symposium.

#### 13. Forthcoming Meetings (ID)

The presence of ISPRS at forthcoming meetings was discussed and consequently a list of meetings requiring Council Attendance was prepared.

#### 14. Relations with International and Other Organizations (ID)

##### 14.1 CEOS

ID reported on the recent CEOS Plenary in Beijing.

##### 14.2 United Nations

Council discussed the invitation from OOSA to be represented on the Action Team on GNSS and decided that there was insufficient interest for ISPRS to justify additional resources.

##### 14.2 ICSU

Information was tabled on the ICSU Grants programme, International Polar Year (IPY) and electronic Geophysical Year (eGY). These had been discussed at the Joint Meeting.

##### 14.4 IEEE

OA tabled information on IEEE-GRSS Technical Committees, and noted that TCPs had been encouraged to look for opportunities to collaborate. ID would seek an opportunity to meet the IEEE-GRSS President.

##### 14.5 GEO

ISPRS would join GEO and ID will attend GEO-6.

#### 14.6 ION

JT had been in contact with ION and a MoU draft is waiting for approval by the ION Board.

##### 14.7 JBGIS

ID would attend the next meeting in April 2005.

##### 14.8 OICC

A letter from OICC was tabled, suggesting ISPRS take part in a pilot project to support and monitor urban development in Egypt. Council had no funds for this but ID would continue the discussion with OICC.

#### 15. Review of Decisions and Actions on Council (OA)

A list of Actions from the previous period was discussed and reviewed at the meeting.

#### 16. Reports from Council (All)

Reports of the Council Members on their activities in the past 2 months were presented.

#### 17. Other Business

There were no other items to be discussed and ID thanked the Council Members for their contributions and reminded the very urgent business matters arising from this meeting.

#### 18. Next Council Meeting

Next Council Meeting is in Zurich at 12 (early arrival)-15 (late departure) May 2005.

#### 19. Close

ID closed the meeting and thanked Shunji Murai once more for hosting this meeting.



### ISPRS Comm. III – Contribution to ISPRS Highlights

By Wolfgang Forstner, President, e-mail: [wf@ipb.uni-bonn.de](mailto:wf@ipb.uni-bonn.de), and Helmut Mayer, Vice President

The long term progress of photogrammetry, remote sensing and geoinformation systems depends on the formulation and solution of basic questions concerning the acquisition and analysis of spatio-temporal data. Knowledge about the physical processes of the sensors, the ontology of the spatio-temporal objects to be acquired and mathematical tools based on strong concepts are combined into efficient computer algorithms. Within ISPRS Commission III 'Photogrammetric Computer Vision' is responsible for this development.

In the following we will sketch a few of the most important basic research problems. All of them are addressed in the research community, some will be solved in the next few years, yet most of them will stay with us beyond the next congress.

#### 1. Calibration and Orientation of Images and Image Sequences

Photogrammetric research was characterized for a long time by finding efficient procedures for calibration and orientation of cameras, from relative orientation procedures for analogue instruments via adjustment procedures for photogrammetric blocks to self-calibrating bundle block adjustment. The availability of GPS and INS on one hand and of digital imagery on the other hand seemed to bring this development to an end, by easing the problem of initial value determination or even replacing photogrammetric orientation procedures, thus allowing full automation.

However, this view appears a bit narrow as it only looks at the calibration and orientation of aerial images. It does

not take into account the ubiquity of digital still and video cameras. The limitation of research to images of *photogrammetric* cameras, having a stable interior orientation, limits the progress of photogrammetric techniques.

The potential of photogrammetric applications could be increased by at least two orders of magnitude if the basic photogrammetric problems, namely calibration and orientation were solved for cameras in the hand of a normal consumer.

Whereas the technical problems of acquisition, storage, processing and display of large amounts of images or of videos are or will be solved, many conceptual and technical problems of calibration and orientation are still open and are core questions of basic research:

- *Autonomous calibration and orientation of cameras*, provided only images are given. This transfers automatic aerotriangulation to the close range domain.
- *Real-time ego motion* determination from image sequences. This is the successor of on-line triangulation, being a hot topic two decades ago.
- *Autonomous calibration and orientation of video camera networks* without user interaction.
- *Guiding the user in image acquisition*. This is the successor of network design.
- *Integration of other sensors*. This might refer to a micro compass in the camera or a GPS receiver in the watch of the user, the camera being linked to a *wearable computer*.

These problems refer to single images as well to image sequences or streams assuming nothing or only little about the interior orientation, e. g. from the header of the image file. They also refer to non-standard situations, such as cameras with fish-eye-lenses or stereo-camera heads with two or more cameras. The challenges are to robustly and reliably cope with all types of scenarios including weaknesses in the configuration, to exploit all diagnostic tools and to translate the result of network design into *recommendations which are understandable for the user*.

These are prerequisites for photogrammetry to become available for everybody. They are only realizable if the basic theoretical questions have been solved. One can expect many of these problems being successfully addressed in this period of Commission III.

## 2. Intensity and Range Images for Surface Reconstruction

One of the basic products of photogrammetry are digital surface models. Though automatic matching procedures for deriving surface models have been developed in the last two decades, their impact has heavily decreased with the availability of laser scanners. The latter have significant advantages in capturing surface models, giving 3D data directly, being weather independent to a large extent and penetrating foliage. All this suggests, that the surface reconstruction problem has become solved.

However, this is only true if one accepts a point cloud as result and the high price of the active sensor laser scanner compared to the low price of the passive sensor digital camera and therefore a lower efficiency. Actually, both sensors yield silly pixel or point sets which for most applications at least need to be structured to be of any value. The basic problems, though, have a different flavour for image and laser data.

### 2.1 Surface reconstruction from images

Reconstructing surfaces from images means inverting the physical imaging process. The problem is known to be ill-posed, i. e., does not give a unique solution without further assumptions. Early attempts assume a Lambertian reflection and smooth surfaces. The under-determinedness increases in case of non-Lambertian reflection. The roughness of real surfaces can increase the difficulty of the correspondence problem dramatically. Some of the basic problems specific for the reconstruction from images are the following:

- *Occlusion handling*. The challenge is the efficient determination of occlusions during the reconstruction process.
- *Texture free surface areas*. The principle "No news is good news" (Grimson) may be used as a motivation for smooth interpolation. Integration of shape from shading is a challenge due to its strict assumptions and mathematical complexity.
- *Partially specular surfaces*. The challenge is the integration of – significantly – more than two images for recovering a locally varying parameterized bidirectional reflectance function simultaneously with reconstructing the surface.
- *Quasi transparent surfaces*. This is a particularly challenging variation of the occlusion problem, e. g., occurring when trees occlude buildings.

The ease of the human visual system to reconstruct surfaces from only two views often has led to the wrong supposition the problem to be easily solvable. All experience points to the contrary.

### 2.2 Surface reconstruction from point clouds

Reconstructing surfaces from point clouds can be viewed as an interpolation or prediction problem. The point clouds may directly be measured, e. g., by a laser range finder or derived indirectly, e. g. by an image stereo algorithm. The problem is easier than the reconstruction from images, as one starts from 3D information. However, it also poses basic problems:

- *Point cloud segmentation*. The problem is similar to the image segmentation problem, which inherently is not well defined, without referring to a task. Given a certain model for the type of surface, the challenge is to simultaneously handle the estimation and classification problems for dealing with irregular point distributions, outliers, and missing data and at the same time achieving high efficiency.
- *Surfaces from range and intensity images*. The partially complementary properties of intensity and range images suggest an integrated reconstruction of sur-

faces. The challenge is the handling of inconsistencies, e. g., with respect to occlusions or reflection, due to the different and possibly independent sensing process.

- *Real-time surface reconstruction.* This becomes a requirement with the availability of real-time orientation procedures for both types of sensors, e.g., for applications in robotics. The challenge is an adequate surface representation, which allows the fusion of widespread surface data.

Common to all surface reconstruction techniques is the problem of developing a rich enough and realistic generic model for the surface to be recovered. The challenge is the variability of surface types from polyhedral, over smooth and piecewise smooth to fractal and the need to automatically locally identify the adequate surface type. There is obviously an intensive overlap with the interpretation of the surfaces.

### 3. Image Interpretation and Cognitive Vision

The value of images lies in the high information density available for image interpretation. The cognitive abilities of the human operator are regularly underestimated when trying to transfer them into algorithms.

Interpretation tasks for photogrammetric images are varying from very simple, e. g., detecting fiducial marks to extremely complex, e. g., identifying and classifying industrial regions. In case of interpreting video streams the situation is similar, the tasks ranging from obstacle detection on a planar pathway to identifying the intentions of a driver in the car in front of the own one. The basic questions have not changed over the last 20 years, comprising knowledge representation, reasoning under uncertainty, coping with the large search spaces of concepts for object recognition or for modelling the spatio-temporal structures of multiple moving objects.

Image interpretation systems were intensively studied until the mid of the 90's. While only few photogrammetric groups have continued research in this area over the last ten years, the topic has reached high attention again in the last few years. Today the problem of object detection and categorization is in the central focus of the computer vision research community. Whereas the last decade could be characterized by research in multiple view geometry, we now find statistical modelling with graphical models, especially Bayesian networks and highly sophisticated estimation and classification techniques, cf. the seminal paper by Mumford (The dawning of the age of stochasticity. In: *Mathematics: Frontiers and Perspectives 2000*, AMS, 1999, 197-218.) The European Commission funds basic research for building cognitive systems with computer vision capabilities (cf. [www.ecvision.org](http://www.ecvision.org)). The EU funded network 'PASCAL - Pattern Analysis, Statistical Modelling and Computational Learning' „will pioneer principled methods of pattern analysis,

statistical modelling and computational learning as core enabling technologies for multimodal interfaces that are capable of natural and seamless interaction with and among individual human users". The basic problems addressed are the same we photogrammetrists need to tackle for making possible computer supported interpretation of image and range images.

### 4. Conclusions

The above sketch shows that Commission III addresses highly interesting problems. This is the basis for a lively exchange between all groups conducting basic research in our field. As engineers we only believe in our results if they are adequately evaluated. The work in the working groups therefore not only aims at fostering the communication between the different research groups, but also at providing a platform for comparing procedures based on common data sets.

The activities of the working groups are documented on their home page, which you may find under the home page of the Commission ([www.ipb.uni-bonn.de/isprs](http://www.ipb.uni-bonn.de/isprs)). When writing this report, the workshop on 'New Generation 3D-City Models', organized by the Chair for Geoinformation, Bonn has already taken place, cf. the report by Th. Kolbe.

We want to invite you come to the Symposium of Commission III 'Photogrammetric Computer Vision '06' (PCV '06) in Bonn, September 18-22, 2006 and submit a paper until March 27, 2006. Details will be found on our homepage.

The goal of the work in Commission III is to design, develop and evaluate mathematical models and methods for automatic image analysis.

- orientation and calibration of images,
  - surface reconstruction,
  - fusion of multi-modal data,
  - processing and interpretation of laser range data,
  - interpretation of images and
  - image sequence analysis
- with emphasis on
- integration of geometry, statistics and semantics,
  - modelling of spatial objects and temporal events,
  - modelling context,
  - scale behaviour of appearance models,
  - use of graphical models, especially Markov random fields and Bayesian networks.

The work should intensify the links with the computer vision and pattern recognition community, especially by integrating key players into the working groups. Following the good tradition of photogrammetric research, benchmarking is one of the main practical ways to promote the field and at the same time bring together researchers of different fields.



## ISPRS Comm. V - Contribution to ISPRS Highlights

By Hans-Gerd Maas, e-mail: [hmaas@rcs.urz.tu-dresden.de](mailto:hmaas@rcs.urz.tu-dresden.de)

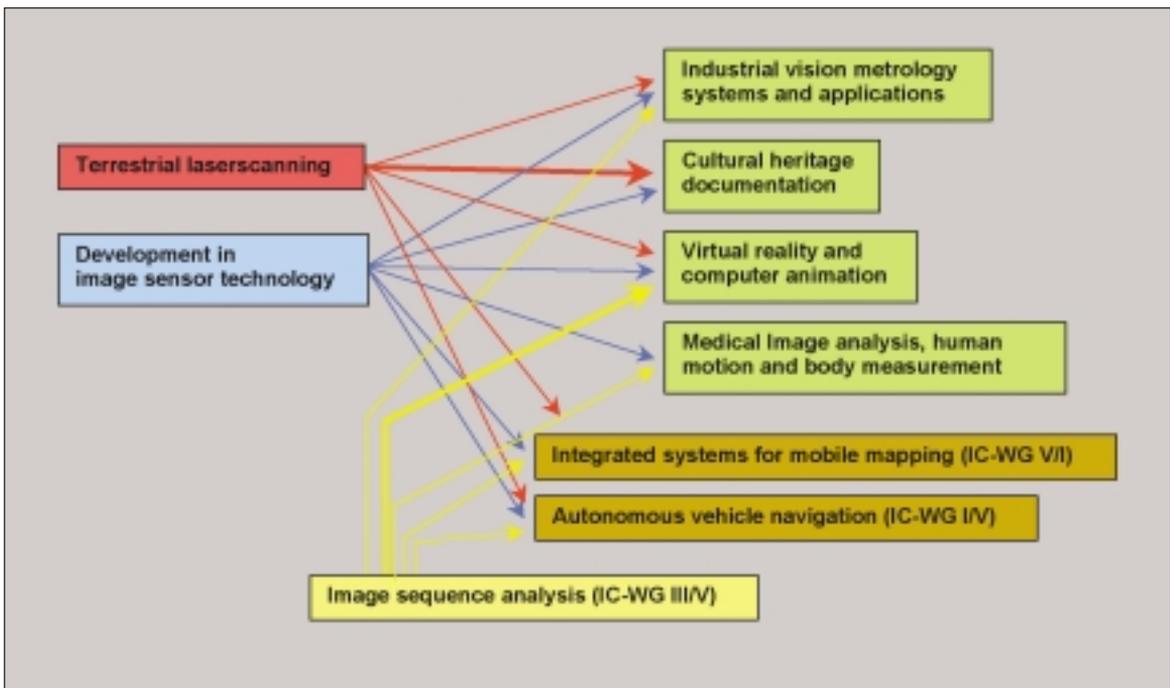
### I. Commission V Scope and Structure

Germany applied for ISPRS Commission V for the period 2004 - 2008 with Hans-Gerd Maas as commission president, Danilo Schneider as secretary and Dresden as 2006 symposium venue. The bid was confirmed by the general assembly during the ISPRS congress in Istanbul. Based on the state of science and technology and the task of the commission defined by the resolutions, the following commission scope was defined:

- Photogrammetric techniques in industrial design, production and quality control processes.
- CAD/CAM-based techniques, image engineering.
- Systems, techniques and applications in cultural heritage recording and documentation.
- 3D object tracking, motion analysis and deformation measurement techniques.
- 3D/4D data acquisition for virtual reality and computer animation.
- Industrial and autonomous robotics.
- Terrestrial laserscanning.
- Integrated point cloud and image acquisition and processing techniques.
- Sensor and data fusion techniques.
- Medical and biometric applications.
- Automation of photogrammetric data processing, optimisation of precision and reliability.
- Promotion of photogrammetric techniques, opening of new application fields.

After the Istanbul congress the following working groups were established and confirmed:

- WG V/1: Industrial vision metrology systems and applications (Thomas Luhmann, Frank van den Heuvel)
- WG V/2: Cultural heritage documentation (Pierre Grussenmeyer, Klaus Hanke)
- WG V/3: Terrestrial laserscanning (Norbert Pfeifer, Derek Lichti)
- WG V/4: Virtual reality and computer animation (Sabry El-Hakim, Fabio Remondino)
- WG V/5: Development in image sensor technology (Ralf Reulke, Sergey Zheltov)
- WG V/6: Medical Image analysis, human motion and body measurement (Petros Patias)
- IC WG V/I: Integrated systems for mobile mapping (Naser El-Sheimy, Antonio Vettore)
- ICWG I/V: Autonomous vehicle navigation (Ron Li, Jurgen Everaerts)
- IC WG III/V: Image sequence analysis (Marc Pollefeys, David Nister)



## 2. Development of Research Fields

The focus of research and development of Commission V has propagated into a wide range of new application fields during the past years. Commission V has also seen a large number of successful research projects passing into practical application and opening new fields of activity for photogrammetrists. A central issue in many developments is the integration of sensor technology with fully automated data processing schemes to generate highly automated online or real-time photogrammetric measurement systems. Commission V has always been successful in attracting 'non-photogrammetrists' - noting that this term is undefined and that everybody extracting quantitative information from imagery is actually a photogrammetrist.

While Commission V activities were formerly mainly focused on applications such as cultural heritage recording and documentation, many promising new application fields are found in industrial design, production and quality control processes. Sophisticated image engineering approaches were developed to support the reliability of image analysis procedures and to achieve success rates beyond 99.9% in fully automatic multi-ocular photogrammetric 3D measurement systems. Active systems based on cameras combined with projection techniques allow for 3D surface measurements at data rates beyond one million points per second.



Dresden aerial view.

are becoming popular. Many of these can be summarized in the category of omni-directional vision systems.

Photogrammetry delivers many contributions to the development of virtual reality products, with applications fields ranging from cultural heritage to animation and movie production. In addition to the generation of high quality textured 3D object models, multi-ocular image sequence processing introduces the 4th dimension, allowing for manifold applications in 3D motion analysis. Image sequence analysis and sensor fusion also play a major role in the development of mobile mapping systems and in



Dresden panoramic image.

In addition, they allow for the realization of powerful illumination algorithms in vision systems used for example in reverse engineering. These techniques have opened immense new markets for photogrammetry, which have only rudimentarily been exhausted by now.

Laserscanners have been used in industrial measurement systems for more than two decades. The advent of terrestrial laserscanners with a range of several hundred meters and a data rate in the order of 10 kHz or more has added a new dimension to cultural heritage recording in recent years. Laserscanners also depict a rather powerful instrument for new market sectors such as facility management. Laserscanners and laserscanner data processing can be considered a bridge between photogrammetry and traditional engineering geodesy, with the instrument design resembling the one of geodetic instruments and point cloud processing principles derived from photogrammetric image processing and image analysis techniques. Laserscanner and high resolution camera sensor data fusion depict a topical research issue in this field. Besides conventional central perspective digital cameras and laserscanners, diverse unconventional sensor types

autonomous vehicle navigation tasks. Beyond this, the fusion of sensorics, photogrammetric data processing, CAD, GIS and VR techniques has recently opened new research and application fields in augmented reality.

Besides industrial applications, medical imaging can be considered an application field with a strong growth potential, where photogrammetric techniques can deliver valuable contributions. New application fields can also be seen in biometry, where photogrammetric techniques are used in applications ranging from forestry to raster electron microscopy.

## 3. Commission Activities

After several successful workshops conducted by Commission V working groups in 2005, the next event will be the Commission V symposium, which will take place in **Dresden 25-27. September 2006**. Another series of workshops is planned for 2007. Detailed information on Commission V structure and activities can be found on <http://www.commission5.isprs.org/>. Contributions will be accepted on the basis of a full paper review. **The deadline for the submission of papers is 1 april 2006.**



## ISPRS Book Series – Announcement of Opportunity

By Paul Aplin, School of Geography, The University of Nottingham, University Park Nottingham NG7 2RD, UK, e-mail: paul.aplin@nottingham.ac.uk

The ISPRS Book Series in Photogrammetry, Remote Sensing and Spatial Information Sciences was initiated in 2003 to generate very high quality scientific publications based on particularly significant research activities taking place within the ISPRS community. The series is now fully operational, with three volumes published, another in press, and more on the way. Individuals participating in ISPRS activities can benefit from, and contribute to, the series in two main ways. First, volumes of the ISPRS Book Series can be purchased at a 35% reduction of cost price. Second, researchers are encouraged strongly to publish significant and topical scientific developments as volumes or volume chapters within the series.

### Operation of the Series

The ISPRS Book Series comprises significant scientific publications in photogrammetry and remote sensing, and related disciplines. Each volume in the series is prepared independently and focuses on a topical theme. Volumes are published on an occasional basis, according to the emergence of noteworthy scientific developments. The material included within each volume is peer-reviewed rigorously, ensuring strong scientific standards. While volumes are published on any suitable theme, it is common for themes to be related to ISPRS meetings. Volumes may vary markedly in character, but are often (i) extended proceedings (papers selected from an ISPRS meeting), (ii) edited volumes (papers invited on a particular theme), (iii) text books (general overview of a significant subject) or (iv) monographs (in-depth study on a specific topic). The series is published by Taylor & Francis.

Individuals within ISPRS Ordinary, Associate, Regional and Sustaining members benefit from a 35% reduction of cost

price for volumes of the ISPRS Book Series. An order form is available from the ISPRS Book Series website: [www.isprs.org/publications/bookseries.html](http://www.isprs.org/publications/bookseries.html).

### Call for Volumes

Practitioners in photogrammetry, remote sensing and spatial information sciences are invited to consider publishing work in the ISPRS Book Series. In particular, prospective volume editors are encouraged to identify suitable themes and submit volume proposals to the ISPRS Book Series Editor. (Details on how to submit proposals are available from the ISPRS Book Series website: [www.isprs.org/publications/bookseries.html](http://www.isprs.org/publications/bookseries.html).) All topical themes are considered, but it is relatively common for volumes to be related to ISPRS meetings (Technical Commission symposia, Working Group workshops, etc.). Consequently, ISPRS meeting organisers are particularly encouraged to consider preparing volumes in association with their meetings.

It should be noted that the timescale over which a volume is produced can be lengthy, often over a year, so preparations must begin well in advance of the proposed date of publication. This is particularly significant where a specific deadline exists, such as the dissemination of volumes at an ISPRS meeting. As such, prospective volume editors are encouraged to contact the ISPRS Book Series Editor at the earliest opportunity.

### Further Information

Full details on the ISPRS Book Series are available at [www.isprs.org/publications/bookseries.html](http://www.isprs.org/publications/bookseries.html).

Queries on any aspect of the series are welcomed by the ISPRS Book Series Editor.

### Published volumes



Volume 1  
2004

*Advances in Spatial Analysis and Decision Making*  
Edited by Zhilin Li, Qiming Zhou and Wolfgang Kainz



Volume 2  
2004

*Post-Launch Calibration of Satellite Sensing*  
Edited by Stanley A. Morain and Amelia M. Budge



Volume 3  
2005

*Next Generation Geospatial Information*  
Edited by Peggy Agouris and Arie Croitoru

## Announcement and Call for Papers

*ISPRS Workshop on Multiple Representation and Interoperability of Spatial Data*

*held at Institute for Cartography and Geoinformatics, University of Hanover, Germany,*

*from 22 - 24 February 2006, [www.commission2.isprs.org/wg3/workshop](http://www.commission2.isprs.org/wg3/workshop)*

The workshop is arranged by the ISPRS working groups:  
 II/3: Multiple Representation of Image and Vector Data  
 II/6: System Integration and Interoperability

### Objectives

Geospatial data and processes can only be fully understood when they are explored taking their thematic and spatial multi-dimensionality into account. Furthermore, different scales reveal different aspects of the underlying structures and processes that are of crucial importance for all applications. These issues are relevant for all kinds of spatial data, namely raster, vector and surface data, but also verbal expressions. A topic of growing importance is the availability of data and services via the internet. The workshop intends to bring together researchers dealing with semantic and geometric data integration, data representation in MRDB-structures, as well as generating and exploiting the links between multiply represented objects.

### Important Dates

Submission of full paper: 15 November 2005  
 Notification of acceptance: 20 December 2005  
 Submission of improved paper: 27 January 2006

### Topics of Interest

This workshop aims at presenting the state-of-the-art and trends in the handling and integration of multiple representation spatial data. Topics to be discussed during the workshop address (but are not limited to):

- Semantic and geospatial database integration
- Component based GIS
- Formal representation of geospatial information and knowledge
- Geospatial ontologies
- Generalization and data abstraction of vector, raster and surface data
- Object representation for multiple representation and multi-scale databases
- Matching of image and vector data in different scales and themes
- Multiple representation analysis tools
- Geo-Web-Services for data generalization and data integration

All submitted papers will be reviewed in a double-blind fashion for quality, originality and relevance by the Scientific Committee.



#### What is an ISPRS symposium?

Symposiums are major events of ISPRS and is the major event of the ISPRS commissions 4 year life-cycle. The next symposium of Commission I is co-organised by the Société Française de Photogrammétrie et Télédétection, IGN and the CNES.

#### What is Commission 1?

ISPRS Commission I is at the heart of ISPRS, dealing with Image Data Acquisition, Sensors and Platforms, which topics should be mastered for an efficient development and use of photogrammetry and remote sensing and for the benefit of scientific and operational applications which are studied in the other seven Commissions of ISPRS.  
<http://www.commission1.isprs.org>

#### Symposium objectives

The main objectives of the symposium are :

- State of the art on sensors, platforms and data acquisition
- Main issues for the present and technological developments for the future
- Comparison and evaluation of systems, algorithms and methods
- Bringing people together, exchange experiences and ideas

#### Important dates

- Call for papers: October 2005
- Abstracts deadline: February 2006
- Notification of acceptance: March 2006
- Full paper: May 2006

#### Symposium site

The symposium will be held at ENSG (Ecole Nationale des Sciences Géographiques) near Paris, from where direct transportation is available by express train.

#### Qu'est ce qu'un symposium de l'ISPRS ?

Le symposium est un événement majeur de l'ISPRS. Il a lieu tout les 4 ans. Le symposium PARIS 2006 est co-organisé par la Société Française de Photogrammétrie et Télédétection, l'IGN et le CNES.

#### Qu'est-ce que la Commission 1 ?

La Commission I qui traite de "l'acquisition des données image, capteurs et vecteurs" constitue le coeur de ISPRS. Les sujets qu'elle aborde sont essentiels pour permettre le développement et l'utilisation de la photogrammétrie et de la télédétection et pour le bénéfice des applications scientifiques et opérationnelles étudiés dans les sept autres commissions de l'ISPRS.  
<http://www.commission1.isprs.org>

#### Objectifs du Symposium

Les objectifs principaux du symposium sont les suivants :

- Etat de l'art sur les plates-formes et l'acquisition des données
- Principaux problèmes d'actualité et développements techniques futurs
- Comparaison et évaluation des systèmes, algorithmes et méthodes
- Echanges d'expériences et d'idées pour l'avenir

#### Dates importantes

- Appel à communications : octobre 2005
- >> **Résumés : février 2006**<<
- Acceptation : mars 2006
- Texte complet : mai 2006

#### Site du symposium

Le symposium se déroule à l'ENSG (Ecole Nationale des Sciences Géographiques) près de Paris, accessible facilement par les transports en commun rapides.

Congress Administrative Secretariat : Colloquium / ISPRS / SFPT - T : 00.33.1.44.64.15.15 - [isprs2006@colloquium.fr](mailto:isprs2006@colloquium.fr) -  
 SFPT secretariat - [sfpt@ensg.ign.fr](mailto:sfpt@ensg.ign.fr)

More information / plus d'information : <http://www.colloquium.fr/sfpt2006>



## A Report on the ISPRS Hannover Workshop 2005, High-resolution Earth Imaging for Geospatial Information

By Vittorio Casella, University of Pavia, Italy, e-mail: vittorio.casella@unipv.it

The Workshop took place in Hannover from Tuesday 17th May to Friday 20th May 2005 in one of the buildings of the University. It was hosted by the Institute of Photogrammetry and GeoInformation (IPI) and chaired by Christian Heipke, who is also director of IPI. The Workshop had the scientific sponsorship of ISPRS and the financial support of Z/I, the Intergraph Company devoted to photogrammetry and airborne surveying.

This was the fifth edition of the workshop which was organized for the first time in 1997. The various successive meetings had an increasing success and a continuously growing number of participants: this year there were 134 people, coming from 30 countries spread over all the five continents.

The workshop was dedicated to the 75th birthday of Gottfried Konecny and a special session was dedicated to this event.

The aim of the workshop is synthesised by its title: to focus on high resolution earth imaging, regardless of the technology by which it is obtained. Due to this significant and quite original approach, the workshop offered the possibility of comparing significant contributions given by people working in different areas: aerial photogrammetry, high-resolution optical satellites, and other devices such as radar and lidar.

### Keynote Speech and Invited Papers

The keynote speech, entitled *Small Satellites – A Technical & Business Challenge*, was given by Sir Martin Sweeting. He discussed the emerging technology of small satellites, conventionally defined as space vehicles whose weight is below 500 kg. They offer almost every country the opportunity of having satellites devoted to their specific needs.

The workshop had five invited papers. One was given by Michael Cramer with the title *Digital Airborne Cameras – Status and Future*. It was an exhaustive report about the spreading of digital airborne cameras on the market (four companies have already sold approximately 20 cameras or more) and about the open technical issues. One concerns image resampling, as most of the cameras produce the final image as a composition of partial images, rectangular tiles or lines. Another is pan-sharpening, the methodology used to derive a high resolution colour image by merging a high resolution panchromatic image and a colour one having a lower resolution.

Karsten Jacobsen delivered the second invited paper entitled *High Resolution Satellite Imaging Systems – Overview*. He gave a comprehensive illustration of the main technical issues and he listed the existing and scheduled optical and radar satellites. They are too many to be summarized, but two main items can be cited: there is a greatly increasing number of countries owning or going to own satellites, small or large; in 2006 two satellites are scheduled with a ground resolution higher or equal to half a meter in the panchromatic channel: WorldView 1 having 0.5 metres and OrbView 5 having 0.41 metres.

Michele Crosetto gave the third invited presentation whose title was *State-of-the-art of Land Deformation Monitoring using Differential SAR Interferometry*. First of all he clarified the meaning of some acronyms and illustrated the basics of the corresponding techniques: InSAR, DInSAR and A-DInSAR. Then he showed some impressive examples of spaceborne (there aren't significant applications in deformation monitoring of airborne SAR, he said) differential InSAR supporting his statement that SAR is very reliable and sensitive (at the millimetre level) for deformation evaluation.

The fourth paper was given by Manfred Schroeder, entitled *25 Years of Space Photogrammetry in Germany – A Research Field Initiated by Gottfried Konecny*. The main scope of the presentation was to introduce the celebration of the birthday of Konecny. Schroeder illustrated five projects of photogrammetry from space covering the period from 1983 till now, which were originated by Konecny or can be considered a legacy of his ideas.

H. Weichert gave the fifth and last invited presentation entitled *Remote Sensing Approach for Digital Aerial Images*. He essentially showed several examples of the usage of the images acquired by a Z/I DMC (Digital Mapping Camera) in order to derive photogrammetric products and classification results typical of remote sensing.

### Presentations and Posters

The workshop had 12 oral sessions and 3 poster ones. They contained 52 oral and 25 poster presentations. They were all well attended and of great interest as were the discussions. The main topics of the given presentations are summarized in the following.

### Digital Cameras

Some interesting presentations were given about geometric and radiometric quality assessment of digital cameras. Smith presented some metric results from the Vexcel

Ultra CamD. *Honkavaara* reported on a comparison between the Vexcel camera and the Leica RC20. *Alamus* described some tests performed by the Institut Cartogràfic de Catalunya using the Z/I DMC.

The general conclusions are that the high-end digital cameras have performances which are comparable with those of analogue cameras. Digital cameras have some weaknesses, such as the unfavourable base-to-height ratio, but they also have the significant advantage of a better radiometric quality, allowing for more precise image coordinate measurements. Nevertheless, a systematic and rigorous research on quality and accuracy still has to be done. An important practical issue is that the processing of the data of digital cameras requires a considerable amount of time. To limit the impact of this heavy computational task, some companies such as Z/I and Leica have introduced distributed processing and parallelism into their programs.

### Upcoming Missions

Three missions were illustrated: the optical Pleiades satellites; the SAR satellites named TerraSAR-X and TanDEM-X; a stratospheric platform named Pegasus whose characteristics are intermediate between planes and satellites was also presented.

De Lussy gave an overview of the Pleiades programme composed of two optical satellites scheduled to be launched in 2008 and 2009; they have a ground resolution of 0.7 metres in the panchromatic band with 12 bits per channel; revisiting time is 24 hours with the two satellites. They are capable of acquiring three stereoscopic images of the same zone and images will be provided with the physical sensor model as well as with the RFM-based model.

*Hoffman* and *Herrmann* reported on the status and the characteristics of the TerraSAR-X satellite. It will be launched in 2006 and will operate in the X band. The ground resolution is up to one metre in the best configuration and this will allow for urban land use classification. *Krieger* spoke about the TanDEM-X satellite, similar to TerraSAR-X and scheduled for launch in 2008/2009. Working with TerraSAR-X, it will allow single-pass SAR interferometry. The life cycles of the two vehicles will overlap for at least three years, this will allow the acquisition of a global DTM having a ground resolution of 12 metres.

*Everaerts* illustrated the Pegasus vehicle, belonging to the category of High Altitude Long Endurance (HALE) Unmanned Aerial Vehicles (UAV). It will fly at an altitude of 20 km, not interfering with the increasing aerial traffic, and carry a digital camera with 4 spectral bands and 12000 pixels, having a GSD of 20cm. Successively, improvements to the imaging system and the availability of SAR and lidar sensors are scheduled.

### Optical Satellites

Research on existing optical satellites is currently concentrated on three main topics: image orientation, DTM calculation by means of image matching, advanced treatment of the interior orientation.

Several authors tackled the various models used for image orientation: rational polynomial coefficients (RPCs), 3D affine transformation, various physical models. Numerous papers contain interesting results about the attainable accuracy and the problems met: *Fraser, Jacobsen, Poon, Willneff, Michalis* and others.

Some presentations were given about DTM calculation by means of matching high resolution satellite images (by *Baltsavias, Büyüksalih, Lehner, Poon, Stolle, Toutin*). Various typologies of images, terrain and camera models were considered and compared. *Baltsavias* and *Poon* used an algorithm, developed at ETH, capable of simultaneously matching more than two images.

*Stolle* presented a DTM-generation methodology based on self-consistency. It can be applied to any kind of image and is based on the usage of more than two: he uses the available redundancy to detect outliers and to give quality estimation of the produced DTM without using any check points.

*Baltsavias* also dealt with the interior orientation of optical satellite sensors. The images are delivered as if they were acquired by a simple and ideal line sensor, but the sensor is composed of multiple CCDs, instead. The virtual, single-line image is obtained by processing, which implies the knowledge of some interior orientation parameters. *Baltsavias* showed that some systematic errors in the generated DTM can be explained by the rather poor interior orientation.

### SAR

There were several significant presentations about SAR interferometry, scheduled sensors and the mapping usage of intensity SAR images. The invited paper of *Crosetto* about InSAR is reported above, as well as the upcoming SAR missions.

*Van Leijen* illustrated a rigorous description of SAR interferometric measurements in terms of least-squares. This allows a precise error propagation and the combined adjustment of SAR measurements, GPS and levelling data. *Van Leijen* also made some interesting observations about DInSar. He argued that ground truth doesn't exist for PS-InSAR (the InSAR technique based on persistent scatterers) as InSAR observations and other geodetic observations do not refer to the same points, because it is almost impossible to know to which object a persistent scatterer corresponds to. Besides, PS-InSAR often gives incorrect estimates of very local effects.

*Eineder* described a method to overcome the known limitations of InSAR when it is used over mountainous areas:

shadowing and layover. The method is based on the usage of multiple imagery, with different geometries.

Finally, Soergel gave a presentation about the opportunities offered to urban analysis by high-resolution intensity SAR data. He showed some images produced by the recent airborne SAR sensor PAMIR whose ground resolution is up to 10cm. He underlined that SAR and optical imagery are complementary because each type shows details which the other obscures.

### Automatic Building Extraction

Automatic building extraction is probably proceeding more slowly than was expected some years ago, but it certainly goes on and the workshop offered some good examples of this. *Hyyppä* summarized results of the EuroS-DR test on building extraction. The participants were given lidar data as well as aerial images; they could use some or all of the data, in an integrated way. They could use commercial as well as scientific programs, with automatic or semi-automatic procedures. A dense ground truth was measured with GPS and accuracy and degree of details of the reconstructions were rigorously assessed. *Bailloeuil* presented an automatic method for improving the spatial location of buildings which are contained in a 2D digital map by means of high resolution panchromatic optical satellite imagery. Using the existing information contained in the map, buildings are roughly localized in the images and their edges are precisely reconstructed with active contours.

### Road Detection and Traffic Monitoring

Some presentations were given about roads. The discussed topics were traffic monitoring (*Reinartz, Suchandt*), vehicle queue detection (*Leitloff*), traffic flow estimations (*Toth*), verification of road databases (*Gerke*). The used data are very different: aerial and satellite optical images, as well as SAR intensity imagery.

### Image and Lidar Data Processing

*Ehlers* presented an improved methodology to perform pansharpening. *Mercer* illustrated an original pansharpen-

ing implementation where the high-resolution image, rather than being a panchromatic optical one, is a SAR intensity image; the low-resolution one is optical as usual, acquired by the Aster satellite.

Some interesting contributions were also given on lidar data. *Jutzi* presented work on full waveform instruments, *Brzank* discussed the use of lidar for coastal zone management and focussed on automatic breakline detection from such data.

*Bähr* illustrated a methodology based on the combined usage of hyperspectral images and lidar data, capable of automatically classifying the type of roof surface material, following a recent EU directive.

Finally, an interesting poster was presented by *Becker*. Firstly she proposed a method to evaluate the effective ground resolution of images produced by aerial digital cameras: as the final image is obtained by tiling and resampling the original component images, the nominal resolution doesn't necessarily correspond with the real one. Successively she proposed a method for improving image resolution, based on image restoration.

### Conclusions

It was a truly rich workshop. The main conclusions can be summarised as follows.

- Digital aerial cameras are an important technical and commercial reality.
- Optical satellite techniques are quickly incorporating all the traditional photogrammetric features, in terms of rigorous image orientation modelling, precise error propagation and redundancy exploitation.
- The number of the available SAR sensors, airborne as well as spaceborne, is increasing. Techniques and applications for radar data are quickly expanding.
- Semi-automation and quasi full-automation are conquering several applicative niches.

The workshop proceedings are available from <http://www.ipi.uni-hannover.de>.

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## Report on the ForestSat 2005 Workshop

*Borås, Sweden from 31 May – 3 June 2005*

*By Professor Håkan Olsson, Co-chair ISPRS, WG VIII/11 Sustainable forest and landscape management, e-mail: [hakan.olsson@resgeom.slu.se](mailto:hakan.olsson@resgeom.slu.se)*

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The ForestSat 2005 workshop about "Operational Tools in Forestry Using Remote Sensing Techniques" held in Borås, Sweden, attracted more than 100 participants from 22 countries, mainly from Europe and North America. The workshop was hosted by the Swedish Forest Administration and was co-sponsored by ISPRS working group VIII/11; IUFRO Unit 4.02.08 Remote Sensing Technology

and GIS; and the Special Interest group for Forestry within the European Association of Remote Sensing Laboratories (EARSeL). The first two days were devoted to scientific presentations in two parallel sessions. All aspects of forestry remote sensing were covered, but there was a certain emphasis on operational use of satellite data in National Forest Inventories. One of the key note speakers

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was professor Erkki Tompoo who shared the latest development of the kNN method, which the National Forest Inventory (NFI) in Finland has pioneered as an operational method for assigning NFI sample plot data to satellite image pixels. Another key note speaker was Dr Ronald McRoberts from USDA Forest Service, Minnesota, who have introduced the use of Landsat satellite data for post stratification of sample plots based forest resource estimates. In this way, reliable statistics can be presented for smaller areas than if the field sample plots only were used. Dr Mats Nilsson from the Swedish National Forest Inventory showed that a similar method also has been developed in Sweden.

Sweden was in January 2005 hurt by the worst ever storm damages on forest. The experienced was that most damaged areas could be detected by air photos, our multi-temporal analysis of optical satellite data. C-band radar was however not useful for this purpose. Interestingly, it became evident from a presentation at the workshop from the French National Forest Inventory, that these experiences were shared also by them, when they analyzed data after the storm in France in December 1999. One promising additional finding from Sweden is however that radar data with very long wavelength (55 MHz VHF band CARABAS –II data) could detect both storm felled areas and many stands were only a fraction of the stems had fallen.

From the results presented at the workshop, it is clear that satellite data operationally can provide useful overviews of forest resources and changes, as well as improving sample plot based statistic surveys. For obtaining more accurate estimates on stand level than provided by traditional air photo interpretation, other methods are however needed. The most promising techniques presented were laser scanning and various radar techniques like VHF SAR and X-band InSAR

The scientific presentations are collected in three proceedings volumes which can be freely downloaded from the bookshop at the web site of the Swedish Forest Administration: <http://www.svo.se/forlag/rapport.asp?boktyp=rapporter>; look for report 8a, 8b and 8c, 2005. A special issue of Remote Sensing of Environment with selected articles based on works presented at the workshop will also follow.

The two days with scientific presentation ended with a discussion, which was opened by three policy oriented participants. Dr Lars Laestadius, World Resource Institute, Washington pointed out that that new user groups like for example NGO's are coming in and that it is important to spread data and products paid with tax-payer money in a way that it reaches regular people. He has worked with a group of Russian NGOs in the World Forest Watch net-

work, who at the workshop presented interesting results based on visual satellite data interpretation of very large areas.

The workshop was also the final meeting of the four year Forest Safe project ([www.svo.se/forestsafe](http://www.svo.se/forestsafe)) in which forest authorities and universities in UK and Sweden have developed new operationally oriented remote sensing methods and the second person to make a prepared statement was Dr Helene McKay from the Forestry Commission, UK. She recognised the value of satellite data for stratification and large area overviews, but stressed the need for end-user oriented and cost efficient systems that can provide and distribute the data in a reliable way.

The third person to make a prepared statement was Anders Persson. He is the lead remote sensing expert in the Swedish Forest Administration, which annually acquires SPOT / Landsat data for all of Sweden, for operational mapping of clearfellings. He stressed that data must be used within its limits, that it is a trap to talk too much about the future and that those responsible for operational tasks not can wait for the scientists only, they must themselves develop routines that are suited for the needs of their organisations.

The continued discussion focused much on the need for operational data supply, and workshop participants adopted the following statement: *"At this point, long term commitment to systematic acquisition, archiving and dissemination of data is the most essential action needed for realising the forest monitoring possibilities offered by satellite remote sensing. Data must also be affordable for teaching, research and NGO's."*

The third, optional, day of the workshop was devoted to practically oriented presentation. Several of these were developed within the ForestSafe project. For example the success of using laser scanner data for measuring plantation forests in the UK was presented. Also the distributed system for mapping clearfellings in Sweden was demonstrated, as well as the use of satellite data in a major forest company and in the Swedish Environmental protection agency. Slides from these presentations are available at the conference web site: [www.svo.se/forestsat2005](http://www.svo.se/forestsat2005).

Finally, the workshop ended with an excursion day where the Swedish forest administration demonstrated their way of working. A highlight this day was also the demonstration of light weight (1 kg) UAVs which took photos of the forests using standard digital cameras.

A new workshop about 3D Remote sensing in forestry to be held in Vienna 13-15 February 2006, and being co-sponsored by EARSeL and ISPRS was advertised. <http://ivfl.boku.ac.at/3DRSForestry>.

## The ISPRS International WG I/2 Workshop on 3D Mapping from InSAR and LiDAR

Banff, Alberta, Canada, 6-10 June 2005 (<http://www.fom.fgan.de/isprs/ws05/>)

The meeting attracted 50 participants from eleven countries spread over four continents. It featured 24 technical papers, two keynote addresses, one invited presentation and was preceded by a one-day pre-workshop tutorial on *Geo-Referencing, LiDAR, Imaging Systems, and InSAR: Principles and Applications*. The first keynote address, titled *The Role of Radar in Mapping the World - Past, Present and Future* was given by Emeritus Prof. Gottfried Konecny from University of Hanover. The very inspiring presentation covered more than 40 years of Radar technology and closed with an outlook to its future in mapping. Mike Renslow from Spencer Gross Associates (and Editor PE&RS) presented his energetic and entertaining keynote address on *The Status of LiDAR Today and Future Directions*. His discussion was primarily focused on commercial aspects of LiDAR, such as data acceptability, application

areas and institutional challenges. In his invited presentation, titled *Sensor Support for Autonomous Vehicle Navigation*, Charles Toth, The Ohio State University, provided an overview of sensor developments and integration in the context of the 2004 DARPA Grand Challenge. The technical program had a balanced mixture of research and practical presentations on both active sensing technologies – there were 14 papers related to LiDAR and 7 to SAR. The LiDAR papers were exclusively concerned with airborne platforms, while the SAR contributions had the full verticality of platforms, including spaceborne and airborne systems. There were three talks about geo-referencing as a much needed enabling technology for both sensors. The presentations provided a review of the state-of-the-art of the LiDAR and SAR technologies, a representative cross-section of operational experiences,



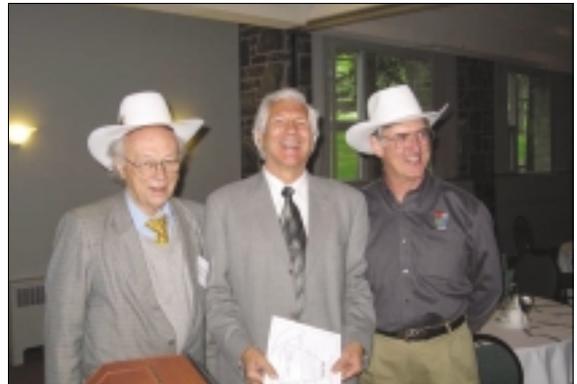
The Banff Centre, in the heart of the Canadian Rockies provided an excellent venue for the workshop. Continuing a tradition extending back to Cambridge (Comm II, 1998) a jazz trio contributed to the 'bon ami' of the workshop dinner.



Charles Toth showing the TerraMax vehicle (yellow) at the 2004 DARPA Grand Challenge. Boris Jutzi explaining his new research results.



Bryan Mercer and Gottfried Konecny engaged in a discussion after the first keynote address.



Bryan Mercer presenting honorary Calgary citizenship to Gottfried Konecny and Mike Renslow.



Although the workshop officially ended, the discussion continued; from left to right Ted Roesch (Terra Remote Sensing), Martin Flood (NIIRS10), Frédéric Bretar (IGN), and Gunho Sohn (GeolCT).

research developments and future directions. A PDF version of the presentations will be made available to the ISPRS archives. The technical program of the workshop was organized by Charles Toth (The Ohio State University), Bryan Mercer (Intermap Technologies), Boris Jutzi (FGAN-FOM) and Naser El-Sheimy (University of Calgary). Bryan Mercer, WG I/2 Co-Chair, deserves special acknowledgement as the local organizer with support from Intermap Technologies and the University of Calgary.

## ISPRS Student Consortium – First Summer School

*Istanbul, Turkey from 19-26 June 2005*

*By The Student Coordinators of ISPRS Student Consortium Esra Erten, Jaakko Järvinen, Sultan Kocaman and Yohei Shiraki and Local Organizing Committee*

The ISPRS Student Consortium (SC) was founded during the ISPRS Congress in July 2004 in Istanbul, when it was established under ISPRS Commission VI 'Education and Outreach'. The continuity of the SC was ensured by setting up an ISPRS Working Group 'Promotion of the Profession to Students' that will provide a stable link between SC and ISPRS.

The main purpose of Student Consortium is to provide an important viewpoint into the work and activities of this professional international scientific society for students. It is open for all the advanced diploma students and young researchers in the ISPRS scientific fields. SC is also supposed to be an important link between the students from different countries, providing a good platform for cultural and information exchange.

During the first year of the SC, we have started from the basics to build up our organization in stable but also flexible way. In practice, this means among other things that we have prepared a WEB site for the SC (<http://www.students.itu.edu.tr/~isprs/>), introduced our organization internationally in many ways and also started to gather information of our members with a member questionnaire located at our WEB site. The current number of SC members is 130 from almost 30 countries all over the world, from India to United States. Especially many European countries are represented.

The designing and realization of the first ISPRS Summer School (SS) has also been one of the main goals for SC during the first year of its appearance. This event took place at Istanbul Technical University's Maslak campus during 19-26 of June and it was arranged in cooperation between SC Student Coordinators and the Local Organizing Committee consisting of Turkish students. Altogether

er almost 50 students registered for our meeting, from which 39 from 11 different countries finally participated. The furthestmost guest came all the way from Australia (University of Melbourne).

For practical reasons, this first ISPRS Summer School was arranged right after IGSM-GHG student meeting, which also took place at ITU's Maslak campus this year. Thus, many students were able to participate in both events. This kind of integration between ISPRS SC Summer School and other international meetings and conferences might be a useful approach also in the future.

The general topic of ISPRS Summer School was 'Satellite Data Processing and Spatio-Temporal Analysis (for Resource and Disaster Mapping, Monitoring and Management)'. In practice, this topic was presented to the participants in a wide range of theory and application lectures provided by many world-class lecturers, real professionals in their own subject matter. Useful and extensive teaching material was provided on CD and in hardcopy.

The programme of the summer school including lecturers and other related information can be found at [http://www.students.itu.edu.tr/~isprs/Summer\\_School.htm](http://www.students.itu.edu.tr/~isprs/Summer_School.htm). At the same WEB site, we plan to put soon also the teaching material of the summer school for free access.

Every evening after the lectures the members of Local Organizing Committee arranged for the participants interesting and variable social events, providing a chance to get to know the Turkish culture. These social events were important for building personal relationships between the participants, while the students could meet and discuss with the lecturers in person as well.

The last official event of the week was a discussion forum on Friday, where all the participants had a chance to express their thoughts about the Summer School. In general, the participants were very satisfied with the arrangements and the content of the Summer School. It was also a unanimous decision that this kind of events should definitely continue in the future. One of the things that participants would clearly want to have more in coming Summer Schools are computer labs, workshops and other similar activities.

This would provide also an important practical view into the material that was taught in theory during lectures. There was also a discussion about whether the Summer School should have a more specific topic, which then would be handled in more details. Maybe these both ideas might be combined in such way that the first part of the Summer School would be a little bit more general lectures for all together and after that participants would split into smaller groups with more specific topics and applications. But as a new organization we should be open and able to try different arrangements, while searching the most functional and practical form for our Summer Schools in the future.

In his conclusion speech at the end of discussion forum, Dr. Rahmi Nurhan Celik, Chair of ISPRS WG VI/5 – Pro-

motion of the Profession to Students, pointed out an important view that the Summer School should be only one of the many activities of the Student Consortium. This means that we should not concentrate too much in optimizing just one annual event, but should instead try to develop several activities covering different needs. We all agree that this is the way for the ISPRS Student Consortium to reach its major goal - to unite all the students around the world working in the ISPRS fields, by providing them many chances to meet each other and to really cooperate.

At the end, we would like to express our special gratitude to Mr. Emmanuel Baltsavias the Second Vice President of ISPRS, Mr. Kohei Cho the President ISPRS Commission VI, the lecturers of the Summer School and all other persons who have greatly helped us during this first year of Student Consortium and especially in arranging of ISPRS Summer School. We would also like to express our gratitude to our sponsors: the ISPRS Council, ESA, ITU, ITU CSCRS, Leica Geosystems Turkey, Yildiz Technical University and the Turkish Chamber of Surveying and Cadastre Engineers. And of course we want to thank all participants as well.

Thank you...

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## Working Group Meeting IV/7

*Singapore from 20 - 24 June 2005*

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The ISPRS working group IV/7 ("Extraterrestrial Mapping") met in Singapore in June of this year during a special session of the assembly of the AOGS (Asia Oceania Geosciences Society). The AOGS meetings have become a popular communication platform for geoscientists worldwide, and in this year AOGS had an attendance of approx. 900 registrants. AOGS has a strong

Planetary Science section which enjoys growing interest. Among a total of 19 Planetary Science sessions, the special session on "Extraterrestrial Mapping" attracted 20 abstracts.

One main topic of the session dealt with the results from the HRSC (High Resolution Stereo Camera) on Mars Express, a camera specifically designed for the topographic mapping of the planet. Mars Express, which had been launched by the European Space Agency in 2003, has now completed almost 2000 orbits; it is likely that the mission will be extended through 2006 and 2007. The session successfully attracted experts who discussed methods of data processing and analysis, as well as cartographic products (see <http://www.dlr.de/mars-express/images/> for press-released sample images).

Another focus of the meeting was on Lunar science. The technology-demonstration mission Smart-I was launched by the ESA (European Space Agency) last year, has successfully entered Lunar orbit, and is currently carrying out an observation campaign. Other space agencies worldwide are currently preparing missions to the Moon, among them the US, Japan, India, and China. The large



*Skyline of Singapore, in June 2005.*

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Suntec Conference Center (left), and coffee/poster area of the AOGS meeting.

Japanese spacecraft Selene, to be launched in 2007, will carry several cameras, spectrometers, radar, as well as a laser altimeter for comprehensive high-resolution topographic mapping of the Lunar surface.

Finally, highlights from the Cassini mission were presented. Cartographers from DLR (German Aerospace Center)

please contact the working group chairman Dr. Jürgen Oberst (Juergen.Oberst@dlr.de).

#### Acknowledgements

We wish to thank the AOGS organizers for giving us the opportunity to hold an ISPRS session in the hospitable and cosmopolitan city of Singapore.

had processed images from the Cassini cameras to derive Digital Terrain Models and global maps of Saturn's Icy Satellites. Scientists and the public alike were fascinated by stunning pictures of Mimas, Enceladus, Tethys, Dione, Rhea, Iapetus, and Phoebe.

Abstracts and presentations from the workshop can be obtained under [www.dlr.de/isprs](http://www.dlr.de/isprs) (click on 'Singapore Meeting'). For further information,

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