

TECHNICAL COMMISSION I: SENSORS, PLATFORMS AND IMAGERY

President: George Joseph (India)

Secretaries: Mr A.K.S. Gopalan, India, Mr V. Jayaraman, India

Terms of Reference

- Planning for aerial and space missions
- Design, construction, testing, installation and calibration of analogue and digital imaging sensors
- Design and performance of data reception and pre-processing systems
- Geometric and radiometric properties of image data and quality standards, and factors (environmental and others) affecting data quality
- Technical systems for recording sensor data, film scanners and auxiliary data (time, position, attitude, etc.) and media (film, magnetic, optical, etc.)
- Pre-processing techniques to generate data suitable for analysis and measurements (radar image synthesis, multisensor integration, radiometric and geometric corrections, etc.)

State of Science and Technology in Commission I Topics

A large number of satellites having a variety of sensors have been providing very valuable data on the Earth's environment. In order to use these data effectively, it is necessary to monitor radiometric performance of these sensors. It is necessary to choose calibration test sites where spectral reflectance characteristics can be determined accurately. CEOS is also actively pursuing this aspect.

There is also a need for development of pre-processing and archival technology. Various issues related to products, media, delivery, timeliness, archival facility must be addressed.

Digital terrain elevation models generated from high resolution stereo data as well as SAR have many civilian applications. The accuracy range achieved is +/- 10 m. This needs further improvements. The airborne laser scanning systems having accuracy of 0.1 to 0.3 m are now available.

The global observing system for the monitoring the health of the earth are being designed. The optimum combination of microwave and optical sensors, the fusion of such data for monitoring various earth processes will have to be addressed. Industrial efforts in this regard needs to be encouraged.

The cost-effective small satellites for specific applications are being advocated by many. This needs to be investigated.

ACCOMPLISHMENTS OF COMMISSION I DURING 1997 WORKING GROUP ACTIVITIES DURING 1997

WG I/1: Sensor Parameter Standardisation and Calibration

Chairperson: Dr Manfred Schroeder (Germany)

Co-Chairperson: Dr A. Alan Belward (CEE, Italy)

State of Science and Technology of WG I/1

For monitoring the radiometric performance of multispectral space sensors and also for intercalibration of different space sensors, large ground test sites have to be selected based on specific criteria. The main criterion is that the spectral reflectance characteristics can be determined very precisely and that these characteristics change only slowly. Activities for definition and selection of these types of calibration test sites are going on in France, Canada and the US (s. papers of A. P. Teillet and A. Belward at the Hannover joint working group workshop in September/October 1997). These test sites should also be used for validation, ie. to convert raw sensor data into accurate and useful geophysical or biophysical quantities. Calibration and validation is also the task of CEOS-Cal/Val WG which plans some pilot projects in this field in the coming years.

WG Activities:

The main event in WG I/1 - activities for 1997 was the organisation of a workshop jointly with WG I/3 "Sensors and Platforms for Topographic Survey" and WG IV/4 "Mapping Using High Resolution Satellite Imagery". The workshop under the title "Sensors and Mapping from Space" was held from 29 Sept. to 2 Oct. 1997 in Hannover, Germany. In this workshop which was attended by approx. 90 participants from 28 countries 37 papers were presented in 12 sessions.

Proceedings of the workshop will be published until the end of 1997 and can be ordered from Institute for Photogrammetry and Engineering Surveys (IPI) University of Hannover, Nienburger Str.11, D-30167, Hannover, Fax +49 511 762 2483

WG News

CEOS - Calibration/Validation Working Group will hold the following meetings in 1998:

- March 24-25, 1998 - Joint Research Centre, Ispra, Italy - IGOS Calibration and validation workshop - Contact: Alan Belward (alan.belward@jrc.it)
- July 22-24, 1998 - Tokyo, Japan
- Working Group on calibration and validation - 14th Plenary Meeting
- Contact: Alan Belward (alan.belward@jrc.it)

CEOS - Cal/Val WG has the following sub-groups - Infrared and Visible Optical Sensors (IVOS) - Synthetic Aperture Radar Calibration (SARCAL) - Terrain Mapping (TM) - Microwave Sensors (MS)

WG I/2: Pre-Processing Archival and Dissemination of Image Data

Chairperson: Prof. Dan Rosenholm (Sweden)

Co-Chairperson: Dr Joe Thurgood (USA)

Secretary: Ms Camila (Sweden)

WG Activities

Two joint workshops with II/3 on 'From Producer to User' - User requirements of archiving, pre-processing and dissemination satellite image data and 'Impact of spatial data handling technologies in Heterogeneous environments' were held during Oct. 7-9, 1997 at Boulder, Colorado, USA.

The workshop on 'From Producer to User' covered the following topics.

- Future requirements on data archival and preprocessing technology
- Preprocessing algorithms
- Future role of preprocessing and archival organisations
- Requirements on data dissemination - products, media, delivery, speed, archive maintenance.
- The need of the data users - expressed by themselves
- Panel discussion on user requirements

WG I/3: Sensors And Platforms For Topographic Survey

by Chairperson: Dr K. Jacobsen

Co-Chairperson: Dr T. Natarajan (India)

State of Science and Technology of WG Topics

Besides the well established governmental based space systems for topographic survey there is a clear tendency to new high resolution commercial sensors - see L. Fritz "August 1997 Status of New Commercial Earth Observation Satellite Systems", Joint Workshop Sensors and Mapping from Space, Hannover.

New digital sensors based on CCD arrays and especially 2 or 3 line stereoscopic sensors in combination with GPS and INS are also commencing to be applied in the field of civilian applications from aircraft.

The bottle neck of limited attitude accuracy of gyroscopes seems to be solved with the laser gyroscopes, which can enable together with GPS a direct determination of all elements of the exterior orientation for several purposes.

The DTM generation by SAR is for operational purposes limited to an accuracy range ≈ 10 m.

Different airborne laser scanning systems are now available for operational use in the accuracy range from 0.1 to 0.3 m. Their cost benefit relation can be compared with the classical photogrammetric DTM generation.

WG Activities

The WG participated in the joint workshop was arranged together with the working groups I/1 and IV/4 with the title "Sensors and Mapping from Space" from September 29 to October 2, 1997 in Hannover, referred to above.

WG News

A working group in this field can only take care for the distribution of information about new systems and their applications. It is not possible to influence the start and to create new systems, but the distribution of knowledge about new systems is also important to support the operational use.

A further workshop is planned in 1999. The main form of information distribution will be in the form of newsletters. The internet page of the working group will be upgraded with information of new available systems.

Relevant special events, general comments:

The working group is strongly influenced by the future enhanced space systems and those already available with the high resolution PAN camera of IRS-1C and 1D. But also the systems for high accurate positioning and attitude evaluation, together with laser scanner can have a very strong influence on the field of photogrammetry.

WG I/4: Microwave And Optical Sensors For Geosphere-Biosphere Studies

Chairperson: Dr Jean Louis Fellous, CNES, Toulouse, France

Co-Chairperson: Prof. John R. Miller, ISTS, North York, Ontario, Canada

The formation of working group is in progress.

WG I/5: Advanced Platforms And Sensors

Chairperson: Mr Takashi Moriyama

Co-Chairperson: Mr K. Thyagarajan, India

WG Activities

The WG-5 regular domestic meetings were held in June and September in Tokyo with seven WG-1 members. The meetings focussed on the current status and technical trend of POS/DG (Positioning and Orientation System for Direct Georeferencing). The group has been investigating small satellite for earth observation, and agreed to compile the information as publishing material at the end of February 1998. The advanced sensors, such as smart sensor, are being investigated.

State of Science and Technology of WG Topics

The WG has been keen to concentrate on investigations on national driven small satellite programmes for earth observation. The group also discussed the performance

evaluation of POS/DG which is developed by Canada/APPLANIX. Future sensors have been studied and an investigation report will be developed next March.

WG News

The WG is preparing to issue a Research Investigation Report on Existing/Planned Small satellite for Earth Observation. This report will be distributed at the coming ISPRS Commission I Symposium in Bangalore, India in February 1998. The investigation has been fulfilled through a contract to Japan Society for Photogrammetry and Remote Sensing. It will be printed in 200 which will be available free of charge for ISPRS members.

Relevant special events, general comments

CEOS (Committee on Earth Observation Satellite) decided to cooperate with ISPRS through the activities that are common interest for both parties. The CEOS Plenary agreed to demonstrate this cooperation with ISPRS by attending the Commission I symposium in Bangalore, India. Takashi Moriyama who is the chairman of WG I/5, and newly appointed as the chairman of CEOS WGISS (Working Group on Information System and Service), has a roll to harmonize common interest activities.