

1996 – 2000

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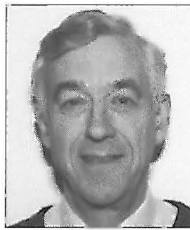
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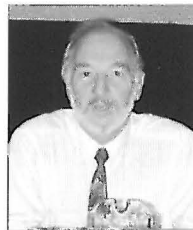
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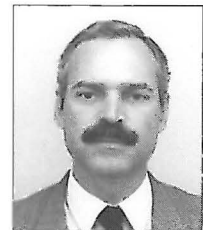
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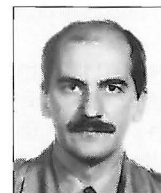
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Commission I - Terms of Reference

- 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 datasets suitable for analysis and measurements (radar image synthesis, multi-sensor integration, radiometric and geometric corrections etc.)

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WG I/1 - Terms of Reference

- Standardisation of definitions and measurement of various sensor specification related parameters, such as spectral resolution, radiometric sensitivity etc.
- Techniques and procedures for laboratory calibration of sensors
- In-flight calibration of sensors, including atmospheric correction and development of standard calibration sites and procedures
- Calibration of non-metric airborne sensors
- Calibration, characterisation and evaluation of image scanners
- Collaboration with organisations involved in the standardisation of imaging devices and components

used in imaging, such as GEN, ISO, IEC, SPIE and CIE.

- Participation with the CEOS Working Group on Calibration and Validation

WG I/2**Pre-processing Archival and Dissemination of Image Data****Chair:**

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WG I/2 - Terms of Reference

- Pre-processing algorithms, including platform modelling, noise removal, radiometric normalisation etc.
- Pre-processing algorithms and architectures for SAR (including Interferometric SAR)
- Data archival technology, including hardware, data compression technology etc.
- Data distribution and dissemination, especially for operational use with fast turn around time

WG I/3**Sensors and Platforms for Topographic Survey****Chair:**

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WG I/3 - Terms of Reference

- Specifications of missions (mode of stereo coverage, swath, orbital characteristics, spatial resolution, payload configuration etc.)
- Design and realisation of aerial and space-borne sensors for cartographic mapping
- On-board data processing
- Systems for position and attitude evaluation and control
- Processing techniques for multi-sensor data integration
- Interferometric SAR applications for DTM generation
- Design, realisation and calibration of airborne laser scanning systems

WG I/4**Microwave and Optical Sensors for Geosphere-Biosphere Studies****Chair:**

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WG I/4 - Terms of Reference

- Survey of developments in global observing optical and microwave systems for land and ocean
- Development of new technologies and techniques in microwave sensor design, including interferometric, polarimetric and multifrequency SAR systems
- Assessment of end-to-end radiometric calibration procedures for microwave imaging systems, including error analysis and error reduction techniques
- Data normalisation for long term data comparison
- Optical-microwave data integration techniques

WG I/5**Advanced Platforms and Sensors****Chair:**

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WG I/5 - Terms of Reference

- Small satellites for earth observation: complexity of satellite realisation, reliability and cost
- Platform guidance, navigation and positioning: integration of GPS and orientation systems
- High resolution imaging spectrometer for ocean colour, mineral exploration etc.
- Review of realisation of new sensors, such as smart sensors, polarisation sensors, pollution monitoring, laser altimeter, rain radar

Commission II - Systems for Data Processing, Analysing and Representation

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Commission II - Terms of Reference

- Design and development of systems for measurement, processing, analysis, representation and storage of photogrammetric, remote sensing and GIS data
- Study and evaluation of system integration aspects for photogrammetry, remote sensing and GIS data processing
- Analysis of systems and their components for automated, semi-automated and manual digital processing systems
- Development of systems and technologies for radar data processing
- Study of real-time mapping technologies
- Standardisation of digital systems for photogrammetry, remote sensing and GIS

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WG II/1 - Terms of Reference

- Design and development of integrated real time mobile data collection systems and autonomous vehicle navigation systems including:

techniques such as GPS, INS and wheel sensors and mapping sensors, such as CCD cameras, laser rangefinders and radar devices

- Research in real time processing of mobile mapping data
- Systems aspects related to sensor calibration, data reduction and optimisation, and sensor information processing
- Automation of information extraction from mobile mapping sensor data
- Integration of navigation and mapping sensors

WG II/2**Software and Modelling Aspects of Integrated GIS****Chair:**

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WG II/2 - Terms of Reference

- System design for integration of GIS and image analysis
- Determination of appropriate procedures for data exchange and interoperability through open GIS standards and intelligent interface design
- Data fusion within integrated GIS
- Development of new benchmark procedures for the whole range of

- integrated GIS functionality
- Visualisation techniques, especially to support data quality assessment
- Interaction between humans and machines
- Low-cost mapping and GIS integration systems
- Collaboration with others on spatial-temporal aspects of GIS

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WG II/3 - Terms of Reference

- Composition and transmission of raster data formats
- Vector data format and topological models
- Spatial data models
- Database management systems for spatial data in a heterogeneous environment
- High volume storage media
- High performance I/O sub-systems
- Cataloguing and data dictionaries
- Data exchange between heterogeneous environments, hardware and software, use of WWW and other networks

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WG II/4 - Terms of Reference

- Integration of algorithms for processing SAR data, such as geocoding, stereoscopic matching, feature extraction, into accessible user systems
- Integration of SAR data with other data
- Provision of information on SAR to improve accessibility
- Promotion of user-friendly SAR software

WG II/5 Systems for Integrated Geoinformation Production

Topics will be managed by Commission

WG II/5 - Terms of Reference

- Design of systems for specific processes or applications which involve the use of multiple sensors and image processing techniques, for example, for monitoring crop growth
- Integration of techniques for correction and analysis
- Standards for systems
- Methods of design and of testing performance

WG II/6**Integration of Image Understanding into Cartographic Systems****Chair:**

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WG II/6 - Terms of Reference

- Semi-automatic and automatic cartographic feature extraction, especially the system integration aspects
- Automatic extraction and exploitation of surface material information
- Integration of digital photogrammetric systems and computer graphics for visualisation and simulation
- Utilisation, verification and update of spatial databases
- Integration of photogrammetric knowledge and techniques into computer vision algorithms and systems
- Application of computer vision algorithms to various sensor and acquisition geometries

WG II/7**Practical and Implementation Issues in Digital Mapping****Chair:**

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WG II/7 - Terms of Reference

- Establishment of a forum for exchange of information and ideas between manufacturers, researchers and users
- Discussion and determination of user requirements with manufacturers, and preparation of action plans for implementation
- Discussion and reporting on standard data transfer formats for digital systems
- Collaboration with other groups such as OEEPE and Open GIS Consortium (OGC)

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WG II/8 - Terms of Reference

- Procedures and systems for automatic image orientation, generation of digital terrain models, and orthoimage generation from airborne and space-borne sensors
- Semi-automatic extraction of GIS and CAD data

- Procedures and systems for revision of spatial databases
- Implementation and study of effects of data compression
- Integration of input and output devices such as image scanners and raster plotters
- Practical issues of digital photo-

grammetric systems, including efficiency, quality control and economy

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Commission III - Terms of Reference

- Algorithms for geometric determination and analysis of photogrammetric data
- Feature extraction from multi-sensor, multi-resolution, multi-temporal imagery
- Image understanding
- Integrated sensor orientation
- Image sequence analysis

- Algorithms for digital photogrammetric systems and their GIS integration
- GIS concepts, with particular emphasis on integration of image data
- Merging theories from remote sensing and computer vision to interpret multi-sensor, multi-spectral and multi-resolution imagery
- Quality control, verification and performance measures of algorithms
- Theory and algorithms for synthetic aperture radar

WG III/1 Integrated Sensor Calibration and Orientation

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WG III/1 - Terms of Reference

- Single- and multi-sensor system calibration
- Automatic sensor orientation using GPS and INS information, and digital image processing techniques
- Automatic aerial triangulation
- Combination of sensor orientation and calibration algorithms with 3D scene reconstruction algorithms
- Multi-sensor information integration, e.g. aerial and satellite imagery, radar data, multi-spectral imagery, in conjunction with WG III/2

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WG III/2 - Terms of Reference

- Algorithms for surface reconstruction from different cues, such as stereo, shading, shadows, texture, and spectral properties
- Integration of information from different sources, including aerial and satellite imagery, radar data, range data, multiple images, and GIS data
- Automatic verification and quality control of reconstructed surfaces
- Interrelations between matching and interpolation
- Role of surface reconstruction in automatic scene analysis

WG III/3

Feature Extraction and Grouping

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WG III/3 - Terms of Reference

- Segmentation of images into meaningful features, such as points, edges, and regions
- Investigation of the impact of geometric and radiometric image formation on image segmentation
- Aggregation of features by iterated grouping methods
- Verification of global consistencies by optimisation techniques
- Investigation of the potential of performing grouping processes in 3D under special consideration of object space constraints, precision and reliability
- Evaluation of the performance of feature extraction and grouping algorithms in co-operation with similar efforts in computer vision

WG III/4

Image Understanding/Object Recognition

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WG III/4 - Terms of Reference

- Theoretical/conceptual investigations in 3D object recognition and image understanding
- Spatial modelling of human-built and natural objects like buildings,

- roads, or vegetation (geometric modelling, semantic modelling)
- Theory and algorithms for automation of 3D object recognition and object extraction
- Knowledge engineering with emphasis on knowledge encapsulation, knowledge representation and manipulation
- Integration of multiple sources (DTM, GIS, colour, etc.) in cooperation with WG III/5
- Performance characterisation of algorithms (quality control, test procedures) jointly with WG III/3

WG III/5

Remote Sensing and Vision Theories for Automatic Scene Interpretation

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WG III/5 - Terms of Reference

- Merging theories from remote sensing (classification) and computer vision for Object Recognition/Image Understanding (OR/

- IU), to analyze and interpret multi-spectral, multi-sensor imagery
- Exploration of the potential of scale space theory for multi-spectral and hyper-spectral imagery; extending the theory by including the spectrum
 - Combination of Modelling efforts of real world objects in GIS, digital photogrammetry and computer vision
 - Investigation of the possibility of constraining the 3D image understanding and object recognition problem by GIS information, in co-operation with IC WG IV/III.2 and WG VII/4

WG III/6**Theory and Algorithms for SAR****Chair:**

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WG III/6 - Terms of Reference

- Theory and algorithms for SAR, particularly for interferometry and feature extraction
- Establishment of state-of-the-art

radar mapping

- Geometric relationships in processing and interpreting SAR data
- Quality control aspects of radar images and derived products, such as radar maps and DTMs

Commission IV - Mapping and Geographic Information Systems

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Commission IV - Terms of Reference

- Analogue and digital mapping procedures and products
- Revision of topographic maps and map databases
- Data acquisition, data processing, analysis of data and visual representation in GIS
- Application of GIS to land-related record management (e.g. multi-purpose cadastre and utility mapping) and decision-making tasks
- Radar and planetary mapping
- Digital terrain models
- Conceptual and logical spatial data modelling for storage and retrieval in spatial data bases

Inter-Commission (IC) WG IV/III.1 GIS Fundamentals and Spatial Data Bases

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IC WG IV/III.1 - Terms of Reference

- Conceptual GIS data modelling with regard to vector, raster and attribute data structures, including 3D aspects
- Multiscale representations of spatial data to investigate aggregation and generalisation techniques
- Integration of uncertainty measures in spatial data structures
- Investigation of kinematic and dynamic spatial data structures to manage spatio-temporal phenomena in GIS
- Development of hybrid data structures to integrate vector data, raster data and imagery of all kinds

Inter-Commission (IC) WG IV/III.2 Integration of Image Analysis and GIS

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IC WG IV/III.2 - Terms of Reference

- Use of GIS data and models to support image analysis
- Matching of image features and GIS objects for change detection and database revision
- Reconciliation of object modelling used in image analysis and GIS
- Investigation and development of techniques for fusion of geocoded multi-sensor data
- Use of image analysis techniques for extracting height information for 2D geo-databases
- Integration of image analysis techniques with GIS for querying, analysis and representation of spatial data
- Treatment of uncertainties, generalisation, and scale and temporal differences of GIS and image derived data

WG IV/1

Database Design and Spatial Data Access

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WG IV/1 - Terms of Reference

- Logical GIS data modelling for mapping of conceptual spatial data structures
- Investigation into the suitability of relational data-base management systems (RDBMS) for storage and retrieval of vector data, raster data, imagery and attributes
- Use of structured query languages for retrieval of geo-referenced data with special emphasis on recent developments such as SQL3 and GeoSQL
- Storage and retrieval of imagery in standard database systems
- Investigations into the potential of object-oriented database systems and object-oriented modelling techniques
- Use of distributed heterogeneous spatial databases to link digital topographic data and imagery (eg Open GIS)

WG IV/2

Digital Terrain Models, Orthoimages and 3D GIS

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WG IV/2 - Terms of Reference

- Use of DTM datasets for regional, national, and global modelling
- Applications of DTMs for topographic and thematic mapping, terrain visualisation and ortho-image generation
- Investigations into 3D digital surface modelling (DSM) techniques
- Integration of DTMs and ortho-images in GIS
- Applications of 3D modelling and 3D visualisation
- Investigations into suitable data structures for 3D GIS

WG IV/3

Temporal Aspects and Topographic Database Maintenance

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WG IV/3 - Terms of Reference

- Documentation of the status of world mapping, and requirements for maps and database revision techniques
- GIS data homogenisation using statistical and image matching techniques for database maintenance
- Implementation of kinematic and dynamic spatial data structures for historical management in GIS
- Investigations for improving methodologies of change detection of cultural details and natural features, using aerial photographs, satellite images and other data sources
- Techniques for the revision of maps and GIS databases, including superimposition of maps and images, and the automated detection, extraction and classification of new features

WG IV/4

Mapping Potential of High Resolution Satellite Imagery

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WG IV/4 - Terms of Reference

- Status and technical definition of high resolution satellite systems for topographic and thematic mapping
- Mapping potential of existing high resolution satellite imagery
- Accuracy and information require-

ments for topographic and thematic maps, and for GIS databases, generated from high resolution satellite imagery

- Investigations into the synergy of simultaneously acquired stereoscopic and multispectral satellite image data

WG IV/5

Extraterrestrial Mapping

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WG IV/5 - Terms of Reference

- Status and technical definitions of satellite systems for extraterrestrial mapping
- Documentation of data sources, mapping techniques and prod-

ucts, of current and future activities in extraterrestrial mapping

- Development of new techniques for data acquisition and extraterrestrial mapping

WG IV/6

Global Databases Supporting Environmental Monitoring

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WG IV/6 - Terms of Reference

- Global databases for mapping and monitoring natural resources and the environment, with special emphasis on availability and quality
- Establishment of comprehensive metadata for availability on the Internet and the World Wide Web
- Development of mapping and modelling techniques appropriate to environmental applications
- Stimulation of co-operation between international and national organisations involved in resource management and inventory, in co-operation with WG VII/5

Commission V - Close-range Techniques and Machine Vision

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Commission V - Terms of Reference

- Close-range and microrange measurements
- Recording and monitoring of objects in motion and under deformation
- Optical and integrated close-range sensor systems
- Digital systems and time constrained solutions in close-range applications
- Image analysis and image synthesis algorithms in close-range applications
- Object-related processing techniques in automatic, semi-automatic and manual mode in close-range applications
- Modelling for visualisation and virtual reality (VR)
- Interface of CAD/CAM and information systems with close-range measurement systems

WG V/1

Close-range Imaging and Metrology

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WG V/1 - Terms of Reference

- Off-line and on-line systems for metrology
- Development of digital imaging systems
- Sensor and system calibration
- Mathematical models and algorithms for vision metrology
- System performance evaluation
- New areas of application for vision metrology

WG V/2

Integration of Photogrammetric Systems with CAD/CAM

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WG V/2 - Terms of Reference

- Survey of existing CAD/CAM systems (functionality, data formats etc)
- Development of methodologies and tools for the integration of photogrammetric systems with CAD/CAM
- Development of CAD/CAM based object-oriented measurement procedures
- The transfer of photogrammetric

technology to the industrial design, engineering and manufacturing sector

WG V/3

Scene Modelling for Visualisation and Virtual Reality

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WG V/3 - Terms of Reference

- Creation of accurate virtual reality (VR) models from real scenes and objects
- Integration of VR models and tools with close-range photogrammetry
- Improvement of performance aspects of close-range photogrammetry, such as speed and automation
- Sensor fusion for complete model creation
- Seeking new VR applications requiring high precision 3-D models based on photogrammetric techniques

WG V/4

Human Motion and Medical Image Analysis

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WG V/4 - Terms of Reference

- Development of medical real-time imaging systems
- Dynamic analysis of human motion
- 3D medical imaging for anthropometry
- 3D representation and visualisation
- Fostering co-operation between photogrammetry and medicine committee

WG V/5**World Cultural Heritage****Chair:**

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WG V/5 - Terms of Reference

- Application of photogrammetry and spatial information system technology to the recording, mapping and visualisation of structures and items of the World Cultural Heritage
- Incorporation of innovative technologies for data acquisition, data processing, information management, development of new products, and visualisation
- Development of low-cost digital systems for the recording and documentation of the World Cultural Heritage
- Fostering close co-operation with national and international groups
- Active promotion of the use of digital photogrammetric recording methodologies and products

**Inter-Commission (IC) WG V/III
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IC WG V/III - Terms of Reference

- Matching strategies in image sequences
- Algorithmic aspects of the combination of stereo imagery and tracking

- Error modelling and propagation of uncertainty
- Construction and representation of local spatial data
- Spatial data interpretation for motion planning
- Devices for image sequence acquisition and storage
- Realtime image sequence processing hardware
- Fusion of multi-sensor information

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Special Interest Working Group on "Animation" - Terms of Reference

- Encouragement of collaboration with the computer animation community for the exchange of knowledge, techniques and applications
- Exchange of technology and application-oriented knowledge through active participation in each other's conferences
- Promotion of application specific technology through co-operation with related ISPRS WGs

Commission VI : Education and Communications

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Commission VI - Terms of Reference

- Promotion of education and training in photogrammetry, remote sensing, GIS and related sciences
- Development of computer assisted teaching and training; support and coordination with regional activities through development of courses and course materials
- Development and dissemination of standards with ISO and other standards organisations

WG VI/1 Education

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WG VI/1 Terms of Reference

- Identification and promotion of educational and training opportunities, taking account of regional needs
- Promotion and organisation of multi-lingual and multi-media educational material
- Identification of channels for international technical co-operation in education
- Development of guidelines for curricula for undergraduate education

WG VI/2

Computer Assisted Teaching

Chair:

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WG VI/2 Terms of Reference

- Collection, analysis, dissemination and promotion of materials, software and data (hard copy and/or

soft copy) for computer assisted teaching

- Investigation of the role of computer assisted teaching in modern education and training

WG VI/3

International Co-operation and Technology Transfer

Chair:

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WG VI/3 Terms of Reference

- Foster relationships between Regional Member organisations and the relevant WGs
- Development of connections with international organisations to urge the wider promotion and use of photogrammetry, remote sensing and GIS
- Promotion of the general understanding of our profession and improvement of public relations for our discipline

WG VI/4

Internet Resources and Spatial Data Sharing

Chair:

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WG VI/4 Terms of Reference

- Promotion of standards and efficient design of information-rich homepages, including Member Reports
- Identification and reporting of

- sources of geospatial data, and forms of storage and accessibility
- Promotion of spatial data sharing
- Identification and recommendation of guidelines for spatial data standards and sharing policy

Commission VII - Resource and Environmental Monitoring

President:

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Commission VII - Terms of Reference

- Methodology of visual image interpretation
- Methodology of computer-aided analysis of sensor data
- Spectral, spatial and temporal radiation properties of objects
- Environmental studies, resources inventories, and interpretative aspects of thematic mapping as applied in studies of vegetation, forestry, agriculture, soils, land and water use, geology, geomorphology, hydrology, oceanography,

coastal zones, snow and ice, atmospheric sciences, archaeology, human settlements and engineering

- Integration of remote sensing and GIS techniques for the monitoring of resources and environment

WG VII/1**Fundamental Physics and Modelling****Chair:**

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WG VII/1 - Terms of Reference

- Physical measurements and modelling related to remote sensing
- Studies of spectral measurements and calibration at different spatial scales
- Standardisation and harmonisation of experimental methods and procedures in remote sensing
- Remote sensing of minor constituents of the atmosphere
- Spectral, spatial and temporal radiation and polarisation properties of objects

WG VII/2**Application of Remote Sensing and GIS for Sustainable Development****Chair:**

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WG VII/2 Terms of Reference

- Development of concepts for sustainability indicators
- Promotion of applications in environmental and natural resource management
- Monitoring and assessment of environmental hazards and disasters
- Monitoring environmental changes, including socio-economic factors

WG VII/3

Thematic Applications of High Spatial Resolution Satellite Imagery

Chair:

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WG VII/3 Terms of Reference

- Data integration for urban planning and management
- Applications for improved rural management, including precision farming
- Support of local environmental impact studies

WG VII/4

Computer Assisted Image Interpretation and Analysis

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WG VII/4 Terms of Reference

- Integration of remote sensing with geospatial data
- Multi-spectral, multi-resolution, and multi-sensor data for image interpretation
- Knowledge encapsulation for purposes of automatic image analysis
- Investigation of performance of advanced classification techniques

WG VII/5

Global Monitoring

Chair:

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WG VII/5 Terms of Reference

- Identification of the remote sensing data requirements for models to support global change studies
- Seek affiliations with organisa-

tions and programmes involved in global change studies, such as the IGBP/HDP (International Geosphere Biosphere Program/ Human Dimension Program) programmes for: land use cover change (LUCC); biospheric aspects of the hydrological cycle (BAHC); global change and terrestrial ecosystems (GCTE); International global change atmospheric chemistry programme (IGAC); global terrestrial observing system (GTOS); and global ocean observing system (GOOS)

- Modelling of global change processes from long-term data and indicators
- Collaboration with WG IV/6 (Global Databases and Monitoring)

WG VII/6

Radar Applications

Chair:

Tony Milne

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WG VII/6 Terms of Reference

- Extension of the use of multi-wavelength and multi-polarimetric radar data in investigations on earth surface characteristics and environmental analysis
- Provision of information on, and assessment of, the suitability of airborne and satellite radar systems for earth surface analysis
- Development of case studies of applications for radar data in: land cover classification; biomass estimation; forest inventory; wetland mapping; agricultural crop monitoring; urban analysis; and sea state conditions
- Provision of a network for collaboration between researchers

involved in developing radar models from backscatter information, capable of predicting selected geophysical parameters, such as soil moisture and biomass

- Investigation of the potential of applications of combined radar and optical data

WG VII/7

Non-Renewable Resources and Geotechnical Applications

Chair:

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WG VII/7 Terms of Reference

- Application of remote sensing digital image processing and analysis

techniques to mineral and petroleum exploration, geotechnical and geological applications

- Use of high spectral resolution sensor data from aerial photography and satellite sensors for earth resource surveys, with special emphasis on mineral classification and geotechnical characterisation of rocks and soils
 - Multi-data integration, including geophysical images
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