

APPROVED RESOLUTIONS
of the XXth ISPRS Congress - Istanbul 2004

General Resolution G.1 Appreciation

The Congress Commends:

The Turkish National Society of Photogrammetry and Remote Sensing, its President Ali Fuat Sarac, and Congress Director Prof. Orhan Altan and the Congress Organizing Committee for their excellent work which has resulted in a very successful Congress.

General Resolution G.2 Links with the 'Global Land Project' of the Earth System Science Partnership (ESS-P)

The Congress:

Noting

- the strong links between ISPRS and ICSU (International Council of Science), a sponsor of international programs about global change ñ International Geosphere-Biosphere Programme (IGBP), International Human Dimensions Programme (IHDP), World Climate Research Programme (WCRP), and an integrated program of biodiversity science DIVERSITAS;
- that four 'global change' programs have decided to dramatically evolve and create the ESS-P, which will generate regional projects on one hand, three integrated projects on the other hand;
- and namely that the Land Use & Cover Change (LUCC) and Global Change & Terrestrial Ecosystems (GCTE) projects plan to set up a 'Global Land Project', now under the leadership of a 'transition team'.

Recognizing

- the importance of that evolution for global change science;
- the major importance of getting consolidated conclusions for international negotiations, national planning, and sustainable development;
- the unique contribution that remote sensing at large can bring to these projects.

Recommends that

- close links be developed between ESS-P and ISPRS, at the Council and Commission level;
- ISPRS should consider any opportunity to contribute to developing use of remote sensing and spatial information sciences within the projects generated by ESS-P;
- Specific attention should be paid to developing close relationships in 2004 with the nascent 'Global Land Project'.

General Resolution G.3 Automating 3D Object Generation and Database Updates

The Congress:

Noting

- the innovations in computer vision;
- the advances in film-less digital sensing from the air, the ground and from space.

Recognizing

- the growing need for 3D content in global, regional and local GIS databases;
- the requirements to have such contents available in an updated form.

Recommends that

- fully automated algorithms for generating 3D objects from imagery be studied and developed;
- fully automated methods be studied and developed for updating current 2D and 3D GIS content using digital imagery acquired from aerial, terrestrial and space systems.

Resolution I.1 Unpiloted Aerial Vehicles

The Congress:

Noting

- that unpiloted aerial vehicles (UAVs) provide a new, controllable platform for remote data acquisition;
- that maneuverability of UAVs permits remote data acquisition in environments dangerous to human life and/or inaccessible to direct examination (e.g. forest fires, volcanoes, toxic spills, transportation disasters, etc.);
- that UAVs provide potential for acquiring remote data more rapidly and at lower cost than from piloted aerial vehicles.

Recognizing

- the range of potential applications not readily possible using piloted vehicles over small geographic or site-specific areas on a real-time basis at affordable costs (e.g., incident analysis);
- that new technologies will be required to design and develop miniature platforms and sensors.

Recommends that

- an inventory of current and technologically feasible miniature sensors be undertaken;
- an inventory of current and possible future civil applications be catalogued and documented as to appropriateness, levels of readiness, and comparative cost;
- the performance of the various UAVs and their onboard sensors for various applications be investigated;
- a report of the above findings be produced by ISPRS for the global community.

Resolution I.2 Methods for Characterizing Radiometric and Geometric Sensor Calibration Parameters

The Congress:

Noting

- that a joint ISPRS/CEOS task force has been established to collect and define parameters used to describe EO sensors, and to recommend a standard list of such parameters;
- that there are disparate ways in which Earth observing sensor parameters are specified, defined, and characterized in the spectral and spatial domains, and that there are growing demands for sensor inter-comparisons;
- that commercial digital aerial cameras and both commercial and government space-based Earth observing scanners are growing in number;
- that field test sites in a variety of global ecological settings are needed to characterize sensors operating in those environments.

Recognizing

- the terms of reference of the CEOS Resolution do not include how to measure and characterize calibration parameters;
- there is little value in defining parameters that describe sensor performance unless there are ways to consistently measure those parameters.

Recommends that

- the joint ISPRS/CEOS task force enlarge the scope of its activities to include descriptions of methods used to characterize post-launch calibration parameters;
- the potential applicability of sensors' parameters be made more readily available for the scientific development community;
- a metadata template be developed for use by post-launch science teams that will help data users understand which underlying methods were used to calibrate geometric and radiometric parameters for specific sensor products derived from both aerial and space imagery.

Resolution I.3 Geometric Handling of Space Images

The Congress:

Noting

- that a growing number of high resolution space-based optical sensors with different geometric attributes are available;
- that mathematically rigorous solutions are required even without knowledge of the full sensor parameters or camera models.

Recognizing

- that optimal use of the geometric properties of high resolution space sensors requires reliable algorithms.

Recommends that

- existing and evolving algorithms be compared under operational conditions;
- the results of the comparisons be extrapolated (outside the area of control points), analyzed, and reported for each space imaging system.

Resolution I.4 Advanced Satellite Imaging Systems

The Congress:

Noting

- the significant progress in obtaining higher spatial, spectral, radiometric and temporal resolution from imaging sensors;
- that the future of operational Earth observations lie with incorporating intelligence into satellite systems;
- that intelligent systems are required for deriving information quickly and in near real-time.

Recognizing

- the need for acquiring timely information about Earth system processes, human activities, and for early warning of natural and human disasters;
- the need to control costs and to cope with increased system complexities.

Recommends that

- improved multi-temporal data acquisition strategies be designed in future systems and enhanced integration and interface methods be developed for existing multiple systems;

- a survey of engineering requirements be initiated to assess the state-of-the-art and system integration potential for intelligent on-board mission planning, data processing, telemetry, and inter-platform communication.

Resolution I.5 DTM Data Acquisition Quality

The Congress:

Noting

- that a number of optical systems, specifically designed to generate DTMs, are available;
- that interferometric SAR has proven its capability to generate DTMs;
- that airborne laser systems are operational;
- that substantial parts of the world still do not have topographic maps of desired scale and accuracy.

Recognizing

- that terrain height / slope is an important parameter for many applications.

Recommends that

- an intensified, detailed study be conducted on the accuracy and cost effectiveness of various sensors and techniques;
- international test sites be identified and catalogued for inter-comparison and evaluation of different methods;
- quality standards be developed for advanced optical and active microwave system-derived DTMs.

Resolution I.6 Platform and Orientation Integration

The Congress:

Noting

- the capability of current earth observation (EO) systems to provide high resolution images;
- the availability of modern technology such as differential GPS and high precision attitude and orientation sensing systems.

Recognizing

- the potential use of high resolution image data in detailed field studies;
- the need for high precision locational accuracy of the field data.

Recommends that

- improved methods for integration of attitude and position information with data processing software algorithms be developed;
- workshops be organized on "Integrated Spatial Sensor Systems" to address topics such as real-time referencing, sensor networking, multi-sensor integration, fusion, sensor management, etc.;
- user standards for data formats, referencing systems, and data archival and retrieval systems be adopted by ISPRS and published.

Resolution I.7 Handbook of Internet Website Information for Sensors and Platforms

The Congress:

Noting

- that there is an increasing number of EO sensors and platforms;
- that there is a long history of sensor and platform designs for both aerial and satellite systems.

Recognizing

- that electronic (digital) information about engineering designs, orbital parameters, and sensor characteristics is distributed among many databases and Internet sources;
- that websites vary greatly in their content, completeness, accuracy, and currency;
- that there are too many websites for any individual or organization to compile into a reliable and up-to-date source;
- that there is unequal global access to sensor and platform information.

Recommends that

- a handbook of Internet websites containing electronic, searchable databases of sensors and platforms (retrospective, current, and planned) be created and maintained as an updatable on-line publication on the ISPRS website;
- robots, UAVs, and other evolving forms of platforms and their evolving sensor systems be included in the handbook.

Resolution I.8 The Robot as a Sensor Platform

The Congress:

Noting

- that sensor-bearing robots are used in many environmentally hostile situations to acquire video and other forms of imagery for industrial accidents, ship wrecks, ground-based archaeological and geophysical situations, and for extra-terrestrial applications;

- that many of these types of close-range observations assist traditional aerial and EO sensor data, particularly in visualizations involving search and rescue operations, non-destructive site evaluations, and similar circumstances where humans cannot make direct observations.

Recognizing

- the growing importance of technologies that are collateral to aerial and satellite remote sensing systems;
- the need to fuse imagery and geospatial data from many sensor types, viewing angles, and scales.

Recommends that

- robots as sensor platforms be reviewed, assessed, and characterized for their value as collaborative systems supporting aerial and satellite platforms;
- sensors carried by robots be evaluated for their use in environmental visualizations and tracking tasks requiring multi-sensor data from other platform types.

Resolution I.9 Small Earth Observing Satellites

The Congress:

Noting

- the increasing use of small satellites for remotely sensing unique and/or limited data for research and validation activities.

Recognizing

- the economical advantages that small satellites offer for developing countries to economically develop their own space programs.

Recommends that

- studies be conducted to assess the benefits of small satellites;
- that ISPRS provide a forum for developing countries to share their results, experiences and recommendations.

Resolution I.10 Integrated Mobile, Multi-Sensor Mapping Systems

The Congress:

Noting

- that ground-based mobile mapping systems are increasingly important to field data acquisition in support of GIS and remotely sensed data collection;
- digital airborne systems are becoming available that can provide rapid mapping products of sufficient accuracy for GIS database generation and update;
- that many applications of mobile mapping are conducted in remote areas and must be designed as portable, light weight systems for human transport;
- that multiple electronic devices must be included in these light weight, portable systems;
- that the fusion of mobile mapping data collected from various acquisition systems is increasingly important for GIS applications:

Recognizing

- the importance of mobile mapping as a component of map updating and for field verification and validation of remotely acquired data;
- that new designs will be required to create miniature field mapping systems incorporating wireless technology for GPS, remote data updates and data entry.

Recommends that

- research should be conducted and workshops organized to assess current and technically feasible designs that improve mobile mapping and updating systems;
- a report of the above findings be produced by ISPRS for the global community.

Resolution II.1 Spatial-Temporal Concepts and Databases

The Congress:

Noting

- that today's methods and solutions for handling spatial-temporal database related issues are still very limited;
- that spatial-temporal infrastructure is a new area to be investigated in the near future;
- that the fundamental concepts for and the practical feasibility of developing spatial-temporal databases and infrastructures are challenging areas.

Recognizing

- that there is a very strong demand on spatial-temporal databases for GIS applications, especially in those areas related to temporal features and monitoring of dynamic changes;
- that the needs for spatial-temporal databases and infrastructures are increasing to cope with rapid developments of new and faster spatial data acquisition technologies, such as LIDAR and high resolution satellite images.

Recommends that

- research be continued for the development, access and management of spatial-temporal databases and the mapping from one database to another to solve semantic interoperability and schematic and semantic heterogeneity;
- research be continued in the areas of spatial-temporal analysis and geostatistics;
- research be continued on the modelling of data uncertainty and quality including the determination of risk indicators;
- spatial-temporal and dynamic GIS applications be developed.

Resolution II.2 Multi-Dimensional & Multi-Resolution Spatial Information

The Congress:

Noting

- an increasing availability of high resolution (in space and time) data from different sources;
- an increasing availability of and demand for 3D-data;
- the need for providing data in different resolutions;
- the heterogeneity of data sources in structure, semantics and geometry.

Recognizing

- that current methods to model and analyze data of different dimension, scale, and temporal resolutions are inadequate for advancing the use and dissemination of spatial information.

Recommends that

- research for development of structures for managing multi-scale and multi-representation data be strengthened;
- methods for generating multiple resolutions of data by generalization and abstraction be developed;
- research be conducted for semantic and geometric data integration and harmonization;
- spatial ontologies and their concepts be developed;
- research on 3D data structures (including topology and level of detail) and 3D-analysis tools be continued.

Resolution II.3 Design and Operation of Spatial Decision Support Systems

The Congress:

Noting

- the increasing need for up-to-date geospatial information and support for decision makers on local, regional, national and international levels.

Recognizing

- that the integration of image and vector data in spatial decision support systems can provide the means to achieve this decision support.

Recommends that

- efforts be undertaken to develop and enhance methodologies needed to improve the integration of field and object data in spatial decision support systems;
- studies be conducted to assess and predict the statistical fitness for use of combining image, vector, and collateral data used for decision processes.

Resolution II.4 Raster-Based Spatial Analysis on the Web

The Congress:

Noting

- the increasing demand for spatial analysis tools for a variety of applications;

Recognizing

- raster-based spatial analysis methodology will be the key to the future development of GIS;
- more comprehensive spatial analysis systems need to be established.

Recommends that

- raster-based spatial analysis with integration of web-based visualization systems be strengthened;
- the role of scale in spatial analysis be researched.

Resolution II.5 Dynamic and Multi-Dimensional GIS

The Congress:

Noting

- the increasing demand to extend 2-D traditional GIS processing systems to 3D;
- the need to incorporate GIS with dynamic data and/or with changes in temporal data.

Recognizing

- that dynamic and multi-dimensional GIS is becoming one of the key issues of digital Earth movement;
- the efforts of ISPRS WGs in promoting the academic research and industrial development on dynamic and multi-dimensional GIS during 2000-2004.

Recommends that

- the series of international workshops on dynamic and multi-dimensional GIS be continued;

- studies be continued on dynamic and multi-dimensional GIS.

Resolution III.1 Directly Observed, Triangulated and Control Point-Free Sensor Poses

The Congress:

Noting

- that direct geopositioning systems are being widely accepted in daily practice;
- that new digital aerial cameras are being introduced;
- that new applications are emerging in the area of egomotion (self-motion).

Recognizing

- the need to better understand the tradeoffs between direct geopositioning and image-based pose estimation;
- the possibilities of film-less sensing as a base for new triangulation approaches;
- the opportunities to fully automate pose positioning;
- the requirements of inside-out as well as outside-in tracking of a moving sensor.

Recommends that

- studies be conducted to compare the performance of direct geopositioning with triangulated estimates of pose positions using highly redundant, film-less image sequences from digital aerial cameras;
- developments in fully automated pose positioning technologies be pursued;
- research on tracking egomotion be conducted, for example, of a user of a 3D database.

Resolution III.2 Directly-Sensed versus Image-Extracted Shapes of Non-Terrain Objects

The Congress:

Noting

- growing interest in and application of sensors that determine object shapes directly, such as by scanning lasers or tactile technologies;
- the emergence of alternative methods for the building of object shapes in non-terrain scenarios, such as industrial manufacturing, medicine, architecture, archaeology, etc. from images.

Recognizing

- the potential of images to provide more than just object shapes;
- the new possibilities for automated image analysis using highly redundant image sequences, be they from calibrated and/or uncalibrated cameras.

Recommends that

- algorithms be developed and studied that fully automate the shape reconstruction of industrial objects from redundant calibrated and uncalibrated image streams;
- trade-offs be studied between direct observed shapes versus image-extracted shapes employing collateral object information.

Resolution III.3 From 2.5D Surface Models to 3D Object Models

The Congress:

Noting

- progress in computer vision algorithms and approaches toward automated creation of 3D models of objects;
- progress in computer graphics to interact immersively with 3D objects in mixed reality scenarios;
- continuing advances in laser scanning allowing the acquisition of dense and accurate point clouds by both aerial and terrestrial scanners,
- a growing interest in the transition from 2D toward 3D Geographic Information Systems.

Recognizing

- the possibilities to reliably and automatically extract features from point clouds,
- the advent of fully digital sensing approaches with an inherent obsolescence of film and its variable costs;
- the availability of highly redundant sensing becoming possible by aerial and terrestrial film-less systems as well as by laser scanning systems.

Recommends that:

- algorithms be developed and studied in cooperation with the computer vision community that produce surface models fully automatically and without any manual intervention or post-editing;
- technologies be investigated that develop a full 3D object from 2.5D measurements;
- fully 3D object models of terrain be developed to consist of the bald Earth and of models of the natural and manmade objects which exist on top of it.

Resolution III.4 Combined Laser-Based and Image-Derived Terrain Surface

The Congress:

Noting

- the growing interest and acceptance of aerial and terrestrial laser scanning technology;
- the reduction of importance in classical terrain elevation modeling from film-based stereo systems;
- the advent of new film-less digital imaging systems;

- that most providers of laser scanning services offer simultaneous acquisition of digital imagery;

Recognizing

- the possibilities of using highly redundant images in blocks from film-less systems,
- the complementary nature of point clouds and imagery.

Recommends that

- new algorithms get developed and studied to take advantage of combined data sets for fully automated surface modeling;
- laser-based surface models and systems for creating them be compared and assessed with respect to new image-based systems and/or surface models obtained from combined datasets, for creation of highly redundant image stacks;
- guidelines for sensor selection for surface modelling of various terrain types be established.

Resolution III.5 Radar Interferometry Algorithms

The Congress:

Noting

- that Earth observation satellites as well as commercial and governmental airborne systems for radar interferometry are proliferating and are being used more frequently;
- that changes on the Earth's surface are of growing concern;
- that global Digital Terrain Model data is becoming available;
- that radar signal processing is expanding to include consideration of phase, polarization, coherence and scattering effects..

Recognizing

- the inherent capability of interferometric radar to observe changes such as motion;
- the improvements in automatic processing of interferometric radar source data.

Recommends that

- radar polarimetric/differential interferometric algorithms be developed, assessed and developed in their application to available radar source data;
- studies be performed to compare surface models obtained from interferometric source data with laser- and image-derived surface models;
- the ability and accuracy of observing and quantifying motion and change on the Earth's surface be studied.

Resolution III.6 Urban Modeling

The Congress:

Noting

- that video cameras, lasers, uncalibrated cameras and mobile sensing are all growing as topics in computer vision;
- that rendering as an application is of increasing interest;
- that urban objects such as buildings and roofs as well as underground structures need to be described both with their outside shape as well as internal structure and use.

Recognizing

- the systems for so-called 'mixed reality' in the form of virtual or augmented reality pose new challenges;
- that costs of database content creation need to be reduced while accuracies of 3D urban data need to be increased;
- that tracking of a user of database content is rapidly becoming an important issue;
- that internet and wireless broadband communication offer new horizons for GIS content.

Recommends that

- studies be conducted on the use of automated analysis of sensor data streams for urban modeling;
- mixed reality, the internet, and broadband wireless data transfer be evaluated in the development of new approaches for the application of urban 3D GIS content.

Resolution III.7 Data Sets and Algorithm Testing

The Congress:

Noting

- the many innovations in sensing technology, geometric resolution, algorithm development, computing, and applications that occur in rapid sequence during a single 4-year inter-Congress period;
- the difficulty of understanding and assessing these innovations in a global context;
- that typically an individual is unable to compare various algorithms, systems and approaches.

Recognizing

- that algorithm performances are being studied, yet this is with private data and through individual efforts.

Recommends that

- standard source data sets be created to reflect the most innovative sensor data and applications scenarios;
- these standard source data sets be distributed for use by the global S&T community;

- a public domain algorithm base be installed and maintained for specific important applications in ISPRS-relevant image analyses;
- approaches to assess algorithm performance be defined, described and made publicly available;
- international tests that compare algorithms be conducted and coordinated, and results published.

Resolution IV.1 Handling of Web-Based Spatial Data and Geo-Information Services

The Congress:

Noting

- the increased interest from the industry on geo-spatial information technology;
- that the various related supporting technologies, such as web technology, spatial information technology, mobile computing, network storage, and geo-grid computing are maturing;
- the increasing needs of the general public for prompt and effective spatial information services.

Recognizing

- that web-based clients will not only be able to use locally stored spatial data and processes, but also can discover and use multiple GIS web services over the Internet;
- that web-based geo-information services will be very helpful in developing powerful GIS applications and for providing diverse opportunities to a wider spectrum of clients.

Recommends that

- development of web geo-spatial data services, such as web map services, web feature services, web coverage services, web registry services, be continued;
- web geo-information parallel processing and analysis services be investigated and applied;
- applications for web geo-information, distributed network storage services be studied and developed;
- applications using geo-grid technology for geo-information services be studied and developed;
- data quality of internet-based processes and applications be studied and measured;
- cooperation continue with organizations working on information systems and services, interoperability, standards, and specifications, such as with CEOS WGISS, OGC and ISO/TC211.

Resolution IV.2 Location-Based Services

The Congress:

Noting

- the increasing number of mobile devices with storage and display capabilities;
- the increasing demand for linking location with services
- the rapidly increasing use of the Internet and mobile networks for dissemination of geo-spatial data;
- faster and cheaper data transmission

Recognizing

- that spatial data is the key element in location-based services.
- that the demand for up-to-date and reliable geo-spatial data continues to grow

Recommends that

- the integration of spatial data in info-mobility services be enhanced;
- methods for real-time integration, generalization, updating and adaptive visualization of spatial information be developed.

Resolution IV.3 Landscape and Visualization

The Congress:

Noting

- advancements in visualization technology;
- increased accessibility of wireless communication and data transfer;
- the emergence of telepresence technology use in the communications medium.

Recognizing

- the importance of landscape modeling for characterizing current environmental conditions, assessing trends and predicting future states;
- the dependency of decision makers on real-time or near real-time communication, spatial data access and visualization;
- the need for scientific visualization through telepresence for simulation, training, and entertainment.

Recommends that

- research continue on the developments for efficient and enhanced landscape data and information representation for decision support;
- continued efforts be made to accurately and comprehensively model the landscape through visualization and landscape metric computation;
- advancements in telepresence, virtual, and augmented reality technology be integrated with remote sensing to develop full sensory experience of virtual environments;
- the usability of photorealistic rendering vs. non-photorealistic rendering be investigated.

Resolution IV.4 Image Databases

The Congress:

Noting

- the increasing temporal frequency of imagery collection from a variety of sources and modalities;
- the increasing spatial spectral resolutions of the collected imagery;
- the increasingly important role of databases for accessing, managing, and retrieving geospatial information;
- the increasing availability of historic photographic and image data.

Recognizing

- that imagery is a major source of geospatial data;
- acquisition and recording modes are important factors in accurately extracting spatial and temporal geospatial information;
- that databases provide an optimal environment for handling large amounts of geospatial data
- the need for searchable photographic and image data.

Recommends that

- methods be developed for addressing the special characteristics of image databases, including historic photographic and image data, taking into consideration the particularities of image data;
- research be performed to create intuitive and reliable ways of managing large quantities of imagery in spatial-temporal databases;
- innovative and efficient ways be developed for indexing, organizing, accessing, and querying imagery residing in large databases;
- automated approaches be devised for the use of image databases to support the extraction, management, and spatial-temporal analysis of geospatial information.
- methods for data interpretation to derive explicit knowledge from implicit data be developed;
- spatial data mining techniques continue to be developed and promoted.

Resolution IV.5 Automation for Database Creation and Updating

The Congress:

Noting

- advances in and the maturation of image processing and GIS spatial analysis methods as well as the availability of a variety of related tools;
- the availability of technologies for rapid data acquisition and processing;
- significant progress occurring in communications technology.

Recognizing

- the increasing demand for rapid mapping capabilities;
- the increasing needs for populating and maintaining useful geo-databases;
- that spatial databases may be homogenous or heterogeneous.

Recommends that

- advanced automated techniques for data extraction and change detection, including GIS-driven approaches, continue to be researched and developed;
- advanced techniques be investigated and developed for implementing *near-real-time* mapping.
- that work continue on automating geo-spatial data production and updating from imagery and collateral sources, both in semi-automatic and in automatic modes;
- that efforts be increased to integrate developed algorithms into digital photogrammetric workstations and geospatial information systems.

Resolution IV.6 National and Regional Spatial Databases

The Congress:

Noting

- that operational change are occurring in national mapping organizations;
- new products requirements from national mapping organizations;
- the establishment of national and regional geospatial data infrastructures;
- the increasing cross-border demand for high spatial resolution data;
- the imagery represents an inevitable part of geospatial information.

Recognizing

- the importance of base geo-spatial data, especially topographic data sets of individual countries;
- the growing needs for and ongoing activities in establishment of interoperable geospatial information infrastructure at the national, regional and global levels;
- the increasing use of geo-spatial databases beyond traditional mapping applications.

Recommends that

- studies, tests and evaluations be conducted on the development, access and management of national databases in federated databases;

- data sharing and dissemination processes using web services be investigated, including cost models;
- data harmonization and data integration approaches, including research on semantic and geometric translation between schemas, be investigated to facilitate the wider use of geo-databases for both mapping and non-mapping applications;
- the synergy of the imagery segment and its integration with GIS, positioning and communications be continued and enhanced in the framework of the national, regional and global spatial data infrastructures and in other applications
- cooperation be encouraged with the global spatial initiatives, such as with GSDI, the Global Mapping project, and CEOS WGISS.

Resolution IV.7 Global Databases and Environmental Infrastructures

The Congress:

Noting

- that large environmental databases on regional, national and global levels have been designed and implemented;
- the improved access of users to a variety of databases is based on developments in information technology;
- the importance of reliable and comprehensive global 3D spatial models and data structures.

Recognizing

- the increasing need for generally accepted and standardized environmental information resources and environmental indicators;
- the need for multi-temporal and multi-scale databases
- the need for a consistent and universal global 3D reference and tessellation model.

Recommends that

- environmental infrastructures be developed to ease accessibility and use by specialists and non-specialists;
- efforts be made to acquire, integrate and harmonize environmental databases on regional, national and global levels;
- global geospatial data infrastructures with metadata catalogues be developed;
- research be conducted on global 3D spatial modelling suitable for global databases;
- cooperation with related global spatial initiatives, such as the ISCGM, CEOS WGISS, the ICA Commission on Spatial Data Standards, etc. be continued.

Resolution IV.8 Extra-Terrestrial Information Systems

The Congress:

Noting

- the renewed interest proposed initiatives for intensified lunar and planetary exploration;
- the recent and upcoming missions to Mars and the Moon.

Recognizing

- the emerging need for advanced methods, techniques, and spatial systems to support space exploration with high-resolution, high-precision mapping data.

Recommends that

- mapping professionals continue to be actively involved in the planning of future lunar and planetary missions in order to maximize the utility of data obtained for supporting future space exploration;
- research be continued in developing improved, new, and advanced techniques for data acquisition and mapping of celestial bodies;
- spatial information systems be developed to support extraterrestrial exploration and science;
- these activities liaise with the ICA Commission on Planetary Cartography.

Resolution IV.9 High Resolution Image Data for Mapping

The Congress:

Noting

- that the number of sensors, including the upcoming small satellite constellations, for Earth observation data acquisition is increasing;
- the availability and increasing use of airborne digital cameras.

Recognizing

- the ever increasing volumes of Earth observation data being acquired from single- and multi-sensor systems;
- the increasing use of high resolution image digital data for geo-database creation and maintenance, and for mapping.

Recommends that

- information content and accuracy of the new high resolution digital sensors be studied and evaluated;
- the synergy of the various high resolution sensors for topographic and thematic mapping be investigated.

Resolution V.1 Automation for Vision Metrology and Industrial Applications

The Congress:

Noting

- the importance of automation in all phases of the close-range vision process, in particular three dimensional measurement via machine vision.

Recognizing

- the need for new developments in algorithms and procedures for automated sensor orientation;
- the necessity of algorithm performance evaluation in theoretical and practical aspects;
- the need for integration of close-range vision processes;
- that the Coordinate Measuring Systems Committee (CMSC) conducts many activities in vision metrology for industrial applications.

Recommends that

- stand-alone vision metrology systems integrating imaging sensors, CAD/CAM, and other systems, such as laser scanning and structured light systems be further studied;
- target and feature extraction, with special consideration of the multi-image correspondence problem, be further developed;
- new sensors and areas of application for vision metrology be studied;
- efforts be made to implement cooperation and collaboration between ISPRS Commission V and the CMSC.

Resolution V.2 Scene Modeling and Virtual Reality Content Creation

The Congress:

Noting

- the growing demand for the creation of complete, accurate and realistic virtual reality (VR) models from real scenes and real-world objects for visualization, documentation analysis, and virtual environment applications.

Recognizing

- the necessity for new developments in 3D modeling and knowledge-assisted 3D scene reconstruction;
- the need for integration of computer graphics and VR technology with close-range vision techniques.

Recommends that

- automatic image analysis techniques used to extract models of objects and scenes for applications in visualization, documentation analysis, and VR be further developed;
- multi-sensor and non-sensor data collection and integration concepts for complex scenes and environments be further studied;
- particular emphasis be put on the integration of laser scanning concepts, systems and data, and the development of new calibration and object extraction technology based on omnidirectional cameras;
- new VR applications requiring 3D models created with photogrammetric techniques, or with other integrated techniques be promoted;
- mechanisms be implemented for cooperation between ISPRS Commission V and visualization, computer vision, and graphics groups.

Resolution V.3 Motion Analysis, Human Body Measurements and Medical Image Analysis

The Congress:

Noting

- the growing demand for medical imaging, medical VR, human body and motion studies, expression analysis and sports analysis.

Recognizing

- the need for automated image understanding and real-time imaging systems in these areas;
- the necessity for involvement of photogrammetrists in these research fields;
- the need for more interaction between related scientific communities.

Recommends that

- research and development in techniques and systems for medical imaging, biomedical engineering, human body, face and motion studies, expression analysis, human user interface issues, and sports analysis be pursued;
- research in representation and medical VR, including support of telemedicine be further studied;
- cooperation and collaboration be intensified with the communities of medical/biomedical engineering, sports science, human/apparel engineering, ergonomics, and animation.

Resolution V.4 Integration of Image Analysis and Spatial Information Systems for Applications in Cultural Heritage

The Congress:

Noting

- the growing demand for applications of close-range vision techniques and spatial information systems for recording, mapping, 3D modeling and visualization of structures of architectural significance and objects of

importance to the cultural heritage.

Recognizing

- the need for innovative technologies for imaging, data processing, modeling, visualization, archiving and information management;
- the need for integration of computer graphics with close-range vision techniques for digital archives or VR museums.

Recommends that

- future developments include the integration of close-range imagery with aerial and satellite images, and spatial information systems to enhance 3D reconstruction and documentation of areas, monuments and buildings for cultural heritage;
- innovative technologies be promoted such as laser scanning in the recording, data processing, and development of new products in support of archaeology, architecture and conservation;
- advanced, low cost, and rapid techniques in documentation and monitoring of the cultural heritage be promoted;
- cooperation with related disciplines, e.g. cultural heritage, urban planning, and facility management, be promoted;
- cultural heritage be promoted through the use of 3D object modelling, VR, and animation techniques.

Resolution V. 5 Quick Response & Distributed Computing

The Congress:

Noting

- that the importance of integration of office-to-field solutions for data collection, remote data access and mobile management of multimedia geospatial databases incorporating close range imagery will inevitably increase for many applications integrating close range and air-/space-borne imagery.

Recognizing

- the need to develop integrated solutions.

Recommends that

- new models and techniques for close-range and aerial/space image integration be developed in cooperation with Commission III and IV, with a focus on aspects such as the combination of data from various sources, object extraction techniques, 3D modeling and texture mapping;
- solutions be developed for the integration of office-to-field data collection systems, remote access capability and for the management of distributed multimedia spatial databases incorporating close range imagery;
- wireless field computing applications be enhanced for geodata acquisition and processing.

Resolution V.6 Visualization and Animation

The Congress:

Noting

- the increasing demand for image-based animation in many applications in sports, medicine, biomechanics, robotics, security, the movie and TV industry, videogames, human/machine interface and human apparel, and environmental simulation technology.

Recognizing

- the potential of close-range vision techniques to be utilized in visualization and animation;
- the need for involvement of photogrammetrists in this area.

Recommends that

- the development of image-based techniques for use in live figure and environment generation tasks;
- the study of methods and technologies to support the interaction of real and virtual objects and actors (augmented reality) be intensified;
- the study and critical comparison of the available visualization techniques and related software be intensified;
- collaboration with the animation and other relevant communities be further developed.

Resolution V. 7 Image Sequence Analysis for Mobile Mapping

The Congress:

Noting

- the potential and growing importance of temporal analysis, time-constrained solutions and dynamic analysis and tracking;
- the variety of systems and applications including mobile mapping, robot vision, machine vision, medical imaging, autonomous navigation, motion analysis, deformation analysis and data capture for virtual reality.

Recognizing

- the need for real-time image processing involving sensor fusion in the integration of image data with navigation sensor data;
- that real-time mapping covers an increasingly important and expanding area that interacts with other societies such as IAG and FIG;

- the need for the development of algorithms and associated computational processes for image sequence analysis and mobile mapping.

Recommends that

- investigations of these topics be promoted, in close cooperation with Commission III and researchers in engineering and computer vision;
- ISPRS continue to play a leading role in organizing and sponsoring the Conference Series on Mobile Mapping, in collaboration with IAG and FIG;
- investigations on algorithmic aspects and the development of computational systems for applications with special emphasis on time constrained solutions be conducted.

Resolution VI.1 Education and Training

The Congress:

Noting

- the relevance of training and education for the ongoing development of the photogrammetry, remote sensing and spatial information sciences, especially in the developing world;
- the benefits of and the need for education networking and sharing of expertise and resources;
- the continuous introduction of new terminologies;
- that the UN Office of Outer Space Affairs (UN/OOSA) prepares an annual curriculum of workshops to be conducted on remote sensing topics.

Recognizing

- the need to enhance communication between educational institutions and individual educators in all regions of the world;
- that variations in understanding and interpretation of terms can create unnecessary confusion;
- that OOSA has proposed that ISPRS assist in the review of its plan for workshops.

Recommends that

- an active role be pursued in the development and maintenance of the CEOS Education Working Group web portal;
- cooperation be expanded with regional members of ISPRS, sister societies, and non-governmental organizations to organize educational activities and pursue the development and maintenance of educational web portals;
- the efforts of UN and other national and international organizations be supported for coordinating and delivering training opportunities in sustainable development and capacity building, in developing countries;
- efforts be made to place and update common definitions of new terms through use of internet facilities, especially via the ISPRS website
- Commission VI be assigned to collaborate with UN/OOSA in review of its annual curriculum for remote sensing workshops.

Resolution VI.2 Computer Assisted Teaching and Learning (CAT/L)

The Congress:

Noting

- that CAT/L systems offer new opportunities and benefits for the education and training processes.

Recognizing

- that information technology is an increasingly used tool for the support of education and training, both for on site and distance learning.

Recommends that

- an evaluation of existing and new concept developments of CAT/L and e-learning be addressed;
- the development and use of new and innovative techniques such as multimedia visualization and virtual reality be encouraged;
- public domain educational software and web pages continue to be developed;
- the CAT Contest (CATCON) awards be continued.

Resolution VI.3 Capacity Building and Technology Transfer within the Developing World

The Congress:

Noting

- the shortage of qualified professional staff in the developing world against the background of rapidly developing technology;
- the limited resources in the developing world to attract qualified professional staff.

Recognizing

- the need to enhance the theoretical, practical and management skills of individuals from the developing world;
- that outreach programs are needed to achieve a Sustainable World;
- the relevance of quality of service with the increased globalization of professional activities.

Recommends that

- opportunities for technology transfer to and within the developing world be further investigated and expanded;
- such technology transfer be initiated, encouraged and/or supported in cooperation with sister societies and international/regional organizations;
- efforts be made to create a general awareness among decision makers, industry, development funding agencies and the general public about the benefits of remote sensing and GIS information.

Resolution VI.4 Promotion of the Profession to Students and Young Scientists

The Congress:

Noting

- the developments in recent years at universities, with the closing and fusing of departments responsible for ISPRS subjects;
- a declining number of students which is signaling an alarm of concern for the viability of the profession and the existence of graduates who are the core of ISPRS.

Recognizing

- the need to increase the relationship between professionals and finishing high school students in order to be able to recruit new professionals for the photogrammetry, remote sensing and spatial information sciences.

Recommends that

- an active promotion be initiated to attract and integrate young people into ISPRS activities, especially University students;
- efforts be made to encourage the use of the photogrammetry, remote sensing and GIS techniques as educational resources and to incorporate them into curricula at grammar and high schools levels;
- the development of multilingual educational material in the photogrammetry, remote sensing and spatial information sciences, mainly for high school and university students;
- efforts be made to promote and conduct an ISPRS Youth Forum in all regions of the world.

Resolution VII.1 Spectral Signature Research

The Congress:

Noting

- rapid developments in spatial and spectral sensing technology;
- the development and fielding of hyperspectral spaceborne sensors as well as a new series of SAR spaceborne sensors;
- these are still the hot areas in remote sensing, especially hyperspectral with the first tech demonstrators in space and the first operational sensors to be launched during 2004/08;
- the rapid development of applications technologies need to be continued in order to effectively use such data and achieve accurate information products.

Recognizing

- that spectral sensing research is essential for the use of remote sensing data;
- the rapid development of applications technologies in areas such as sustainability and security issues;
- that it is fundamental for the retrieval of accurate information from remotely sensed data.

Recommends that

- research on spectral signatures, especially in the areas of hyper-spectral and microwave sensing, be continued;
- cooperation be continued with institutions maintaining databases on spectral signatures;
- collaboration with the International Symposium on Spectral Sensing Research (ISSSR) and other international conferences on Physical Measurements and Spectral Signatures in Remote Sensing be strengthened and coordinated with ISPRS Symposia and Workshops;
- research be undertaken in modeling of physical processes, especially the use of spectral signatures as input.

Resolution VII.2 Image Classification and Analysis Methodologies

The Congress:

Noting

- the increasing availability of high spatial, hyper-spectral and high temporal resolution remote sensing data from various earth observation sensors.

Recognizing

- efforts made in developing classifiers using advanced processing techniques such as contextual, fuzzy, neural and genetic algorithms;
- the requirements for applying integration and fusion methods (at the feature and decision levels) for interpretation purposes;
- limitations of single sensors for sufficient feature extraction and/or classification on one hand and the current limited availability of multi-sensor data on the other hand.

Recommends that

- multi-sensor data acquisition techniques and fusion concepts at the feature and decision levels for landscape modelling tasks be studied and developed;

- extraction tools and classifiers for high spatial and spectral resolution data be further developed;
- expert systems for remote sensing data classification be developed;
- classifiers for high spatial, spectral, and temporal resolution data which can be easily available to and comprehensible by common users be developed;
- classification/analysis methodologies for microwave data with respect to multi-angle, multi-polarization and multi-frequency developments be addressed;
- data integration and fusion techniques be developed.

Resolution VII.3 Analysis of Characteristics of Multi-Spectral, Hyperspectral, Multi-Sensor, Microwave and Multi-Temporal Image Data for Extraction of Attribute Information

The Congress:

Noting

- that numerous measurements of the atmosphere, land and ocean are made from a host of space-borne sensors operating in the optical and microwave regions with improved resolutions.

Recognizing

- retrieval of geographical and biophysical parameters/attributes from these measurements is essential to understand the bio-geo-physical processes and interactions for modeling various phenomena;
- that methods for sensor modelling (e.g. direct or indirect orientation determination, triangulation, and orbital constraints) are highly operational, whereas methods for thematic data extraction using advanced data sources are far from being operational.

Recommends that

- improved physical and analytical algorithms/techniques for extraction of geophysical and biophysical parameters be developed;
- enhanced methods for thematic data extraction using advanced data sources be developed;
- standards for these procedures, assigning accuracy thresholds, be developed.

Resolution VII.4 Validation of Data and Information Using Laboratory and In-Situ Methodologies

The Congress:

Noting

- the significant efforts that are being made for generating bio-geo-physical products from space based remote sensing missions.

Recognizing

- use of these products without proven accuracy is limited and detailed validation is necessary.

Recommends that

- standards be developed for validation procedures;
- measurement networks and protocols be created;
- international cooperation be promoted for collection of validation data from various regions;
- developments of methodologies be addressed for the upscaling of in-situ measurements and the downscaling of remote sensing measurements;
- cooperation with CEOS CalVal Working Group, the Global Monitoring for Environment and Security (GMES), and other similar groups be established.

Resolution VII.5 Improving Atmosphere Modeling for Radiometric Correction

The Congress:

Noting

- the availability of radiation transfer models for estimating atmospheric perturbations to signals reaching the space-borne sensors.

Recognizing

- the limitations in obtaining realistic measurements on aerosol properties and other parameters at the desired number of locations, required by these models;
- the complexity of atmospheric models makes it difficult for use by many common users.

Recommends that

- software/models for image based atmospheric correction that meet required levels of accuracy be developed;
- ISPRS help promote the creation of aerosol measurement networks, their characterization and cooperation with institutions engaged in creating aerosol databases.

Resolution VII.6 Generation and Use of Global Databases

The Congress:

Noting

- the increasing availability of global databases, data gathering methodology, the wide variety of remote sensing data sources, and worldwide emerging infrastructures.

Recognizing

- that future developments need close cooperation in the field of global monitoring and modeling;
- that UNISPACE III supports worldwide actions related to Agenda 21 at the local, regional and global level, in close cooperation with international scientific organizations and the appropriate institutions of the United Nations.

Recommends that

- the development of methodologies for generation and quality evaluation of global databases for global studies in cooperation with Commission IV and the International Geosphere Biosphere Program (IGBP) be continued;
- algorithms for monitoring aspects of global change such as land use, land cover, and land change be developed;
- evolving strategies be developed for assimilating remotely sensed data into global models.

Resolution VII.7 Sustainable Development and Sustainability Indicators

The Congress:

Noting

- that considerable efforts are made to use remote sensing based inputs for sustainable use of natural resources and protection of environment.

Recognizing

- the depletion and degradation of natural resources caused by unplanned development driven by increasing demographic pressure;
- the increasing use of remote sensing to address human health and welfare issues.

Recommends that

- remote sensing based information and systems be promoted for use in attaining food and water security;
- algorithms, models, and sustainability indicators be developed for predicting changes in different eco-systems such as agro-ecosystems, forests, and coastal zones;
- efforts be made to enhance international cooperation by identifying and generating common environmental sustainability indicators amenable to remote sensing.

Resolution VII.8 Connections between Health and Water Bodies

The Congress:

Noting

- the close relationship between ISPRS and ICSU;
- the report of the CSPR panel of ICSU *Environment and its relation to sustainable development*;
- the fact that this report commits ISPRS and IUGG to develop a research program on *Connections between water and health* in the ICSU research programme on Science for Health and Well Being.

Recognizing

- that remote sensing and GIS techniques are a unique source of multiresolution and multitemporal information on the evolution, extent, and evolution of water bodies.

Recommends that

- cooperation with specialists developing relationships between parameters and information about health and water be strengthened;
- actual information needs about water bodies be defined by these specialists;
- techniques to derive these information from remote sensing sources and utilize it in GIS be developed, consolidated, and disseminated.

Resolution VIII.1 Agricultural Systems Management

The Congress:

Noting

- that optical, thermal and microwave remote sensing data has facilitated crop inventory, soil mapping, land degradation studies, conjunctive use of water resources and many aspects of agricultural management.

Recognizing

- that agricultural remote sensing research is mostly limited to studies of different aspects in isolation;
- that to attain the dual goal of productivity and sustainability, agriculture has to be managed as an integrated system.

Recommends that

- procedures and models needed to attain food and nutrient security be developed for remote sensing-enabled cropping systems;
- efforts be made to provide space based inputs for precision farming;
- models be developed for assessment of environmental impacts on modern agriculture;
- crop growth monitoring systems be developed that consider all factors influencing the crop.

Resolution VIII.2 Forest Biodiversity and Management

The Congress:

Noting

- the significant contributions made by aerospace remote sensing technologies for inventorying forest resources and for monitoring and characterizing biodiversity at the landscape level.

Recognizing

- the importance and vulnerability and rapid depletion of forest resources, including their biological diversity;
- the improved spatial, spectral, and temporal capabilities of new sensor technologies for attending to these studies.

Recommends that

- procedures and models for inventorying and monitoring of forest resources, timber stock, and biomass estimation be improved;
- research efforts towards estimation and conservation of forest biological diversity and its sustainability using remote sensing and GIS techniques be enhanced;
- ISPRS cooperate and participate in international efforts, such as those conducted by the International Union of Forest Research Organizations (IUFRO), to improve forest management and biodiversity.

Resolution VIII.3 Mineral Resources and Geological Mapping

The Congress:

Noting

- the extensive use of satellite data in geological and geomorphological mapping and mineral exploration.

Recognizing

- the need for greater use of hyperspectral, thermal, microwave and interferometric data in geological mapping and mineral exploration.

Recommends that

- techniques be developed for the integrated use of space and in-situ geophysical measurements in exploration of mineral resources;
- cooperation in this area be promoted with relevant international organizations, such as with unions of the International Council of Science (ICSU).

Resolution VIII.4 Human Settlements and Impact Analysis

The Congress:

Noting

- that rapid, unplanned urbanization is a problem worldwide;
- that high spatial resolution data with stereo coverage is increasingly available for use in urban mapping and planning and for documentation of heritage sites.

Recognizing

- that growing urbanization, increasing density of population, transmigration from rural to urban areas and associated pollution are impacting the environment and global change;
- the benefits of remotely sensed data in monitoring the impacts of urbanization.

Recommends that

- appropriate tools and models for perspective and development plans for urban areas and for providing urban amenities in rural areas be developed;
- actions as recommended by the HABITAT II Conference be pursued;
- appropriate methods for documentation, conservation, management and permanent control of Natural Heritage and Cultural Landscapes be developed in collaboration with CIPA for UNESCO;
- actions be initiated to monitor land use and land cover transformation, with special emphasis on urban growth.

Resolution VIII.5 Disaster Monitoring, Mitigation and Damage Assessment

The Congress:

Noting

- that remote sensing, GIS, satellite positioning, and space communication have become effective tools for disaster monitoring, mitigation and damage assessment.

Recognizing

- that disaster management has been recognized as an urgent issue in the recommendations of UNISPACE III;
- the increasing need of 4D landscape representations for several environmental or disaster monitoring tasks.

Recommends that

- the development of appropriate tools and methodologies for disaster management using remote sensing and GIS technologies be pursued;

- in collaboration with Commission I, efforts be initiated to help define an integrated system of observation comprising space, aerial, and in-situ measurements for disaster early warning, monitoring, damage assessment, and mitigation;
- cooperation with various partners such as CEOS, the International Global Observing Strategy (IGOS), and the International Charter on Space and Major Disasters be enhanced.

Resolution VIII.6 Coastal Zone Management and Ocean Colour Research

The Congress:

Noting

- that coastal zone is an important ecosystem;
- the availability of ocean colour data from a large number of space missions;
- advances made in the retrieval of bio-geo-chemical parameters of relevance to coastal and open ocean waters.

Recognizing

- the role of ocean colour data in the study of ocean carbon cycle;
- that the link between mixed layer and ocean ecosystem as well as coastal zone management and fishery management is understood.

Recommends that

- relevant activities be initiated for development of analytical algorithms for retrieval of bio-geo-chemical parameters, data merging, and for facilitation of operational use of ocean colour data;
- cooperation be established with other international agencies such as the International Ocean Colour Coordinating Group (IOCCG);
- procedures and protocols be developed for Integrated Coastal Zone Management using remote sensing and GIS techniques.

Resolution VIII.7 Water Resources Security

The Congress:

Noting

- that remote sensing data has been extensively used to identify and monitor surface water bodies and reservoirs and in ground water exploration;
- that snow cover monitoring and glacier inventory are assuming greater importance.

Recognizing

- that efficient and sustainable use of water resources is a priority for the world.

Recommends that

- procedures and analysis packages for integrated use of remote sensing and GIS databases for sustainable development of water resources be developed;
- monitoring of glaciers and the possible effect of global change on their retreat be studied.

Resolution VIII.8 Ocean State Forecasting

The Congress:

Noting

- availability of space-borne measurements providing ocean state/parameters such as sea surface temperature, wind vectors, waves, sea surface height, heat fluxes, etc;
- existence of networks of buoys for in-situ observations.

Recognizing

- the need for accurate ocean state forecasting for several applications such as ship routing and navigation, off-shore oil exploration, communication, etc;
- importance of air-sea interaction in determining weather, cyclogenesis, etc;
- the need for more tide prediction sites throughout the world.

Recommends that

- improved methods for retrieval of ocean parameters, their validation, merging algorithms and modeling efforts be developed;
- collaboration be established with Intergovernmental Oceanic Commission and Global Ocean Observation Experiment group;
- studies be conducted to demonstrate the value of remotely sensed imagery for accurately predicting site-specific tidal cycles in collaboration with the International Hydrographic Organization (IHO).

Resolution VIII.9 Atmospheric and Weather Studies

The Congress:

Noting

- many measurements pertaining to the atmospheric constituents and profiles are available from a network of space and in-situ systems.

Recognizing

- the need for understanding various atmospheric processes;
- the need for both short term and long term weather predictions.

Recommends that

- a Working Group be formed to evaluate the efficacy of presently available models and their accuracies;
- it identify gaps in existing observational capacity;
- it define a system of space, air and in-situ observation systems, and refinement of models in collaboration with the World Meteorological Organization.

Resolution VIII.10 Support of Implementation of International Policies and Treaties

The Congress:

Noting

- the increased political and societal significance of international policies and treaties, such as the Kyoto Protocol;
- the wide use of imaging technologies for supporting international law enforcement and regulatory agreements.

Recognizing

- the need for objective, reliable, economic and timely implementation of the related international policies and treaties;
- investigations and development of thematic mapping using remote sensing data at national and international levels;
- the economic value of imagery to monitor, detect, and assess human activities.

Recommends that

- investigations and development of vegetation (especially forest), soil and other thematic mapping techniques be pursued;
- the use of remote sensing data at national and international levels, with focus on carbon fixing and desertification, be studied;
- the use of remote sensing data for enhancing identification, detection, and rapid response techniques be promoted;
- ISPRS coordinate with the International Global change Atmospheric Chemistry (IGAC) Programme;
- an ad-hoc committee be established to coordinate ISPRS contributions to studies of applying remote sensing for international policies and treaties.

Resolution VIII.11 Polar Research

The Congress

Noting

- that the year 2007 will mark the 125th anniversary of the 1st International Polar Year (IPY) (1882-83), 75th anniversary of the 2nd IPY, and 50th anniversary of the International Geophysical Year (IGY) (1957-58);
- that they were major initiatives leading to significant new insights into global processes and ultimately to decades of valuable polar research;
- that these historical milestones have the potential to stimulate the future of polar science, i.e. to spark exciting new research, engage the next generation of scientists, and publicly illustrate the benefits and challenges still inherent in polar exploration.

Recognizing

- the importance of the global environment, and the role of polar regions in preserving this invaluable resource;
- the capability of aerospace remote sensing technologies in providing valuable inputs to polar research in an unbiased manner; and in near-real time;
- the efforts initiated by ICSU to ignite future polar research by commemorating the 125th anniversary of the first IPY through its Planning Group activities.

Recommends that

- an ISPRS Working Group be assigned to develop dialog and collaboration on polar research;
- the WG support ICSU and the IPY 2007 by identifying and conducting relevant remote sensing initiatives.

Resolution VIII.12 Continuity and Open Access to Moderate Resolution Earth Observation Data

The Congress:

Noting

- the success in using moderate resolution Earth Observation (EO) satellites for obtaining global data sets for resource inventory and monitoring, economic, and cultural applications;
- that access to moderate resolution EO data is encumbered by varying national policies and increasingly restrictive regimes for open distribution;
- that many space faring nations have plans to launch Earth observation satellites in the 2004-2008 quadrennium, and beyond.

Recognizing

- that international inputs are required to define specifications and requirements of these missions to meet widening applications in the social, as well as natural sciences;
- that the global remote sensing community has an obligation to ensure continued collection of moderate spatial resolution data and a responsibility to help unify the policies governing their availability;
- that uniform data and imagery access policies are required to ensure that products from several individual satellites can be fused to generate products not producible from any single source.

Recommends that

- a Working Group be assigned to help define an optimum constellation of complementary satellites to meet Earth observation requirements on a long term basis;
- the WG liaise with IPAC, the GEO Ad hoc Working Group, the UN-OOSA Action Teams, and other related national and international initiatives to promote and voice the technical and data policy needs of ISPRS Members;
- the WG work towards facilitating access to EO data to all those who need it for sustainable development activities at a reasonable cost.

Resolution VIII.13 Tropical areas

The Congress:

Noting

- that the monitoring and management of tropical areas raises several multidisciplinary issues that are addressed by ISPRS;
- that many developing countries are located in these areas.

Recognizing

- that remote sensing techniques provide a unique multiresolution and multitemporal source of information about these large areas;
- that it is often difficult to efficiently monitor or even to access these areas through other means;
- that many ISPRS scientists have already developed skills that should be made available to answer to the actual needs of managers.

Recommends that

- definitive statements and conclusions be prepared which identify remote sensing-based solutions that meet the needs of managers and policy makers in relation to national and regional sustainable development in tropical areas;
- a targeted outreach policy be developed, particularly targeting international donors to assist in such studies;
- workshops be held in these areas bringing together scientists, civil engineers, relevant managers and decision makers, preferably in each of the three large areas (Latin America, Sub-Saharan Africa, South East Asia);
- such activities be led in close cooperation with Commission VI.