

ISSN 1682-1750

THE INTERNATIONAL ARCHIVES OF THE PHOTOGRAMMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES  
ARCHIVES INTERNATIONALES DE PHOTOGRAMMÉTRIE, DE TÉLÉDÉTECTION ET DE SCIENCES DE L'INFORMATION SPATIALE  
INTERNATIONALES ARCHIV FÜR PHOTOGRAMMETRIE, FERNERKUNDUNG UND RAUMBEZOGENE INFORMATIONSWISSENSCHAFTEN

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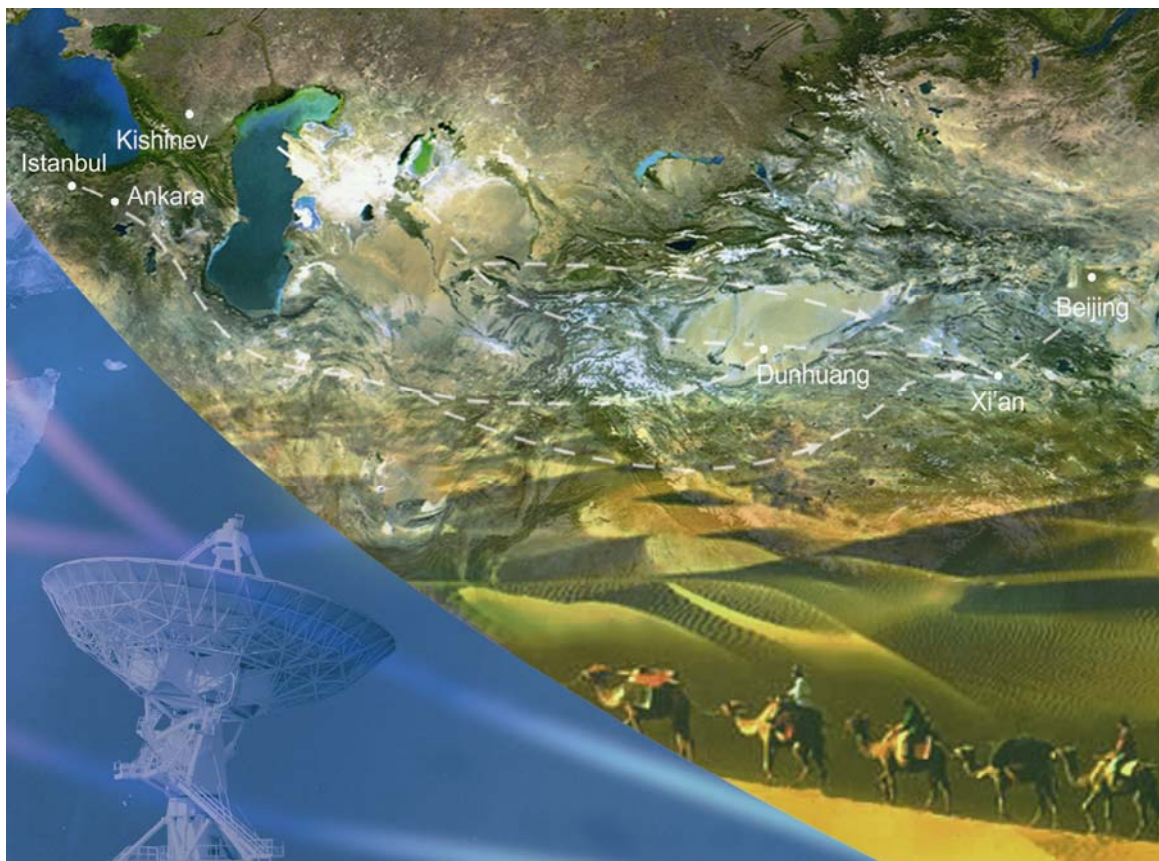
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Edited by:  
CHEN Jun, JIANG Jie, Shailesh NAYAK

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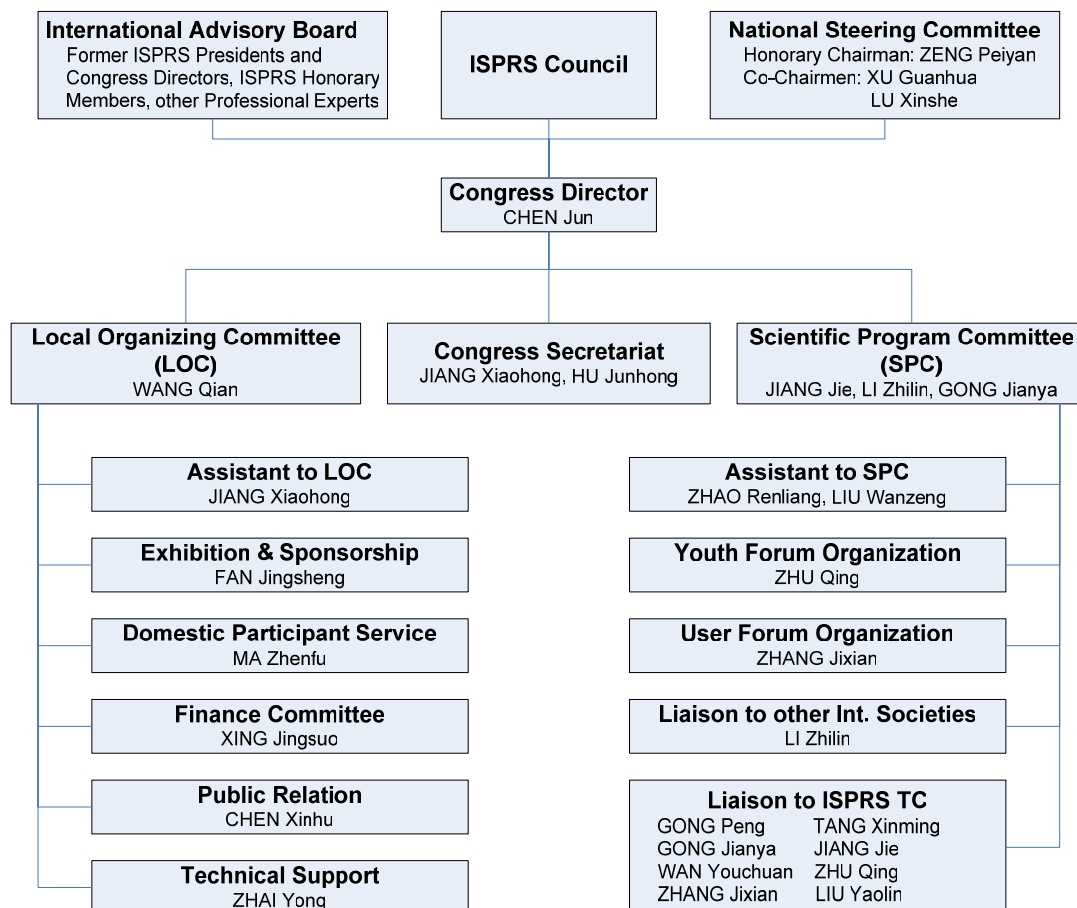
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## Introduction

The most effective means of depicting events over space and time is through spatial data. The value of representing information in form of a map has been realised since the beginning of civilisation. The transition of representation of information from historical artistic depiction to complex digital formats has been due to tremendous progress made in acquisition of data through remote sensing, organisation of databases around Geographic Information System (GIS) and Global Positioning System (GPS). The advances in computer, database and communication technologies, and digital cartography has facilitated emergence of geo-databases and digital mapping.

During last four years, significant development has taken place in spatial data infrastructure. Databases of various types have been produced at national, regional and global levels. The focus is on acquisition of stereo images for 3D analysis. The recent availability of high-resolution orbital data (CARTOSAT 1 & 2, TerraSAR-X) has provided unique opportunity to carry out research in automatic image interpretation and object extraction. The emphasis is clearly on automatic updating of databases. The improvement in positional accuracy needs to be addressed. The image-based spatio-temporal data has been receiving increasing attention especially related to content-based indexing, querying, data mining, in information retrieval. The development in algorithms for management of geo-sensor networks is continuing and likely will see further improvement.

The advancement in visualisation allows virtual displays of landscape in great detail, from a global scale of world-wide processes to fine scale views of cities and buildings. Visualisation techniques are used to interactively explore spatial structures and processes, create virtual realities, demonstrate human impact on landscapes, etc. The 3D visualisation capability has significant impact on society.

Continuous development of various web-based GIS services and applications have substantially increased and enhanced the use of GIS in spatial data access and dissemination, exploration, visualisation, processing, analysis and modelling. Grid computing continues to be an active research subject in Web GIS as it manages massive distributed computing/storage resources and improves performance. Open-source software has provided new, cost-effective solution to web-based geospatial information and service. The concept of virtual Globe is very important for the future development of Web GIS. Location-based services enable wired and wireless users to integrate geospatial information developing a solution. The development of open standards and the interoperability will facilitate enormous potential for sharing scientific data with common standards for providing web-based and location based services, to the variety of users.

The application of such databases and development of services for societal benefit is critical. The geospatial technology is a key for response to a disaster or a emergency. The setting of warning centres, especially for tsunami, has been around geospatial technology for acquisition of data from variety of platforms, organisation into a data base, representation and visualisation of data/information, analysis, modelling and dissemination of advisories including generating hazard or risk maps. The collection and analysis of data including 3D within first hours to few days and its integration with existing data is crucial for rescue and relief operations.

A number of missions are on way to explore the resources on our solar system. The data supplied by these missions will open a new chapter in mapping of extra-terrestrial systems and creating spatial databases, and web based access. The spatial information systems for planetary system are being built. The interest in Lunar mapping research is increasing (SELENE, LRO, Chandrayan-1). Digital terrain products are likely to be available shortly to construct Lunat topographic model. Various approaches are being investigated to produce high resolution DTMs from HRSC (MEX) and HiRISE (MRO) to generate geodetically controlled digital topographic models for Mars. Cassini spacecraft provided data to produce atlases of icy satellites of Saturn.

The Proceedings are culmination four years of research carried out by all working groups of the Commission. It reflects the current state of knowledge in the field of geospatial technology and applications. I am sure the Proceedings will be very useful to all researchers in this field.

I also take an opportunity to thank all my colleagues in the Commission, my fellow presidents and the council for their support and guidance during last four years.

Shailesh Nayak  
President of ISPRS Technical Commission IV

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