Report of ISPRS Technical Commission I Symposium

ISPRS Technical Commission I (TC I) focuses on the prototyping, modelling, calibration, validation and applications of various advanced sensors and systems. With the traditional sensors being improved through different methods, new-type tracks are emerging in various ways. Aerospace telescopes, thousands of beam laser altimetry, Ka/P-band InSAR sensors, micro cameras, high accuracy thermal sensors, mobile perception etc., are growing rapidly. More and more models and algorithms accelerate the development from prototype to practical. Low-cost miniaturization, integration, especially intelligence, lead the trend of sensor systems. TC I monitors sensor technology. It provides a platform for scientists and specialists to discuss and communicate research progress. The themes cover the concepts, methods, designs, and standards of conventional and innovative sensors systems, including optical, hyperspectral, thermal, LiDAR, SAR and their integration. It also offers the applicants the opportunity to use new technology.

ISPRS TC I Symposium was held on May 13 to 17, 2024, in Changsha, China, with the theme of Intelligent Sensing and Remote Sensing Application, guided by ISPRS and the Chinese Society for Geodesy Photogrammetry and Cartography (CSGPC), hosted by Land Satellite Remote Sensing Application Center (LASAC) and Central South University, also co-organized by many local universities and institutes. An Advisory Committee, a Scientific Committee and a Working Committee were established to organize the Symposium.

The Symposium included a plenary session, technical sessions, paper posters, tutorials, exhibition, technical visits, and a contest on intelligent interpretation for multi-modal remote sensing application. All ISPRS Council members attended the Symposium on-site. More than 1500 representatives from 29 countries and regions gathered to share their advanced technologies and experiences, and exchange the latest development trends on sensor systems. Officials from the Ministry of Natural Resources of China, the People's Government of Hunan Province, as well as major leaders from CSGPC, Central South University, and ISPRS attended the opening ceremony and delivered welcome speeches.





- Topics

The topics of TC I Symposium covered all TC I Working Groups, current research hot topics on sensor systems, and also a joint topic with TC III. The 14 topics are:

- 1. Satellite Missions and Constellations for Remote Sensing
- 2. Mobile Mapping Technology
- 3. Multispectral, Hyperspectral and Thermal Sensors
- 4. LiDAR, Laser Altimetry and Sensor Integration
- 5. Microwave and InSAR Technology for Earth Observation
- 6. Orientation, Calibration and Validation of Sensors
- 7. Data Quality and Benchmark of Sensors
- 8. Multi-sensor Modelling and Cross-modality Fusion
- 9. Robotics for Mapping and Machine Intelligence
- 10. Autonomous Sensing Systems and their Applications
- 11. Digital Construction: Reality Capture, Automated Inspection and Integration to BIM
- 12. Point Cloud Generation and Processing
- 13. Artificial Intelligence Technology Related to Sensor Systems
- 14. Multi-sensor Remote Sensing Applications

- Keynote speeches

During the plenary session, nine well-known experts on sensor systems gave keynote speeches, including Prof. Chen Jun (China), Prof. Christian Heipke (Germany), Prof. Li Deren (China), Prof. Charles Toth (USA), Prof. Gong Jianya (China), Prof. Naser El-

Sheimy (Canada), Prof. Guo Renzhong (China), Wolfgang Kainz (Austria), and Jonathan Li (Canada).



- Papers

The Symposium collected 229 manuscripts from 29 countries related to the topic of sensor systems. 45 manuscripts were submitted to the ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences and 184 were submitted to the International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. After peer-review by the members of Scientific Committee, 212 papers were accepted. Following registration and payment confirmation, 108 papers were presented orally and 78 as posters. According to paper quality and oral presentation in the technical sessions, 16 best papers were selected by Scientific Committee and WG Chairs. Bonuses and certificates of these best papers were presented at the closing ceremony of the Symposium. The publisher has confirmed that 174 papers were published, which can be found online through the following websites:

https://isprs-archives.copernicus.org/articles/XLVIII-1-2024/ https://isprs-annals.copernicus.org/articles/X-1-2024/.







- Data sharing

A Memorandum of Understanding between ISPRS and LASAC for sharing remote sensing data of China's natural resources land satellites was signed in the opening ceremony. LASAC has abundant data resources of China's natural resources satellites, and is willing to share the sample data for scientific research and education with the whole society for free through ISPRS, promoting international cooperation in photogrammetry, remote sensing, and their applications. The sample data, covering about 3 million km² and 5 continents, includes images of China's natural resources land remote sensing satellites such as 5m Optical, ZY-3, 5m/8m Optical, L-band Differential Interferometric SAR, GF-1, GF-2 and GF-7, involving five types of loads, i.e. 1m resolution optics, 2m resolution optics,

stereo mapping, hyperspectral imaging and L-band SAR satellites. The data download links will be published through ISPRS website soon.



- Tutorials

Three tutorials on SAR, point cloud processing and navigation were held during the Symposium, titled SAR Satellites and Applications, Point Cloud Processing with AI: Theory, Methods and Applications, and Inertial Navigation: State of the Art and Future Trends. Chaired by Dr. Li Tao, Prof. Yang Bisheng, and Prof. Naser EI-Sheimy, more than 200 representatives attended.



- Contest

As part of the Symposium, a contest on Intelligent Interpretation for Multi-modal Remote Sensing Application was held. More than 300 teams, including 800 persons from universities, research institutes and commercial companies participated in this contest. Four tracks aiming at practical requirements were set: change detection in high-resolution and multi-temporal optical images, water body extraction from high-resolution and multimodal optical images, classification of multi-scale marine phenomenon in SAR images, and forgery detection in multi-scenario remote sensing images of typical objects. The top six teams for each track were finally determined and were awarded at the opening ceremony of the Symposium.



- Exhibition

Four levels were designed for the exhibition, including diamond, platinum, gold and silver. During the Symposium, 23 top and well-known commercial companies, institutes and universities participated in the exhibition as sponsors.



- Technical visits

The Rail Transit Science Popularization Base of Central South University and Hunan Province Satellite Application and Technology Center of Natural Resources were designated as the technical visits. About 50 representatives registered to take the visits, the content of which was very scientific and interesting.



- TC I business meeting

The TC I business meeting was held both online and offline on May 15. The ISPRS TC I officers, all ISPRS Council members and TC I Working Groups attended the meeting. Most of the Advisory Board members of TC I were invited to take part in the meeting also. Prof. Tang Xinming, the president of TC I, and Prof. Antonio Maria Garcia Tommaselli, Vice-President of TC I, reported on TC I activities since the last Congress and remarked on coming events. All WGs reported their activities and plans for coming events. All reports are reviewed and discussed. Some valuable comments and advise were provided by ISPRS Council and TC I Advisory Board.

