IAG SC 4.1 "Emerging Positioning Technologies and GNSS Augmentation" Objectives and Structure for the Term 2015-19

Vassilis Gikas¹, Guenther Retscher ², Allison Kealy³, Kefei Zhang⁴, Jens-André Paffenholz⁵, Laura Ruotsalainen⁶, Harris Perakis¹, Marcelo Santos⁷

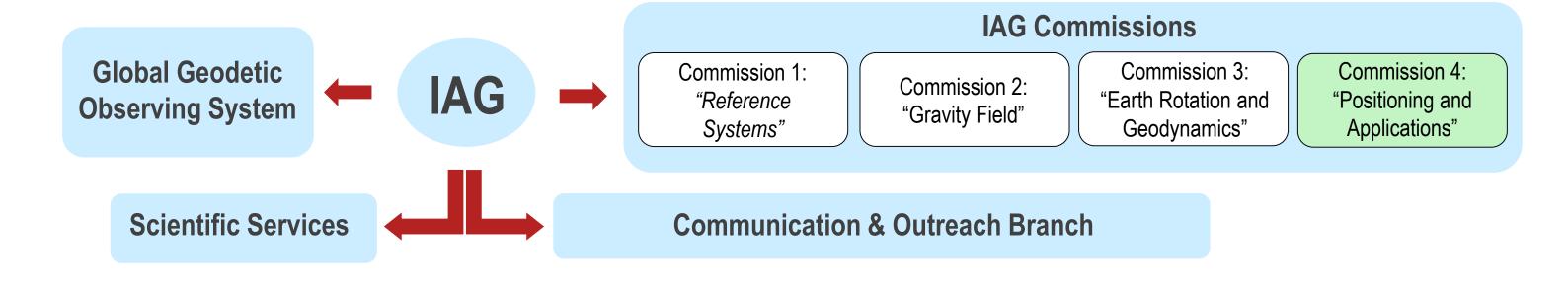


National Technical University of Athens (Greece) 1, Technical University of Vienna (Austria) 2, University of Melbourne (Australia)³, RMIT University (Australia)⁴, Leibniz Universität Hannover (Germany)⁵, Finnish Geospatial Research Institute (Finland) ⁶, University of New Brunswick (Canada) ⁷



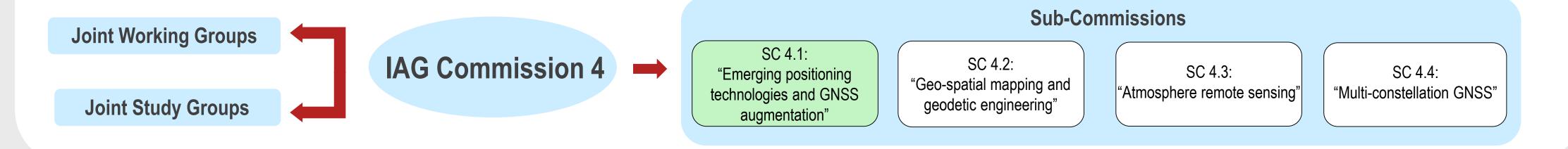
International Association of Geodesy (IAG)

The International Association of Geodesy (IAG) forms a constituent Association of the IUGG (International Union of Geodesy and Geophysics). Its mission is the advancement of geodesy at an international level through research and teaching activities that include collection, analysis, modeling and interpretation of observational data and stimulation of technological development, including the provision of a consistent representation of the shape, rotation and gravity field of the Earth and the planets. The Association's structure comprises a number of components including the Commissions, the Scientific Services, the Global Geodetic Observing System (GGOS) and the Communication and Outreach Branch (COB) which is responsible for the promotional and communication activities of IAG. IAG Commissions represent the Association in all scientific domains related to their field of geodesy.



IAG Commission 4 "Positioning and Applications"

The structure of IAG Commission 4 comprises two main components; firstly, the Sub-Commissions which are in charge with specific topics of research interest and secondly, the Joint Study Groups and Joint Working Groups which are setup to deal with specialized problems in collaboration with other interested IAG entities.



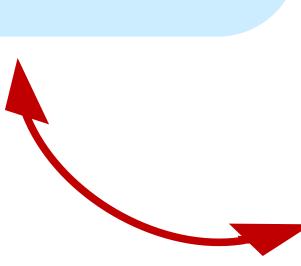
IAG Sub-Commission 4.1 "Emerging Positioning Technologies and GNSS Augmentation"

For the term 2015-19 IAG Sub-Commission 4.1 comprises four Working Groups established to address clearly defined, well focused scientific topics of limited scope within the field of the Commission.

WG 4.1.2

"Indoor Positioning and Navigation"

- Investigate emerging sensor technologies (e.g. LED, magnetometers), integrated techniques and protocols for indoor positioning and tracking,
- Discuss, investigate and develop new algorithm and smart solutions
- Bring key researchers and developers in this area together
- Disseminate effectively the state-of-the-art knowledge and new discoveries in the geospatial communities.



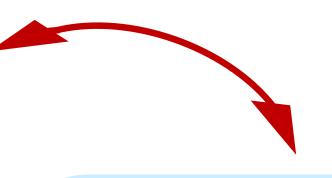
WG 4.1.1 "Multi-Sensor Systems"

- Characterize the performance of positioning sensors for core GNSS capabilities augmentation
- Evaluate current algorithms for measurement integration within multi-sensor systems
- Develop new measurement integration algorithms based on techniques of other research domains, e.g. machine learning and genetic algorithms, spatial cognition etc.
- Establish links between the outcomes of this WG and other IAG and FIG WGs
- Generate formal parameters describing the performance of current and emerging positioning technologies that can inform IAG and FIG members.

Subcomission 4.1 "Emerging positioning technologies and GNSS augmentation"

WG 4.1.4 "Robust Positioning for Urban Traffic"

- Specify and characterize system requirements, with special interest on the environmental and safety aspects
- Evaluate the usability of emerging technologies for the urban traffic navigation, including visionaiding and collaborative driving systems
- Select the best set of technologies fulfilling the system requirements
- Analyze the performance of the selected system both for vehicles and pedestrians in urban areas
- Select the most suitable algorithms for map matching and routing



WG 4.1.3 "3D Point Cloud based Spatiotemporal Monitoring"

- Evaluate the object abstraction for epochal comparison by means of discrete point-wise, areas-based and shape-based approaches.
- Investigate and develop suitable algorithms for change tracking over time in 3D point clouds
- Evaluate the fusion of heterogeneous data (e.g. 3D point clouds, GB-SAR) with respect to structural health monitoring applications.
- Establish links to colleagues from civil and mechanical engineering as well as similar national and international working groups such as DVW, ISPRS, IAG and FIG working groups.
- Characterize the performance of laser scanners and cameras and their fusion in MSS with respect to spatio-temporal monitoring of artificial and natural objects in different scales.

