Royal Institute of Navigation

Navigation 2021 Call for Papers

Call For Papers Now Open! Submit Your Abstract Here
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The work being done globally by those involved in positioning, navigation and timing is providing essential value to humanity, contributing to the achievement of a sustainable planet for all.

RIN aims to bring together diverse disciplines to enable international collaboration towards a more navigable world.

Navigation 2021 brings together two established conferences* and is hosted by the Royal Institute of Navigation.

The organisations are inviting papers in the following categories:

- Peer-reviewed: Your abstract and, if accepted, paper will be peer reviewed and published to be indexed and searchable. Your presentation will be invited in a parallel technical session at the conference.
- Presentation: Your abstract will be reviewed and, if accepted, you will be invited to present your work in a parallel session at the conference.
- Poster: Your abstract will be reviewed and, if accepted, your poster will be displayed in the virtual exhibition hall. We plan to encourage delegate interaction through poster presentations during the networking sessions.

The best peer-reviewed papers will be invited to submit for consideration to be published in the *Journal of Navigation*.

Navigation 2021 brings together two established conferences. The International Navigation Conference (INC) and the European Navigation Conference (ENC).

The Call For Papers is now open! Submit your abstract before 23 April 2021. Please note that for submissions in the peer-review category there are two stages to your submission: Stage 1: submit your abstract before 23 April 2021, and Stage 2: if you are successful in your abstract submission you will be invited to submit your full paper between 23 July and 27 August 2021.

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Conference Themes

PNT Systems & Technology
The use of PNT is accelerating as connected devices offer compelling applications and possibilities. This ubiquity and reliance brings both opportunity and responsibility. This session concentrates on architectures, systems and novel navigation technology concepts. The organisations welcome speculative ideas as much as concepts developed to early prototypes and beyond.

The content can extend from the in depth development of a system component through to trials and test results of an entire technology.

- Future systems
- System evolution
- Signal design & analysis
- Clock technology
- Augmentation systems
- Alternative PNT
- Autonomous systems & inertial sensing
- Signal processing for robust PNT
- Crowd systems & smart phones
- Robust proximity detection
- Navigating with neurons – from neural nets to cognition
- Simultaneous localisation and mapping (SLAM)
- Track and trace proximity

Navigation In The Space Environment And Space Segment Developments
Requirements for navigation in the space environment are rapidly becoming more challenging. At the same time this is a burgeoning industry with major, world financial players and technology developers moving towards entirely novel concepts of space missions and constellations. Navigation and control technology sits firmly at the heart of these developments. This session seeks to provide a forum to discuss and explore the emerging paradigm.

- Enhanced PNT resilience through novel exploitation of LEO spacecraft
- LEO PNT and PNT in New Space
- Novel space segment architectures for next generation PNT
- Orbit prediction and state uncertainty models
- Close proximity manoeuvring and docking operations
- Flight management: autonomous station keeping and AI
- Space traffic management and mega-constellations
- Lessons learnt from air traffic management
- Collision avoidance in low earth orbit
- Policy and international cooperation and the tragedy of the commons
- Highways to the moon – cislunar navigation
- Comet rendezvous missions

Robust & Resilient PNT
As society is more and more reliant on accurate and reliable position, navigation and time, it is important to secure the resilience of this geospatial data, especially for safety- and security-critical applications such as for example transport and time synchronization. This session focuses on alternative and multi-system approaches to improve PNT and to foster redundancy and robustness.

- Alternative PNT
- PNT augmentation
- System-of-systems approaches
- PNT security & robustness
- Interference, jamming and spoofing
- Mitigation and hardening
- Authentication and encryption
- Network augmentation and positioning

Applications of PNT
The navigation world is in the midst of a revolution with PNT as a commodity being used across so many applications. The availability of high accuracy and low cost multi-frequency and multi-constellation receivers is opening new application domains and possibilities. At the same time, autonomous and multimodal transport is transforming economy of scale and opening new challenges and opportunities. Coverage of applications addressing safety, environmental and sustainability aspects are encouraged in this session.

- Atmospheric monitoring & science
- High accuracy positioning
- Geomatics and SLAM
- Indoor / underground navigation
- Road navigation
- Connected autonomous vehicles / transport
- Rail technology
- Digital farming
- Machine control
- Aeronautical navigation
- Drone and UAV navigation and flight space management
- Maritime navigation
- Search and rescue
- Space geodesy
- Energy management and climate change monitoring
- PNT for safety and security
- Navigation-enabled applications

Animal And Human Navigation
Over millennia, animals and humans have developed robust strategies for finding their way through the world – from the deep sea to deserts, and through complex built environments. In this session we explore the behavioural, cognitive and neural mechanisms that animals and humans have developed to enable accurate navigation and positioning. Technology that aids human navigation will also be explored. Cross disciplinary knowledge sharing in this session will help progress the development of effective, user-centred and lightweight PNT technology.

- Urban wayfinding
- Navigating with neurons – from neural nets to cognition
- Instrumentation for animal navigation
- Behaviours and technology
- Cognition in navigation
- Human centred indoor navigation
- Applications of PNT for inclusive wayfinding systems
- Biotechnology innovation in navigation
- Migration
- Role of genetics in navigation and direction finding
- Sensing architectures in animals
- Direction finding and behaviours in animal navigation
- Applications of animal navigation to improve PNT efficiency and safety

PNT In Society

PNT from satellites and other sources is used across many critical infrastructures and by billions of people worldwide. In this session we explore how access to positioning (relative and absolute), navigation and timing services impact all aspects of modern life. From private individuals in their cars or on foot, through professional users optimising processes and enabling the green energy transition, to health-related applications such as contact tracing, PNT is a significant enabler bringing tangible economic benefits as well as contributing to a sustainable future.

- PNT for humanity
- GNSS and the environment
- PNT for safety and security
- Robust proximity detection
- PNT for health
- Track and trace
- Pandemic insights and management
- PNT and privacy
- PNT policy & governance
- Ethics of data sharing and analytics
- Inclusive sense of space
- De-carbonisation