Abstract Submission Deadline: November 1, 2021

Abstract Submission

Abstracts should be submitted electronically via the ION Abstract Management Portal, no later than November 1, 2021. To submit an abstract, sign in at www.ion.org/abstracts. If you have not used the Abstract Management Portal before, click "Create My Account". Once signed in, click on ION Pacific PNT and complete the form.

Abstracts should describe objectives, anticipated or actual results, conclusions, any key innovative steps and the significance of your work.

Authors will be provided with an electronic author's kit in early December, which will contain both in-person and virtual presentation instructions, and publication guidelines.

Virtual presentations will be made available to authors who have passed peer review that are unable to travel to Hawaii to present in person due to U.S. State Department entry restrictions, and who also meet all other virtual presentation requirements.

All authors and session chairs will be required to pay registration fees.

Final Manuscripts

Completed manuscripts must be uploaded to the ION's Abstract Management Portal (AMP) by February 11, 2022. Manuscripts will be designated as a primary paper, or as an alternate paper, in the onsite program based on the Session Chairs' peer review of the full manuscripts.

Manuscripts will be peer reviewed once (note that there will be no secondary review). Manuscripts not representative of the original abstract submitted will not be included in the conference proceedings regardless of whether or not they were presented at the conference; and this may affect the acceptance of future abstracts by the author. While full manuscripts are required for peer review by February 11, corrected/updated manuscripts will be accepted through April 30, 2022.

To be included in the conference proceedings final manuscripts must meet the peer review requirements; an author must present at the conference as scheduled in the conference program and pay the registration fee.

Exceptional manuscripts will be considered for Best Paper Awards.

Complimentary online access to papers will be provided to all eligible conference registrants through June 30, 2022. Eligible conference registrants will be able to download an electronic version of the proceedings following the conference.

Journal Publication

Authors of appropriate papers are encouraged to submit papers for possible publication in the ION's archival journal, *NAVIGATION*, indexed by Thomson Reuters. Papers may be submitted online at http://mc.manuscriptcentral.com/navigation.

Table Top Exhibits

Table top exhibits are $2,200 each, which includes one six-foot table pushed flush against the wall, one chair and one full conference registration. For more information, please contact the ION National Office at 703-366-2776, or mandrews@ ion.org.

Registration Information

Full registration includes all sessions, conference meal functions, and an electronic version of the proceedings. Individual registration benefits are nontransferable. **Registration rates quoted below include a $500 discount for staying in the conference hotel.*** Higher registration rates will apply for those not staying in the conference hotel.

- Member/Corporate Member Rate: $990*
- Non-member Rate: $1070*
- Student Rate: $600*
- Single Day Rate: $600*

* Received and paid by March 1 and staying at Hilton Waikiki. Rates are subject to change.

Advance Hotel Reservation Information

Accommodations are offered at the Hilton Waikiki Beach, which is across the street from the most vibrant stretch of beach in Hawaii.

Room Rate: $209 per night for conference attendees who book before March 1. Limited government rates are available to U.S. government employees.

Resort Fee: The optional $30/night resort fee includes internet access, unlimited movies, discounted island activities, Ala Moana and International Market savings passports, two daily water/soda, recreational and cultural activities, pool toys and activities and local/toll-free calls.

Self-Parking: $35 valet per night for overnight guests.

Reservations:
- Online: Visit www.ion.org/pnt
- By Phone: 1-808-922-0811; be sure to identify yourself as an ION Pacific PNT attendee to receive the special attendee rate.

Why Stay at the Conference Hotel?

The official conference hotel is the center of conference activities. It's a quick trip to get to the technical sessions, it provides opportunities for networking with conference attendees and it makes it easy to return to your room. That's obvious. But there are other reasons that you need to consider before you look at another hotel.

In return for the use of the hotel's meeting facilities, the conference guarantees the hotel that a certain percentage of attendees will stay in that hotel. The hotel discounts the rate for conference attendees from their normal charges.

If the conference does not meet the contracted sleeping room commitment, it must still pay the hotel for these rooms. Unfilled rooms can cost the conference thousands of dollars, hurting both the current conference, and the next conference's ability to negotiate a beneficial hotel contract. In both cases the registration fee is then under pressure to increase unreasonably.

What if we don't contract for sleeping rooms? Attendees will pay more for their hotel rooms and the conference will incur additional expenses for meeting room rental fees, which would increase the cost of registration. Additionally, the hotel will not hold a block of rooms for attendees, which may leave some people far from the conference venue.

Why does the cost differential increase for Pacific PNT 2022 if I don't stay at the conference hotel?

Especially in the time of COVID-19, competitive hotels make it difficult for groups to meet their obligations to the hotel to secure the meeting room space required to host the meeting. Please support the hotel, the conference and ION by staying at the conference hotel.

PACIFIC PNT 2022

APRIL 11-14 2022
Hilton Waikiki Beach
Honolulu, Hawaii

CALL FOR ABSTRACTS
Due November 1, 2021

ION
INSTITUTE OF NAVIGATION

PACIFIC PNT

Where East Meets West in the Global Cooperative Development of Positioning, Navigation and Timing Technology

In-Person and Virtual Presentations will be Offered

CALL FOR ABSTRACTS
Abstracts Due November 1, 2021

April 11-14, 2022
Hilton Waikiki Beach • Honolulu, Hawaii
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Special Session Topics

BeiDou
The Chinese satellite navigation system Beidou is now a fully operational worldwide GNSS with 35 Phase III satellites now in orbit. This special session will feature invited and contributed presentations on all aspects of current and new Beidou systems and application developments: new BDS signal designs and receiver development, BDS signal-in-space quality monitoring and assessment, interoperable space service volume for autonomous orbital determination, Beidou/GNSS Interference detection, inter-satellite link technology, messaging systems, and new Beidou/GNSS applications.
Co-chairs: Dr. Ruizhi Chen, *Wuhan University, China* and Dr. Xinqun Zhan, *Shanghai Jiaotong University, China*

COSMIC/FORMOSAT
COSMIC/FORMOSAT is a constellation of six micro-satellites launched one decade ago through a partnership between Taiwan and the US. These extremely cost-effective LEO satellites rely on occultation measurements of GPS signals to infer atmospheric profiles to improve weather forecasting, climate modeling, and ionosphere and space weather monitoring. The resounding success of the project led to a follow-on mission, COSMIC-2/FORMOSAT-7, launched in 2019. This special session will feature invited presentations and contributed work on all aspects of this exemplifying project and future outlook of the next generation capabilities.
Chair: Dr. Loren Chang, *National Central University, Taiwan*

QZSS
Japan's Quasi-Zenith Satellite System (QZSS) became operational in 2018. Four future satellites are being planned to provide independent navigation capabilities over Japan. This session will have presentations from the government, contractors, universities, and industries. Attending the session, you will be fully informed about the QZSS regional satellite navigation program, including the latest QZSS program status, launch schedule of satellites, navigation performance, payload design/characteristics, receiver development, technical validation results, and application development activities.
Co-chairs: Dr. Takeyasu Sakai, *National Institute of Maritime, Port and Aviation Technology, Japan* and Dr. Nobuaki Kubo, *Tokyo University of Marine Science and Technology, Japan*

Session Topics

Aircraft Navigation and Surveillance
Advances in aircraft navigation and surveillance. Future navigation requirements, integrity monitoring (RAIM/FDE), integration with inertial, automatic dependent surveillance, collision avoidance, and radar.
Chair: Dr. Todd Walter, *Stanford University, USA*

Algorithms and Methods
Methods and advanced algorithms for positioning, navigation, and timing with a diversity of sensors and signals. Approaches to exploit multiple GNSS constellations and new signal structures. Nonlinear estimation, optimization, and fusion algorithms. Techniques to improve acquisition and tracking in terms of sensitivity, robustness, accuracy, and multipath mitigation.
Co-chairs: Dr. Xin Chen, *Shanghai Jiaotong University, China*; Dr. Rong Yang, *Shanghai Jiaotong University, China*; and Dr. Madeline Naudeau, *AFRL, USA*

Alternative Navigation and Signals of Opportunity
Navigation using signals from digital TV and radio, radar, cellular networks, Wi-Fi, telecommunications networks, ultra-wideband signals, pattern matching, sensor integration and indoor messaging systems. Advances in systems, algorithms, and integration techniques for terrestrial PNT, including eLoran, DME, pseudolites, terrestrial transmitters, Wi-fi, cellular, VLF/LF systems, one-way and two-way RF ranging. Other signals include those from low earth orbiting (LEO) satellites. Navigation using signals and standards unique to Pacific Rim countries is especially welcome.
Co-chairs: Dr. Kyle Kauffman, *AFIT, USA* and Dr. Yuen Chau, *Nanyang Technological University, Singapore*

Aviation Applications of GNSS
Applications of GNSS to aviation navigation, precision approach and landing. Ground-based and space-based augmentation systems (LAAS, WAAS, EGNOS, GAGAN, MSAS), flight test performance, integrity designs, integration with other aircraft sensors such as inertial and barometric altimeter. Challenges, issues, policy and progress toward certification of GNSS receivers for aviation applications. Topics relevant to Pacific Rim countries are especially welcome.
Chair: Dr. Maarten Uijt de Haag, *TU Berlin, Germany*

Challenging Navigation Problems
Navigation in indoor, urban, surface, underwater, and other GNSS-degraded environments. Inertial navigation, acoustic devices for bathymetry, positioning, and velocity determination for underwater vehicles and ships, sonar developments, and transponder networks. Non-traditional and collaborative navigation techniques, including terrain-aided navigation, low-cost sensors, non-linear signal processing techniques, reconfigurable filter designs, plug-and-play concepts, connectivity, information sharing, and safety aspects. Topics addressing special challenges in Pacific Rim regions, especially those involving the use of the open-source dataset, urbannav, to develop and evaluate GNSS positioning in urban canyons for pedestrians and autonomous systems and multi-sensor integration or urban areas, are encouraged.
Co-Chairs: Dr. Charles Shao, *Tsinghua University, China* and Dr. Li-Ta Hsu, *The Hong Kong Polytechnic University, China*

Emerging PNT Consumer Applications
PNT for advancement in intelligent transportation, social media, domestic and healthcare products, precision agriculture and machine control. Driverless cars, driver-assist technologies, vehicle-to-vehicle communications, automotive radar, lane-keeping, parking assist; positive train control; augmented reality; health and contact tracing; and gaming systems integration with PNT; autonomous wheel chairs, lawnmowers, snowplows, vacuums; Alzheimer and Autistic patient tracking systems; monitoring, navigation, and control of machinery used in agriculture, construction, and mining.
Chair: Steve Malkos, *Google, USA*

GNSS-R and GNSS-RO for Environmental Monitoring
Use of GNSS and GNSS reflections for remote sensing of ocean roughness, wave height, and wind speed; soil moisture and vegetation water content measurements; Use of GNSS radio occultation for tropospheric and ionospheric profiling; and airborne, balloon, mountain top, and other satellite-based reflectometry and radio occultation advances.
Co-chairs: Dr. James Garrison, *Purdue University, USA* and Dr. Amal Chandran, *Nanyang Technological University, Singapore*

High Precision GNSS Correction and Monitoring Networks
Local area, wide area and worldwide GNSS correction networks, design, status, precise clock and orbit products, ionosphere/troposphere corrections, signal anomalies, performance results, multi-constellation networks, new developments and applications, and unique characteristics of corrections in Asian-Pacific areas.
Chair: Patricia Doherty, *Boston College, USA*

Inertial Navigation Technology and Applications
Applications and integration of INS with other navigation sensors. Design, modeling, calibration, advanced processing techniques, performance characteristics of different technologies, including but not limited to MEMS, FOG, laser gyro and cold-atom. Open architecture design, integration, fault detection and isolation, and testing. New developments in low cost inertial sensing for personal and automotive applications. Design, manufacturing, and testing of low cost sensors in emerging application areas. Algorithms for calibration and integration with other low-cost sensors. Navigation algorithm and sensor development for UAS navigation, stabilization, guidance and control. Integration with autopilots, flight management systems and UAS sensors. Considerations for safety of flight, testing, and standardization especially in Asia Pacific countries.
Co-chairs: Benjamin Mohr, *Honeywell, USA* and Dr. Yuanxin Wu, *Shanghai Jiaotong University, China*

Interference and Spectrum
Effects of interference on GNSS performance, compatibility of GNSS with terrestrial and satellite-based services. Radiofrequency compatibility between satellite navigation systems. Interference detection, characterization and mitigation techniques. Robust navigation in the presence of interference.
Chair: Dr. Jiwon Seo, *Yonsei University, South Korea*

Ionosphere Monitoring with GNSS
Processing algorithms for ionosphere monitoring, characterization from single and multiple GNSS receivers, ionospheric propagation phenomena, receiver design and tracking algorithms, tomography, ionospheric attenuation and scintillation, higher-order effects, plasma drift estimation and gradient measurements, and Asian-Pacific regional ionosphere characteristics.
Co-chairs: Dr. Tzu-Wei Fang, *NOAA, USA* and Dr. Zhe Yang, *Tongji University, China*

Natural Hazards Detection and Other Remote Sensing Applications
The use of GNSS receiver networks to monitor geophysical events. Atmospheric and ionospheric remote sensing applications in real-time or post-processed modes are encouraged including e.g., GNSS detection of seismic waves, volcano eruptions, explosions, tsunamis and space weather events using ground-based and space-based GNSS observations along with novel processing and analysis techniques are also solicited.
Co-chairs: Dr. Attila Komjathy, *JPL, USA* and Yoshikatsu Iotake, *Global Positioning Augmentation Service Corporation, Japan* (invited)

Time and Frequency Distribution
Precise time synchronization and frequency transfer between fixed and mobile platforms, new developments in oscillator technology, optical clocks, chip-scale atomic clocks, terrestrial and satellite two-way time transfer, GNSS time transfer, GNSS time offsets, error sources and performance characteristics, oscillators for space and scientific applications.
Co-chairs: Dr. Frank van Graas, *Ohio University, USA* and Dr. Xiaochun Lu, *National Time Service Center, China* (invited)

UAS Technologies
Equipment and procedures for Unmanned Aerial Systems, novel platforms and applications, sense and avoid, communication, navigation, human factors, standards, test and evaluation. UAS applications such as remote delivery, imagery and remote monitoring.
Chair: Dr. Louis Dressel, *Wing (Google), USA*

PLENARY: Policy and Status Update

Keynote: The Polynesian Voyaging Society

Plus, updates and status of satellite-based navigation systems that are in operation or under development. System overview, current and planned performance, schedule and plans, current policies, and services and special challenges affecting Asian-Pacific areas.
Co-chairs: Dr. Frank van Graas, *Ohio University, USA* and Dr. Y. Jade Morton, *University of Colorado, Boulder, USA*

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