April 8-11, 2019
Hilton Waikiki Beach
Honolulu, Hawaii

PACIFIC PNT

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

Aloha from

Register and reserve your hotel room by March 15 to take advantage of discounted rates

www.ion.org/pnt
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University of Colorado at Boulder, USA

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- Dr. Changdon Kee, Seoul National University, South Korea
- Dr. Jiwon Seo, Yonsei University, South Korea
- Dr. Loren Chang, National Central University, Taiwan
- Dr. Charles Lin, National Cheng-Kung University, Taiwan
- Dr. David Chapman, AFRL, USA
- Dr. Kenneth Fisher, Georgia Tech Research Institute, USA

Session Overview

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Conference Schedule

- **Monday, April 8**
  - Plenary Session: 3:00 p.m. – 5:30 p.m.
- **Tuesday, April 9**
  - Technical Sessions: 9:00 a.m. – 12:00 p.m.
  - Conference Luncheon: 12:00 p.m. – 1:30 p.m.
  - Technical Sessions: 1:30 p.m. – 4:30 p.m.
- **Wednesday, April 10**
  - Technical Sessions: 9:00 a.m. – 12:00 p.m.
  - Conference Luncheon: 12:00 p.m. – 1:30 p.m.
  - Technical Sessions: 1:30 p.m. – 4:30 p.m.
- **Thursday, April 11**
  - Technical Sessions: 9:00 a.m. – 12:00 p.m.
  - Conference Luncheon: 12:00 p.m. – 1:30 p.m.
  - Technical Sessions: 1:30 p.m. – 4:30 p.m.
About Waikiki and Honolulu

Honolulu is the epicenter of Hawaii. Here, Pacific PNT attendees will find everything from historic landmarks and treasured monuments to world-class shopping and a flourishing arts and culture scene. Home to the majority of Oahu’s population, the sprawling city of Honolulu spreads throughout the southeastern shores of Oahu, from Pearl Harbor to Makapuu Point, encompassing world famous Waikiki.

Waikiki is most famous for its beaches, but non-beach entertainment abounds as well. Attractions in Waikiki include the Honolulu Zoo and the Waikiki Aquarium. Along the main strip of Kalakaua Avenue, attendees will find world-class shopping, dining, entertainment, activities and resorts.

In surrounding Honolulu, attendees can take in a variety of attractions, including Pearl Harbor, Iolani Palace, Kawaiahao Church, Aloha Tower, and the arts district of Chinatown. One of the most popular forms of entertainment for the visitor to Hawaii is the luau, a traditional Hawaiian festival party. The Royal Hawaiian Hotel on the beach at Waikiki, offers the Royal Hawaiian Luau, one of the best around.

Visa Information

Attendees requesting a visa letter must:

1. Submit the Visa Letter Request Form located at www.ion.org/pnt; and
2. Register and pay the conference registration fees BEFORE a letter of invitation will be sent. Exemptions to this policy apply only to those authors whose papers have been accepted for presentation, company personnel working in the exhibit area or trade associated press.

Visa letter requests will only be reviewed AFTER you have submitted the Visa Letter Request Form. If an attendee is unable to secure a visa, he/she will need to apply for a refund before the refund deadline for the conference.

We recommend that you apply for your visa at least three months in advance. Currently there is a mandatory security check period of 30 days for people whose passports are issued from several countries. U.S. consular offices now interview most applicants as part of the application process. Please ensure you arrive at the embassy with all required documentation at the time of your interview. Note that the Institute does not intervene in U.S. State Department’s issuance of visas. Visa waiver travelers from ALL 27 Visa Waiver Program countries must present either a machine-readable passport or a U.S. visa.

To learn more about the Visa Waiver Program, go to http://travel.state.gov/visa.

Hotel Reservations

Accommodations are offered at the beautiful Hilton Waikiki Beach with a discounted hotel rate of $209 per night for conference attendees who book before March 15, 2019. Limited government rate rooms are available to U.S. government employees (includes Mitre, Aerospace and JPL employees). In a place where Hawaiian royalty once vacationed, this renowned Waikiki Honolulu hotel is across the street from the most vibrant stretch of beach in Hawaii. Valet parking is $35 per night for overnight guests, and high-speed internet in guestrooms complimentary for conference attendees who book in the conference room block.

Optional Resort Package

The Hilton Waikiki Beach offers an optional resort package for $30 per night, which includes:

- Unlimited movies
- Buy one, get one free admission to Magic of Polynesia Show
- Ala Moana & International Market savings passport
- Two daily water/soda
- Recreational and cultural activities
- Pool toys and activities
- Local/toll-free calls

Make Your Reservation Today:

- Online: Visit www.ion.org/pnt
- Phone: Call the hotel at 808-922-0811 and identify yourself as an ION Pacific PNT attendee.

Save $200 on Your Registration Fees

Attendees who stay at the Hilton Waikiki Beach receive a $200 discount on their conference registration fee. Your hotel confirmation number will be required during registration to claim this discount. Make your hotel reservation before registering for Pacific PNT; the registration discount will not be given retroactively. For more information on why we offer this discount, go here: www.ion.org/pnt/why-stay.cfm

Transportation

The Hilton Waikiki Beach is approximately eight miles from Honolulu International Airport (HNL). Taxi fare is approximately $40 one-way. SpeediShuttle is the most affordable shuttle company servicing Honolulu International Airport, with per-person fares starting at $16 one-way. To utilize SpeediShuttle transportation, call 1-877-242-5777, go to www.speedishuttle.com, or email oahu@speedishuttle.com. For more hotel and travel information, please see www.ion.org/pnt
PLENARY: Policy and Status Update

Date: Monday, April 8, 2019
Time: 3:00 p.m. - 5:30 p.m.
Room: Prince Edward

Moderators:

Dr. John Raquet  
Air Force Institute of Technology, USA

Dr. Mikel Miller  
Integrated Solutions for Systems, USA

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.

1. **Update on the BeiDou Navigation Satellite System (BDS),** Jun Shen, China Satellite Navigation Office, China

2. **COSMIC/FORMOSAT: Ionospheric Weather Observed by GNSS Radio Occultation,** Tiger J.Y. Liu and CAPE Group, (Center for Astronautical Physics and Engineering (CAPE); Institute of Space Science; and Center for Space and Remote Sensing Research, National Central University, Taiwan

3. **Future of Space-based PNT,** David C. Chapman, Air Force Research Laboratory Space Vehicles Directorate
A1: BDS
Date: Tuesday, April 9, 2019
Time: 9:00 a.m. - 12:00 p.m.
Room: Prince Edward

Session Chairs:

Dr. Ruizhi Chen  
Wuhan University, China  

Dr. Xinqun Zhan  
Shanghai Jiaotong University, China

11:39. Research on Standalone BeiDou Radio Frequency Minimum Performance Test for Mobile Communication Terminals, Zhang Qinjuan, Dai Xun, Chen Xiaochen, China Academy of Information and Communication Technology, China

12:00 p.m. – 1:30 p.m. Attendee Luncheon
B1: Alternative Navigation and Signals of Opportunity

Date: Tuesday, April 9, 2019
Time: 9:00 a.m. - 12:00 p.m.
Room: Prince David

Session Chairs:
Dr. Kyle Kauffman
Air Force Institute of Technology, USA
Dr. Chau Yuen
Singapore University of Technology and Design, Singapore

9:05. Robust Low-Latency Indoor Localization Using Bluetooth Low Energy, Haojun Ai, Sheng Zhang, Kaifeng Tang, Ning Li, Weiyi Huang, Yifeng Wang, Key Laboratory of Aerospace Information Security and Trusted Computing, Ministry of Education, China School of Cyber Science and Engineering, Wuhan University, China

9:27. Crowd-sensing Simultaneous Localization and Radio Fingerprint Mapping Based on Probabilistic Similarity Models, Ran Liu, Sumudu Hasala Marakkalage, Singapore University of Technology and Design, Singapore; Madhushanka Padmal, Thiruketheeswaran Shaganan, University of Moratuwa, Sri Lanka; Chau Yuen, Singapore University of Technology and Design, Singapore; Yong Liang Guan, Nanyang Technological University, Singapore; U-Xuan Tan, Singapore University of Technology and Design, Singapore


10:11. Urban Wi-Fi Fingerprinting for Routing of Multi-modal Transport Users, Guenther Retscher, Aizhan Bekenova, Department of Geodesy and Geoinformation, Vienna University of Technology - TU Wien, Austria

Break, 10:35 a.m. - 10:55 a.m.

10:55. Toward GPS-denied Navigation Utilizing Back Projection-based Synthetic Aperture Radar Imagery, Randall S. Christensen, Jacob Gunther, Utah State University; David Long, Brigham Young University


12:00 p.m. – 1:30 p.m. Attendee Luncheon
C1: Algorithms and Methods 1
Date: Tuesday, April 9, 2019
Time: 9:00 a.m. - 12:00 p.m.
Room: Prince Jonah

Session Chairs:
Dr. Xin Chen  
Wenyi Li  
*Shanghai Jiao Tong University, China*  
*Tsinghua University, China*

9:05. *An Adaptive Method for BeiDou Dual-Frequency Joint Acquisition Based on SNR Estimation*, Wuxun Zhang, Xin Chen, Di He, Shanghai Jiao Tong University, China; Yueming Yang, Shanghai Panchip Microelectronics Co., Ltd., China


10:11. *Geolocation of Pulses Using Bispherical Coordinates and Multiple Omnidirectional Receivers*, George N. Gilliam, Tracie A. Severson, Department of Weapons, Robotics, and Control Systems Engineering, United States Naval Academy

Break, 10:35 a.m. - 10:55 a.m.


12:00 p.m. – 1:30 p.m. Attendee Luncheon
A2: COSMIC/FORMOSAT
Date: Tuesday, April 9, 2019
Time: 1:30 p.m. - 4:30 p.m.
Room: Prince Edward

Session Chairs:

Dr. Loren Chang  
National Central University, Taiwan

Dr. Bill Schreiner  
UCAR, USA

1:35. Ionospheric Weather Observations with FORMOSAT-3/COSMIC and Prospects with FORMOSAT-7/COSMIC-2, Tiger J.Y. Liu, Loren C. Chang, F.Y. Chang, C.K. Chao, Center for Astronautical Physics and Engineering; and Institute of Space Science, National Central University, Taiwan


4:09. Performance Assessment and Improvements for the FORMOSAT-5 Onboard Orbit Propagator Using GPS Ephemeris, Edward Chi-Ting Liao, Loren C. Chang, Center for Astronautical Physics and Engineering, National Central University, Taiwan; Wen-Lung Chiang, Ming-Yu Yeh, National Space Organization (NSPO), Taiwan
B2: Interference and Spectrum

**Date:** Tuesday, April 9, 2019  
**Time:** 1:30 p.m. - 4:30 p.m.  
**Room:** Prince David

**Session Chairs:**  
**Logan Scott**  
*Logan Scott Consulting, USA*  
**Dr. Jiwon Seo**  
*Yonsei University, South Korea*

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**1:35. Towards a Comprehensive Approach for Obtaining Resilient PNT**, Logan Scott, LS Consulting


Break, 3:05 p.m. - 3:25 p.m.


**3:47. Kalman Filter Derivation and Comparison to MUltiple SIgnal Classification (MUSIC)**, Russell Powell, Caleb Perry, Adam Simmons, Navigation Technology Associates, Inc.; Gregory Reynolds, Clinton Blankenship, U.S. Army CCDC, Aviation and Missile Center
C2: Algorithms and Methods 2
Date: Tuesday, April 9, 2019
Time: 1:30 p.m. - 4:09 p.m.
Room: Prince Jonah

Session Chairs:

Dr. Madeleine Naudeau
AFRL, USA

Dr. Jianfeng Wu
National Time Service Center, China

1:57. Timescale Development for GNSS Applications, Michael J. Coleman and Ronald L. Beard, U.S. Naval Research Laboratory

2:19. Bobcat-1: The Ohio University CubeSat for Inter-Constellation Time Offset Determination, Sabrina Ugazio, Kevin Croissant, Brian Casey Peters, Frank van Graas, Ohio University

2:41. Distance Determination Between WGS84 Coordinates: An Assessment of Approximation Methods for Reduced Computational Complexity, David Seiferth, Christopher Blum, Matthias Heller, Florian Holzapfel, Institute of Flight System Dynamics at Technical University of Munich, Germany

Break, 3:05 p.m. - 3:25 p.m.

A3: QZSS
Date: Wednesday, April 10, 2019
Time: 9:00 a.m. - 12:00 p.m.
Room: Prince Edward

Session Chairs:

Dr. Takeyasu Sakai
National Institute of Maritime, Port and Aviation Technology, Japan

Prof. Nobuaki Kubo
Tokyo University of Marine Science and Technology, Japan

9:27. The Operational Phase Performance of Centimeter-Level Augmentation Service (CLAS), Rui Hirokawa, Kenji Nakakuki, Seigo Fujita, Yuki Sato, Akinari Uehara, Mitsubishi Electric Corporation, Japan

9:49. Evaluation of QZSS SLAS (Sub-meter Level Augmentation Service) Performance, Daiki Matsumoto, Takayuki Kaneso, NEC Aerospace Systems, Ltd., Japan; Takashi Urushido, Satoru Owada, NEC Corporation, Japan

10:11. Capturing Method of Millimeter Displacement in Centimeter Class PPP-RTK Measured Data, Koki Asari, Masayuki Saito, Izumi Mikami, Satellite Positioning Research and Application Center, Japan

Break, 10:35 a.m. - 10:50 a.m.

10:55. Brief Study to Improve Robustness for RTK-GNSS with QZSS (Quasi-Zenith Satellite System), Hiromune Namie, The National Defense Academy, Japan; Nobuaki Kubo, Tokyo University of Marine Science and Technology, Japan; Osamu Okamoto, National Institute of Technology, Ibaraki College, Japan; Hiroki Irie, National Institute of Technology, Kumamoto College, Japan; Masashi Yoshida, Salesio Institute of Technology, Japan; Akio Yasuda, Tokyo University of Marine Science and Technology, Japan

11:17. DFMC SBAS Prototype System Performance Using Global Monitoring Stations of QZSS, Mitsunori Kitamura, and Takeyasu Sakai, Electronic Navigation Research Institute, National Institute of Maritime, Port and Aviation Technology

11:39. Integration of GNSS-PPP and IMU/SPEED Sensors in Urban Areas, Nobuaki Kubo, Yize Zhang, Daisuke Hatta, Tokyo University of Marine Science and Technology, Japan

12:00 p.m. – 1:30 p.m. Attendee Luncheon
B3a: UAS Technologies
Date: Wednesday, April 10, 2019
Time: 9:00 a.m. - 10:35 a.m.
Room: Prince David

Session Chairs:
Dr. Nisar Ahmed  
*University of Colorado, USA*

Dr. Robert Leishman  
*Air Force Institute of Technology, USA*

9:05. Navigation of Multiple sUAS Using GNSS, Inertial and Range Radios, Joel Huff and Maarten Uijt de Haag, Ohio University


9:49. Predictive Guidance for Automated Velocity Obstacle Collision Avoidance, Josh Wilkerson, Naval Air Warfare Center Weapons Division
**B3b: Indoor and Urban Navigation**

**Date:** Wednesday, April 10, 2019  
**Time:** 10:50 a.m. - 12:00 p.m.  
**Room:** Prince David

**Session Chairs:**

Dr. Nisar Ahmed  
*University of Colorado, USA*  

Dr. Robert Leishman  
*Air Force Institute of Technology, USA*

10:55. Deep Neural Network Based Multipath Mitigation Method for Carrier Based Differential GNSS Systems, Dongchan Min, Minchan Kim, Jinsil Lee, Jiyun Lee, Korea Advanced Institute of Science and Technology, South Korea

12:00 p.m. – 1:30 p.m. Attendee Luncheon
C3a: Natural Hazards Detection and Monitoring Using GNSS

Date: Wednesday, April 10, 2019
Time: 9:00 a.m. - 10:35 a.m.
Room: Prince Jonah

Session Chairs:

Yoshikatsu Iotake
Global Positioning Augmentation Service Corporation, Japan

Dr. Attila Komjathy
Jet Propulsion Laboratory, USA

9:49. Comparing Detection Techniques of Coseismic Disturbances by using Differential Ionospheric Delay of GNSS Signal, Bugyeom Kim, Seonho Kang, Deokhwa Han, Changdon Kee, Seoul National University, South Korea; Junesol Song, Ecole Nationale de l’ Aviation Civile (ENAC), France
Technical Sessions

C3b: Railway Navigation

Date: Wednesday, April 10, 2019
Time: 10:50 a.m. - 12:00 p.m.
Room: Prince Jonah

Session Chairs:

Dr. Charles Shao
Tsinghua University, China

Dr. Mikel Miller
Integrated Solutions for Systems, USA

10:55. GPS/BDS-based Virtual Balise - Enabling Satellite-based Train Control with a Train-centric Approach, Jiang Liu, Bai-gen Cai, De-biao Lu, Jian Wang, Beijing Jiaotong University and Beijing Engineering Research Center of EMC and GNSS Technology for Rail Transportation, China

11:17. Intelligent Antennas for Mitigating GNSS Jamming & Spoofing Hazards on the ERTMS Train Control, Cosimo Stallo, Pietro Salvatori, Andrea Coluccia, Massimo Capozzi, RadioLabs, Italy; Giovanni Gamba, Qascom, Italy; Ernestina Cianca, Tommaso Rossi, Simone Di Domenico, University of Roma 2, Italy; Alessandro Neri, University of Roma 3, Italy; Francesco Rispoli, Ansaldo STS, Italy; Massimiliano Ciaffi, RFI, Italy

11:39. Indoor Vehicle Localization Based on Wi-Fi Navigation Beacons for Multi-Modal Transportation Applications, Alessandro Neri, Roma TRE University and RadioLabs, Italy; Pietro Salvaroti, RadioLabs, Italy; Massimo Massaro, Roma TRE University, Italy; Francesco Rispoli, Ansaldo STS, Italy

12:00 p.m. – 1:30 p.m. Attendee Luncheon
A4: Emerging PNT Consumer Applications

Date: Wednesday, April 10, 2019
Time: 1:30 p.m. - 4:30 p.m.
Room: Prince Edward

Session Chairs:

Shunsuke Kamijo  
The University of Tokyo, Japan

Masaaki Hayashi  
Seiko Epson Corporation, Japan

1:35. The Necessary Consideration for More Effective Location Information on E911, Masaaki Hayashi, The Chair of Standardization Working Group of QBIC (QZSS Business Innovation Council), Japan Committee Member of ISO TC20, and Seiko Epson Corporation, Japan

1:57. A Script Hook-based Ultra-Low Cost Driving Simulator for Development of Self-Driving Algorithms, Ji-Ung Im, Sang-Hun Ahn, Jong-Hoon Won, INHA University, South Korea

2:19. GNSS Signal in Railway Train Operation Scenario Quality Grid Generation Method, Debiao Lu, Jun Tan, Baigen Cai, Jiang Liu, Jian Wang, Beijing Jiaotong University, China

2:41. Lifelog using Mobility Context Information in Urban City Area, Yanlei Gu, Dailin Li, Yoshihiko Kamiya, Shunsuke Kamijo, The University of Tokyo, Japan

Break, 3:05 p.m. - 3:25 p.m.


3:47. Generation of Crustal Movement Correction Parameter Considering Valid Period and Accuracy Guarantee, Yuki Ichikawa and Mikihiro Hosoi, Aisan Technology Co., Ltd., Japan
B4: Inertial Navigation Technology and Applications

**Date:** Wednesday, April 10, 2019  
**Time:** 1:30 p.m. - 4:30 p.m.  
**Room:** Prince David

**Session Chairs:**

Benjamin Mohr  
Honeywell, USA  
Dr. Yuanxin Wu  
Shanghai Jiaotong University, China

1:35. **Step-Based Attitude Update (SBUPT) Technique for Pedestrian Dead Reckoning (PDR) using Handheld Devices,** Maan E. Khedr, Ahmed Radi, and Naser El-Shimy, Department of Geomatics Engineering, University of Calgary, Canada

1:57. **Transfer Alignment Using Synergistic IMUs,** Shahram Moafipoor, Brad Despres, Jeff A. Fayman, Lydia Bock, Geodetics Inc.

2:19. **An Efficient Method for Gyroscope-aided Full Magnetometer Calibration,** Maoran Zhu, Yuanxin Wu, Wenxian Yu, Shanghai Jiao Tong University, China

2:41. **Indoor Altitude Determination Using MEMS-based Sensors in Smartphones,** Guenther Retscher, Department of Geodesy and Geoinformation, Vienna University of Technology - TU Wien, Austria

Break, 3:05 p.m. - 3:25 p.m.

3:25. **Factor Graph-Based Cooperative Positioning Algorithm for Pedestrian Navigation Systems in Indoor Environments,** Chunyang Yu, University of Calgary, Canada; Haiyu Lan, Profound Positioning Inc., Canada; Yiran Luo, University of Calgary, Canada; Shiwei Fan, Harbin Institute of Technology, China; Naser El-Shimy, University of Calgary, Canada
C4: GNSS-R and GNSS-RO for Environmental Monitoring

Date: Wednesday, April 10, 2019
Time: 1:30 p.m. - 4:09 p.m.
Room: Prince Jonah

Session Chairs:

Dr. Mehmet Kurum
Mississippi State University, USA

Dr. Jade Morton
University of Colorado, Boulder, USA

1:35. On the Feasibility of Smartphone-based Interferometric GNSS Reflectometry, Mehmet Kurum, Ali Cafer Gurbuz, Claudia, Nelson, Lauren Orsini, Mia Scheider, Mississippi State University

1:57. Function and Performance Assessment of a GNSS-R Receiver in Airborne Tests, Jyh-Ching Juang, Sheng-Hsiung Ma, National Cheng Kung University, Taiwan; Yung-Fu Tsai, Chen-Tsung Lin, National Space Organization, Taiwan

2:19. A Novel Application of Deformation Monitoring using GNSS-R Technology, Yang Yang, Yu Zheng, Wenkun Yu, Duojie Weng, Wenbin Li, Wu Chen, Hong Kong Polytechnic University, China


Break, 3:05 p.m. - 3:25 p.m.

3:25. The FengYun-3 Radio Occultation Sounder GNOS: A Review of the Missions and Early Results, Yueqiang Sun, Congliang Liu, Weihua Bai, National Space Science Center, CAS and Beijing Key Laboratory of Space Environment Exploration, China; Yan Liu, National Meteorological Center, Chinese Meteorological Administration, China; Qifei Du, Xianyi Wang, National Space Science Center, CAS and Beijing Key Laboratory of Space Environment Exploration, China; Guanglin Yang, Mi Liao, Zhongdong Yang, Xiaoxin Zhang, National Satellite Meteorological Center, Chinese Meteorological Administration, China; Xiangguang Meng, Danyang Zhao, Junming Xia, Yuerong Cai, National Space Science Center, CAS and Beijing Key Laboratory of Space Environment Exploration, China; Gottfried Kirchengast, Wegener Center for Climate and Global Change (WEGC) and Institute for Geophysics, Astrophysics, and Meteorology/Institute of Physics, University of Graz
A5: Challenging Navigation Problems 1

Date: Thursday, April 11, 2019
Time: 9:00 a.m. - 12:00 p.m.
Room: Prince Edward

Session Chairs:

Dr. Dorota Grejner-Brzezinska
The Ohio State University, USA

Dr. Lawrence Robertson
AFRL Space Vehicles Directorate, USA

9:05. GNSS Expert Witness Evidence in Australian Courts, Solange Cunin, Andrew Dempster, University of New South Wales, Australia; Allison Kealy, RMIT University, Australia; Gary Edmond, University of New South Wales, Australia

9:27. Position-Domain Hatch Filter for Integrated GPS/BeiDou/Altimeter, La Woo Kim, Won Jae Yoo, and Hyung Keun Lee, Department of Electronics and Information Engineering, Korea Aerospace University, South Korea

9:49. NLOS Detection and Compensation using a Vector Tracking-based GPS Software Receiver, Bing Xu and Li-Ta Hsu, Interdisciplinary Division of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University, China

10:11. A GNSS Software-Defined Receiver with Vector Tracking Techniques for Land Vehicle Navigation, Yiran Luo, Beijing Institute of Technology, China and University of Calgary, Canada; Jian Li, Beijing Institute of Technology, China; Chunyang Yu, Zhitao Lyu, University of Calgary, Canada; Zhe Yue, Northwestern Polytechnical University, China; Naser El-Sheimy, University of Calgary, Canada

Break, 10:35 a.m. - 10:55 a.m.

10:55. Direct Estimation of Multipath in a Deep Urban Area using Multi-GNSS Carrier Phase Variation and Previous Position, Yongjun Lee, Byungwoon Park, Sejong University, South Korea; Yoola Hwang, Byoung-Sun Lee, Jaeyoung Ahn, Electronics and Telecommunications Research Institute

11:39. Range-based 3D Mapping Aided GNSS with NLOS Correction based on Skyplot with Building Boundaries, Hoi Fung Ng, Guohao Zhang, Li-Ta Hsu, Interdisciplinary Division of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University, China

12:00 p.m. – 1:30 p.m. Attendee Luncheon
B5: Aircraft Navigation and Surveillance

Date: Thursday, April 11, 2019
Time: 9:00 a.m. - 12:00 p.m.
Room: Prince David

Session Chairs:

Neeraj Pujara
Air Force Research Laboratory, USA
Dr. Maarten Uijt de Haag
Ohio University, USA


9:49. Standards for ARAIM ISM Data Analysis, Todd Walter, Juan Blanch, Kazuma Gunning, Stanford University

10:11. SIS Monitoring for ARAIM in the Absence of Precise Clock Estimates, Kazuma Gunning, Todd Walter, David Powell, Stanford University

Break, 10:35 a.m. - 10:55 a.m.

11:39. Development Status of DFMC-SBAS using QZSS PTD (Positioning Technology Development) Subsystem, Hiroko Tokura, Takayuki Kaneso, NEC Aerospace Systems, Ltd., Japan; Satoru Owada, Takashii Urushido, NEC Corporation, Japan; Mitsunori Kitamura, Electronic Navigation Research Institute, National Institute of Maritime, Port and Aviation Technology, Japan

12:00 p.m. – 1:30 p.m. Attendee Luncheon

ION Pacific PNT • April 8-11, 2019 • Hilton Waikiki Beach • Honolulu, Hawaii • www.ion.org
C5: Ionosphere Monitoring with GNSS  
**Date:** Thursday, April 11, 2019  
**Time:** 9:00 a.m. - 12:00 p.m.  
**Room:** Prince Jonah  

**Session Chairs:**  
- Dr. Frank van Graas  
  *Ohio University, USA*  
- Dr. Jiyun Lee  
  *KAIST, South Korea*  

9:05. Assessment and Mitigation of Ionospheric Spatial Decorrelation on GBAS: Lessons Learned, Jiyun Lee, KAIST, South Korea  

9:27. Characteristics of Ionospheric Gradients in the Transition Region from Magnetic Low to Mid-latitudes for GBAS Implementation, M. Nakamura, S. Saito, T. Yoshihara, Electronic Navigation Research Institute, Japan  

9:49. Analysis of Ionospheric Scintillation and its Impact on PPP at Low Latitudes, Kai Guo, Marcio Aquino, Sreeja Vadkke Veettil, University of Nottingham, Nottingham, UK; Zhizhao Liu, Wu Chen, The Hong Kong Polytechnic University, Hong Kong; Haroldo Antonio Marques, Military Institute of Engineering (IME), Brazil  

11:17. Tidal Forcing Effects on the Zonal Variation of Solstice Equatorial Plasma Bubbles, Loren C. Chang, Cornelius Csar Jude H. Salinas, Yi-Chung Chiu, Pei-Yun Chiu, Institute of Space Science and Engineering, Center for Astronautical Physics and Engineering, National Central University, Taiwan; Charles C.H. Lin, Department of Earth Science, National Cheng Kung University, Taiwan  

11:39. Modeling the Near-field Ionospheric Disturbances During Earthquakes, Xing Meng, Attila Komjathy, Olga P. Verkhoglyadova, Giorgio Savastano, Jet Propulsion Laboratory, California Institute of Technology; Mattia Crespi, Michela Ravanelli, University of Rome “La Sapienza,” Italy  

12:00 p.m. – 1:30 p.m. Attendee Luncheon
Technical Sessions

A6: Challenging Navigation Problems 2
Date: Thursday, April 11, 2019
Time: 1:30 p.m. - 4:30 p.m.
Room: Prince Edward

Session Chairs:

Dr. Allison Kealy  
RMIT University, Australia
Dr. Li-Ta Hsu  
Hong Kong Polytechnic University, Hong Kong

1:57. Real-time GNSS NLOS Detection and Correction Aided by Sky-Pointing Camera and 3D LiDAR, Xiwei Bai, Weisong Wen, Guohao Zhang, Li-Ta Hsu, The Hong Kong Polytechnic University, Hong Kong


B6: Aviation Applications of GNSS

Date: Thursday, April 11, 2019
Time: 1:30 p.m. - 4:30 p.m.
Room: Prince David

Session Chairs:

Dr. Todd Walter
Stanford University, USA

Dr. Eugene Bang
ENAC, France

1:35. An Overview of Advanced Receiver Autonomous Integrity Monitoring (ARAIM), Todd Walter, Stanford University

1:57. Lower Bounds in Optimal Integrity Monitoring, Juan Blanch and Todd Walter, Stanford University

2:19. ARAIM with More than two Constellations, Yawei Zhai, Xingqun Zhan, Jin Chang, Shanghai Jiao Tong University, China; Boris Pervan, Illinois Institute of Technology


3:47. Revaluation of Spatial Decorrelation Parameters of Atmospheric Delay for GBAS (Ground-based Augmentation System) Safety Design, Takayuki Yoshihara, Susumu Saito, Atsushi Kezuka, Shinji Saitoh, Electronic Navigation Research Institute, National Institute of Maritime, Port and Aviation Technology, Japan

4:09. Design and Analysis of a Public Key Infrastructure for SBAS Data Authentication, Andrew Neish, Todd Walter, J. David Powell, Stanford University
C6: High Precision GNSS Correction and Monitoring Networks  
**Date:** Thursday, April 11, 2019  
**Time:** 1:30 p.m. - 4:30 p.m.  
**Room:** Prince Jonah  

**Session Chairs:**

Dr. Jade Morton  
*University of Colorado at Boulder, USA*  

Dr. (George) Zhizhao Liu  
*Hong Kong Polytechnic University, Hong Kong*

1:57. **Discrepancies Between Provided DCB Estimates and Equivalent Formulations in CAS DCB Product**, Harrison Bourne and Jade Morton, University of Colorado, Boulder, US


2:41. **Instantaneous Decimeter-level Positioning using Triple-frequency GPS/BeiDou/Galileo/QZSS Data Over Wide Areas**, Jianghui Geng, Jiang Guo, Hua Chang and Ran Zeng, GNSS Research Center, Wuhan University, China

Break, 3:05 p.m. - 3:25 p.m.

3:25. **Signal Deformation Monitoring for Anomalous Multipath Threats**, R. Eric Phelts and Todd Walter, Stanford University

3:47. **Preliminary Test Results of RTK-aided Conical Domain Model for SBAS Ionospheric Correction**, Donguk Kim, Deokhwa Han, Changdon Kee, Seoul National University, South Korea

4:09. **Application Research of IGS Products in GPS Real-time Positioning and Timing**, Ran Yan, National Time Service Center (NTSC), Chinese Academy of Science (CAS) and University of the Chinese Academy of Sciences, (UCAS), China; Jianfeng Wu, NTSC, UCAS, CAS, China; Yonghui Hu, NTSC, UCAS, CAS, China
About Waikiki and Honolulu

Honolulu is the epicenter of Hawaii. Here, Pacific PNT attendees will find everything from historic landmarks and treasured monuments to world-class shopping and a flourishing arts and culture scene. Home to the majority of Oahu's population, the sprawling city of Honolulu spreads throughout the southeastern shores of Oahu, from Pearl Harbor to Makapuu Point, encompassing world famous Waikiki.

Waikiki is most famous for its beaches, but non-beach entertainment abounds as well. Attractions in Waikiki include the Honolulu Zoo and the Waikiki Aquarium.

Along the main strip of Kalakaua Avenue, attendees will find world-class shopping, dining, entertainment, activities and resorts.

In surrounding Honolulu, attendees can take in a variety of attractions, including Pearl Harbor, Iolani Palace, Kawaiahao Church, Aloha Tower, and the arts district of Chinatown. One of the most popular forms of entertainment for the visitor to Hawaii is the luau, a traditional Hawaiian festival party. The Royal Hawaiian Hotel on the beach at Waikiki, offers the Royal Hawaiian Luau, one of the best around.

Visa Information

Attendees requesting a visa letter must:

1. Submit the Visa Letter Request Form located at www.ion.org/pnt; and
2. Register and pay the conference registration fees BEFORE a letter of invitation will be sent. Exemptions to this policy apply only to those authors whose papers have been accepted for presentation, company personnel working in the exhibit area or trade associated press.

Visa letter requests will only be reviewed AFTER you have submitted the Visa Letter Request Form. If an attendee is unable to secure a visa, he/she will need to apply for a refund before the refund deadline for the conference.

We recommend that you apply for your visa at least three months in advance. Currently there is a mandatory security check period of 30 days for people whose passports are issued from several countries. U.S. consular offices now interview most applicants as part of the application process. Please ensure you arrive at the embassy with all required documentation at the time of your interview. Note that the Institute does not intervene in U.S. State Department’s issuance of visas. Visa waiver travelers from ALL 27 Visa Waiver Program countries must present either a machine-readable passport or a U.S. visa.

To learn more about the Visa Waiver Program, go to http://travel.state.gov/visa.

Hotel Reservations

Accommodations are offered at the beautiful Hilton Waikiki Beach with a discounted hotel rate of $209 per night for conference attendees who book before March 15, 2019. Limited government rate rooms are available to U.S. government employees (includes Mitre, Aerospace and JPL employees). In a place where Hawaiian royalty once vacationed, this renowned Waikiki Honolulu hotel is across the street from the most vibrant stretch of beach in Hawaii. Valet parking is $35 per night for overnight guests, and high-speed internet in guestrooms complimentary for conference attendees who book in the conference room block.

Optional Resort Package

The Hilton Waikiki Beach offers an optional resort package for $30 per night, which includes:

- Unlimited movies
- Buy one, get one free admission to Magic of Polynesia Show
- Ala Moana & International Market savings passport
- Two daily water/soda
- Recreational and cultural activities
- Pool toys and activities
- Local/toll-free calls

Make Your Reservation Today:

- Online: Visit www.ion.org/pnt
- Phone: Call the hotel at 808-922-0811 and identify yourself as an ION Pacific PNT attendee.

Save $200 on Your Registration Fees

Attendees who stay at the Hilton Waikiki Beach receive a $200 discount on their conference registration fee. Your hotel confirmation number will be required during registration to claim this discount. Make your hotel reservation before registering for Pacific PNT; the registration discount will not be given retroactively. For more information on why we offer this discount, go here: www.ion.org/pnt/why-stay.cfm

Transportation

The Hilton Waikiki Beach is approximately eight miles from Honolulu International Airport (HNL). Taxi fare is approximately $40 one-way. SpeediShuttle is the most affordable shuttle company servicing Honolulu International Airport, with per-person fares starting at $16 one-way. To utilize SpeediShuttle transportation, call 1-877-242-5777, go to www.speedishuttle.com, or email oahu@speedishuttle.com. For more hotel and travel information, please see www.ion.org/pnt