

# ION GNSS+ 2016

## Best Presentations Awards

### Session A1: Advances in GNSS Software-defined Receivers

Accelerating GNSS Software Receivers: Carles Fernández-Prades, Javier Arribas, Pau Closas, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain

### Session B1: Multisensor Navigation in Challenging Environments 1

Plug and Play Sensor Fusion for Lane-Level Positioning of Connected Cars in GNSS-Challenged Environments: Andrey Soloviev, *QuNav*; Michael Veth, *Aerial Autonomy*; Chun Yang, *QuNav*

### Session C1: GNSS Augmentation Systems and Integrity 1

Expanded Ionospheric Estimation and Threat Model Algorithms for SBAS: Eugene Bang, *Korea Advanced Institute of Science and Technology, South Korea*

### Session D1b: Land-Based Applications 1

An Integrated Algorithm Based on BeiDou/GPS/IMU and its Application for Anomalous Driving Detection: Rui Sun, *Nanjing University of Aeronautics and Astronautics, China*; Ke Han, Jun Hu, *Imperial College London, UK*; Hongyang Bai, *Nanjing University of Science and Technology, China*; Washington Y. Ochieng, *Imperial College London, UK*

### Session F1: GNSS+ Augmentations for High Performance and Safety Critical Applications

Authentication Concepts for Satellite-Based Augmentation Systems: Andrea Dalla Chiara, *Qascom, Italy*; Ignacio Fernandez Hernandez, Eric Chatre, *EU Commission, Belgium*; Vincent Rijmen, *University of Leuven, Belgium*; Giacomo Da Broi, Oscar Pozzobon, *Qascom, Italy*; José Caro Ramon, Javier Fidalgo, *GMV, Spain*; Nicola Laurenti, Gianluca Caparra, Silvia Sturaro, *University of Padova, Italy*

### Session A2: GNSS Receiver Processing and Navigation Algorithms 1

Performance Evaluations of an Equatorial GPS Amplitude Scintillation Detector Using a Machine Learning Algorithm: Yu Jiao, John Hall, Yu (Jade) Morton, *Colorado State University*

### Session B2: Remote Sensing, Space Applications, Timing, and Clock Technology

Multi-receiver GPS-based Direct Time Estimation for PMU: Sriramya Bhamidipati, Yuting Ng and Grace Xingxin Gao, *University of Illinois at Urbana-Champaign*

### Session C2: UAV Navigation

Signals of Opportunity Aided Inertial Navigation: Joshua J. Morales, Paul F. Roysdon, and Zaher M. Kassas; *University of California, Riverside*

### Session F2: Precise Point Positioning (PPP) and L-band Services

Demonstration: E5b Signal Containing Value-Added Information Broadcast in Real Time via the SES ASTRA 5B GEO Satellite: Marion Aubault-Roudier, Denis Laurichesse, *CNES, France*; Hanaa Al Bitar, Mathieu Raimondi, Pierre Lesage, Arnault Sfeir, Michael Klein, *Thales Alenia Space, France*; Matthieu Sihrener, *ESSP, France*; Nicolas Ramponi, *SES Techcom, Luxembourg*

### Session A3: Signal Processing for Degraded Environments

Bandlimiting and Dispersive Effects on High Order BOC Signals: Cillian O'Driscoll, *Independent Consultant, Ireland*; Jose Angel Avila Rodriguez, Rigas Ioannides, Roberto Prieto Cerdeira, *ESA/ESTEC, The Netherlands*

### **Session D3: High Precision GNSS Positioning 1**

**Multi-GNSS PPP Performance Assessment with Different Ranging Accuracies in Challenging Scenarios:** Javier Míguez, *European Space Agency (ESA) and Universitat Autònoma de Barcelona (UAB), Spain*; José V. Perello Gisbert, Raúl Orus Pérez, J. Antonio García-Molina, *ESA, The Netherlands*; Xavi Serena, *GMV Innovating Solutions, Spain*; Francisco Gonzalez, *ESA*; Gonzalo Seco Granados, *UAB, Spain*; Massimo Crisci, *ESA, The Netherlands*

### **Session E3a: GNSS Augmentation Systems and Integrity 2**

**Performance Differentiation in a Tightly Coupled GNSS/INS Solution:** Ryan Dixon and Michael Bobye, *NovAtel Inc., Canada*

### **Session E3b: Modernization of GNSS 1**

**Towards Dual Mode Secured Navigation Using the Galileo Public Regulated Service (PRS) and GPS Precise Positioning Service (PPS):** Nigel Davies, Andrew Evans, Matthew Jones, Malcolm Macleod, Richard Bowden, QinetiQ, UK; David Hagan, Howard Mayoh, David Mathews, *Rockwell Collins, UK*

### **Session F3: Marine Applications**

**Performance Evaluation and A New Disaster Prevention System of Precise Point Positioning at Sea:** Eiko Saito, Nobuaki Kubo, *Tokyo University of Marine Science and Technology, Japan*; Kazumasa Shimoda, *National Institute for Sea Training, Japan*

### **Session A4: Next Generation RF and Digital Signal Processing Receiver Techniques**

**Performance Evaluation of VDFLL Architecture for a Dual Constellation L1/E1 GNSS Receiver in Challenging Environments:** Enik Shytermeja, Axel Garcia-Pena, Olivier Julien, *Ecole Nationale de l'Aviation Civile (ENAC), France*

### **Session B4a: Cooperative and Collaborative Navigation**

**PeerAppear: A P2P Framework for Collaborative Visual Localization:** Andrew Compton and John Pecarina, *Air Force Institute of Technology*

### **Session B4b: Advanced Inertial Sensing and Algorithms**

**Using Converted Linear Measurements Taken by a Human Operator for INS Aiding:** Turner J. Montgomery and Meir Pachter, *Air Force Institute of Technology*

### **Session D4: High Precision GNSS Positioning 2**

**Millimeter Accuracy of RTK Positioning Employing Helix Antennas with Cutoff Patterns:** D. Tatarnikov, A. Stepanenko, A. Astakhov, L. Rapoport, *Topcon Technology Center, Russia*

### **Session E4: Modernization of GNSS 2**

**Alternative MEO Constellation Configurations to Improve Coverage and Resiliency while Lowering Space Segment Cost:** Earl Anderson and Frank Czopek, *Microcosm Inc.*

### **Session F4: Land-Based Applications 2**

**Innovative Design for GNSS/MSS Survey/GIS Receiver:** Ilya Khazanov, Dmitry Kozlov, Gleb Zyryanov, *Spectra Precision, Trimble, Russia*

### **Session A5: GNSS Receiver Processing and Navigation Algorithms 2**

**Intelligent Urban Positioning using Shadow Matching and GNSS Ranging Aided by 3D Mapping:** Mounir Adjrard and Paul D. Groves, *University College London*

### **Session B5: Multisensor Navigation in Challenging Environments 2**

**Simultaneous Localization and Mapping in Multipath Environments: Mapping and Reusing of Virtual Transmitters:** Christian Gentner, Boxiao Ma, Robert Pöhlmann, Markus Ulmschneider, Thomas Jost, Armin Dammann, *German Aerospace Center (DLR), Germany*

## **Session C5: Atmospheric Science 1**

**Evaluation of Surface Variables from Global Reanalysis Models and their Application in Precipitable Water Vapour Retrieval from GNSS Observations over Nigeria:** Olalekan Adekunle Isioye, *University of Pretoria, South Africa*

## **Session D5b: Next-generation Sensors in Phones, Tablets and Wearables**

**Moving Forward to the Future Low-Cost PPP Paradigm:** Jesús David Calle Calle, Pedro Francisco Navarro Madrid, Irma Rodríguez Pérez, Guillermo Tobías González, *GMV, Spain*

## **Session E5: Methods for Authentication and Anti-spoofing**

**Joint Antenna Array Attitude Tracking and Spoofing Detection Based on Phase Difference Measurements:** Manuel Appel, *German Aerospace Center (DLR), & RWTH Aachen University, Germany*; Andriy Konovaltsev, *DLR, Germany*; Michael Meurer, *DLR, & RWTH Aachen University, Germany*

## **Session F5: Aerospace Applications 1**

**Validation of GNSS Multipath Model for Space Proximity Operations Using the Hubble Servicing Mission 4 Experiment:** Benjamin W. Ashman, *Goddard Space Flight Center*; J.L. Veldman, P. Axelrad, *University of Colorado*; J.L. Garrison, *Purdue University*; L.B. Winternitz, *Goddard Space Flight Center*

## **Session A6b: Atmospheric Science 2**

**DCB Estimation Based on Uncombined PPP:** Yan Xiang, *University of Calgary, Canada*

## **Session B6: Navigation Using Environmental Features**

**Integration of GNSS Positioning and 3D Map using Particle Filter:** Taro Suzuki, *Waseda University, Japan*

## **Session C6: GNSS Augmentation Systems and Integrity 3**

**Exploiting Satellite Motion in ARAIM: Measurement Error Model Refinement Using Experimental Data:** Mathieu Joerger, *The University of Arizona*, Boris Pervan, *Illinois Institute of Technology*

## **Session D6a: Complementary PNT 1**

**Performance Characterization of Positioning in MISO LTE Systems:** Kimia Shamaei, Joe Khalife, and Zaher M. Kassas, *University of California, Riverside*

## **Session D6a: Complementary PNT 2**

**Navigating from Low Earth Orbit:** Tyler Reid, Andrew Neish, Todd Walter and Per Enge, *Stanford University*

## **Session E6a: Interference and Spectrum Protection 1**

**Monitor, Detect, Characterise, Mitigate and Protect – Introducing STRIKE3:** Michael Pattinson, Mark Dumville, Yeqiu Ying, *Nottingham Scientific Ltd. UK*; Zahidul Bhuiyan, Heidi Kuusniemi, *Finnish Geospatial Research Institute, Finland*; Björn Gabrielsson, Åsa Waern, *Swedish Defence Research Agency (FOI), Sweden*; Martin Poloskey, *Automotive & Rail Innovation Center (ARIC) of AGIT mbH*; Steve Hill, *Satellite Applications Catapult Limited*; Nagaraj Shivaramaiah, Suresh Kibe, *GNSS Labs*; Sanguk Lee, *ETRI, Japan*; Joaquin Reyes Gonzalez, *European GNSS Agency (GSA)*

## **Session E6b: Interference and Spectrum Protection 2**

**Demonstration of UAV Based GPS Jammer Localization During a Live Interference Exercise:** Adrien Perkins, Louis Dressel, Sherman Lo, Per Enge, *Stanford University*

## **Session F6a: Aerospace Applications 2**

**Precise Onboard Orbit Determination for LEO Satellites with Real-Time Orbit and Clock Corrections:** André Hauschild, *German Aerospace Center (GSOC), DLR, Germany*; Javier Tegedor, *Fugro Satellite Positioning AS, Norway*; Oliver Montenbruck, *GSOC/DLR, Germany*; Hans Visser, *Fugro Intersite BV, The Netherlands*; Markus Markgraf, *GSOC/DLR, Germany*