The Institute of Navigation

2012 International Technical Meeting
Technical Session Overview

January 30 – February 1, 2012 Newport Beach, CA

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<td>8:45 a.m. – 12:00 p.m.</td>
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<td>1:00 p.m. – 4:10 p.m.</td>
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<td>Welcome: 8:45 a.m. – 9:00 a.m.</td>
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<td><strong>Plenary Session:</strong> 9:00 a.m. – 10:15 a.m.</td>
<td>Pacific Ballroom C/F</td>
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<td>10:15 a.m. – 10:45 a.m.</td>
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**Note that the photographing of sessions/presentations and/or the audio or video recording of sessions/presentations is prohibited. As a courtesy to others, please set all cell phones to vibrate.**

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**Plenary Session**

**January 30, 2012 • 8:45 a.m. – 12:00 p.m.**

**Pacific Ballroom C/D**

Welcome and Introductions: 8:45 a.m. - 9:00 a.m.

Dr. Todd Walter
ION President
Stanford University

Dr. Jade Morton
ION General Chair
Miami University, Ohio

Mr. Douglas Taggart
ION Program Chair
Overlook Systems Technologies, Inc.

**Challenges of Turning Vision into Reality:** 9:00 a.m. - 10:15 a.m.

Mr. Jeff Carlisle, Executive Vice President, Regulatory Affairs and Public Policy, LightSquared

Mr. Ray Kolibaba, VP and OCX Program Manager, Raytheon

Mr. Jim Geringer, Director of Policy and Public Sector Strategy, ESRI

Mr. Jules McNeff, VP Strategy and Programs, Overlook Systems Technologies, Inc.

Break 10:15 a.m. – 10:45 a.m.

**Challenges of Realizing a Global Navigation Capability:** 10:45 a.m. - 12:00 p.m.

Mr. Anthony J. Russo, Director National Coordination Office for Space-Based PNT

Mr. Ray Swider, Director for GPS & PNT, Office of the Secretary of Defense

Dr. David Last, Consultant, UK

Mr. Chuck Schue, President & CEO, UrsaNav

Informal Luncheon, 12:00 p.m. – 1:00 p.m., Rose Garden (outside)

In case of inclement weather, this function will be held in the Pacific Ballroom A/B.
Session A1: Alternate Sensors & Systems
2:00 p.m. – 5:30 p.m., Pacific Ballroom C


Break 3:35 p.m. – 3:55 p.m.

4:00 4. Flight Test Performance Assessment of eDME for APNT: K. Li, W. Pelgrum, *Ohio University*

4:30 5. A New Concept of APNT: 3-D Positioning with Even a Single DME Station: O. Kim, C. Kim, *Seoul National University, South Korea*; T. Lee, *Korea Institute of Science and Technology, South Korea*; C. Kee, *Seoul National University, South Korea*

5:00 6. Integration of Cold-Atom Interferometry INS with Other Sensors: A.J. Canciani, J.F. Raquet, *Air Force Institute of Technology*

Alternates


3. GNSS-based Multi-Sensor System for Structural Monitoring Applications: M. Figurski, M. Wrona, *Military University of Technology, Poland*

Session B1: Algorithms & Methods 1: Receiver Signal Processing
2:00 p.m. – 5:30 p.m., Pacific Ballroom E/F


2:35 2. Detailed Signal Analysis Without a Dish: A GPS IIF L5 Signal Case Study: J. York, J. Little, O. Caldwell, S. Nelsen, *ARL University of Texas at Austin*


Break 3:35 p.m. – 3:55 p.m.


5:00 6. A Compressed Sensing Technique for GPS Signal Acquisition: S-H. Kong, *Korea Advanced Institute of Science and Technology, South Korea*
continued from page 2

Alternates

1. Optimized GNSS Signals Acquisition Based on Special Non-uniform Sampling:
   B. Bardak, I. Kale, *University of Westminster, UK*

2. Memory Resource Integration of GNSS Code Acquisition: C-W. Chen, S-H. Chen,
   W-L. Mao, H-W. Tsao, *National Taiwan University, Taiwan*

Session C1: Autonomous Navigation/Robotics
2:00 p.m. – 5:30 p.m., Pacific Ballroom D

2:05 1. A Real-time Autonomous Visual Navigation System for Helicopters Based on
      GPU Accelerated Speeded-Up Robust Features: H. Bai, *Nanjing University of
      Science and Technology, China* and *University of Toronto, Canada*; X. Xue, *Nanjing
      University of Science and Technology, China*; A. Goldenberg, *University of Toronto, Canada*

2:35 2. Robust Ground Vehicle Constraints for Aiding Stand Alone INS and
      Determining Inertial Sensor Errors: J. Ryan, D. Bevly, *Auburn University*

Break 3:35 p.m. – 3:55 p.m.

3:05 3. The CSUF Robotic Lawnmower: Lessons Learned from Modifying a Riding
      Lawnmower: J. Huang, M.J. Yeh, D. Fallah, *California State University, Fullerton*

4:00 4. An Autonomous Lawnmower Using Fuel Cell: B. Karimi, D. Pasko, C. Murphy,
      C. Ballachino, D. Jervis, M. Folcik, *University of New Haven*

4:30 5. Characterizing Local Effects on Protection Level Concept in Urban
      Boella, Italy*; F. Dovis, L. Lo Presti, *Politecnico di Torino, Italy*
Tuesday Morning, January 31  
8:30 a.m. - 12:00 p.m.

Session A2: Timing Applications  
8:30 a.m. – 12:00 p.m., Pacific Ballroom E/F

8:35  1. Micro Ion Frequency Standard: P.D. Schwindt, Y-Y. Jau, H. Partner, L. Fang,  
A. Casias, K. Wojciechowski, R. Olsson, D. Serkland, R. Manginell, R. Boye, Sandia  
National Laboratories; J. Prestage, N. Yu, Jet Propulsion Laboratory  
Honeywell Aerospace  
9:35  3. All-Optical Integrated Rubidium Atomic Clock: L. Maleki, A.A. Savchenkov,  
V.S. Ilchenko, W. Liang, D. Seidel, A.B. Matsko, OEWaves Inc.; N.P. Wells, J.C. Camparo,  
B. Jaduszliwer, The Aerospace Corporation  

Break 10:05 a.m. – 10:25 a.m.

10:30  4. Ranging/Timing off of the NDGPS Signal: Potential Performance: P.F. Swaszek,  
University of Rhode Island; R.J. Hartnett, US Coast Guard Academy; G.W. Johnson,  
Alion Science & Technology  
11:00  5. Design and Performance of a Low Frequency (LF) Time and Frequency  
11:30  6. A GPS Common-View Time Transfer Scheme Considering the Code Bias:  
M.Y. Shin, D.J. Cho, S.H. Park, Korea Ocean Research & Development Institute,  
South Korea; S.J. Lee, Chungnam National University, South Korea  

Alternate

1. Experimental Results of the Time Comparison Between the QZS-1 and Ground  
Time Management Stations: M. Nakamura, Y. Takahashi, J. Amagai,  
T. Gotoh, M. Fujieda, R. Tabuchi, T. Hobiger, S. Hama, National Institute of  
Information and Communication Technology, Japan; Y. Yahagi, NEC Engineering,  
Ltd., Japan; T. Takahashi, S. Horiuchi, NEC Corporation, Japan; H. Noda, Japan  
Aerospace Exploration Agency, Japan  

Lunch is on Your Own
Tuesday Morning, January 31  
8:30 a.m. - 12:00 p.m.

Session B2: Spectrum and Interference Issues  
8:30 a.m. – 12:00 p.m., Pacific Ballroom D

8:35  1. Receiver Performance and Adjacent MSS L Band Interference Rejection:  
      C. Kurby, R. Lee, Greenwood Telecommunications

9:05  2. Performance Impacts of the LightSquared ATC Reference Stations on High  
      Precision Geodetic Receivers: K.A. Berstis, G.L. Mader, N.D. Weston, W.A. Stone,  
      G.L. Deangelo, E.E. Marion, NOAA/National Geodetic Survey

9:35  3. Testing High Precision Space Receivers Versus LightSquared Interference:  
      S. Esterhuizen, D. Turbiner, D. Stowers, L. Young, Jet Propulsion Laboratory

Break 10:05 a.m. – 10:25 a.m.

10:30 4. Field Observations of Personal Privacy Devices: J.C. Grabowski, Zeta Associates

11:00 5. Quantization Effects on GNSS Receivers in Presence of Interference: Analysis  
      and Simulation: M. Abdizadeh, J. Curran, G. Lachapelle, PLAN Group, University of  
      Calgary, Canada

11:30 6. The Impact of Uninformed RF Interference on GBAS and Potential Mitigations:  
      S. Pullen, G.X. Gao, Stanford University; C. Tedeschi, J. Warburton, FAA W.J. Hughes  
      Technical Center

Alternates

1. Detection and Mitigation of Spoofing Attack on a Vector Based Tracking GPS  
   Receiver: A.J. Jahromi, T. Lin, A. Broumandan, J. Nielsen, G. Lachapelle, PLAN Group,  
   University of Calgary, Canada

2. LightSquared Interference on Galileo Signals: A Theoretical Assessment:  
   D. Fontanella, I. Bartunkova, B. Eissfeller, University FAF Munich, Germany

Session C2: Space & PNT Applications

8:30 a.m. – 12:00 p.m., Pacific Ballroom C

      Tracking and Backup Navigation System: G. Kim, S. Jeon, C. Kim, C. Kee, Seoul  
      National University, South Korea; S. Choi, Korea Aerospace Research Institute  
      Satellite Information Research Center, South Korea

      University; M. West, University of Illinois at Urbana-Champaign

9:35  3. China Compass PNT Service Architecture and Outlook: Q. Sun, J. Zhang, Y. Zhu,  
      Beihang University, China

Break 10:05 a.m. – 10:25 a.m.

10:30 4. DORIS Observations from Iridium for Atmospheric Science: D. Rainwater,  
      ARL, University of Texas at Austin; B. Barnum, APL, Johns Hopkins University;  
      T. Gaussiran, ARL, University of Texas at Austin

11:00 5. Maneuver Parameter Estimation for TanDEM-X Relative Positioning: Y. Moon,  
      R. Koenig, G. Michalak, German Research Centre for Geosciences(GFZ), Germany

11:30 6. Next Generation Scalable Spaceborne GNSS Science Receiver: J.Y. Tien,  
      B. Bachman, J.A. Dickson, S. Esterhuizen, G.W. Franklin, T.K. Meehan, T.N. Munson,  
      D.E. Robison, D. Turbiner, L.E. Young, Jet Propulsion Laboratory/Caltech

Alternate

1. Tolerance Limits Corresponding Confidence Limits Way for Integrity Budget  
   on Multi-Constellation: Q. Sun, J. Zhang, Y. Zhu, Beihang University, China

Lunch is on Your Own

January 30 - February 1, 2012  •  Newport Beach, CA  •  www.ion.org
Tuesday Afternoon, January 31
2:00 p.m. - 5:30 p.m.

Session A3: Urban and Indoor Applications
2:00 p.m. – 5:30 p.m., Pacific Ballroom D

2:05 1. Comparison of Point Features for Vision Based Navigation: Y. Ma, Honeywell Aerospace, USA; S. Rao, Honeywell Technology Solutions Lab., India

2:35 2. A Movement-Classification Algorithm for Pedestrian Using Foot-Mounted IMU: M.S. Lee, C.W. Shim, C.G. Park, Seoul National University, South Korea


Break 3:35 p.m. – 3:55 p.m.

4:00 4. Tag-free RSSI Based Indoor Localization: E.A. Wan, A.S. Paul, Oregon Health & Science University; P.G. Jacobs, EmbedRF LLC

4:30 5. Modeling HSGPS Doppler Errors in Indoor Environments for Pedestrian Dead-Reckoning: Z. He, M. Petovello, G. Lachapelle, PLAN Group, University of Calgary, Canada

5:00 6. Theory and Practice of Near-Field Electromagnetic Ranging: H.G. Schantz, E.A. Richards, The Q-Track Corporation

Alternates

1. Precise Output Error Characterization for Triangulation of Visual Landmarks from Two Views with Noisy Camera Pose: J. Gorgen, L. Lemay, SPAWAR Systems Center Pacific; D. Gebre-Egziabher, University of Minnesota

2. Indoor Positioning System using Single Pseudolite with Multiple Antenna: C. Kim, O. Kim, Seoul National University, South Korea; T. Lee, Korea Institute of Science and Technology, South Korea; C. Kee, Seoul National University, South Korea

3. Vector Tracking Loop Implementation and Outdoor Test Results for GPS and Pseudolite System: S. Jeon, Seoul National University, South Korea; H. So, Agency for Defense Development, South Korea; G. Kim, C. Kim, C. Kee, Seoul National University, South Korea; T. Lee, Korea Institute of Science and Technology, South Korea

4. Fading Modeling and Characterization of Indoor GNSS Channels: Y. Wang, X. Zhang, X. Cui, M. Lu, Tsinghua University, China

Session B3: Algorithms & Methods 2: Navigation
2:00 p.m. – 5:30 p.m., Pacific Ballroom E/F


2:35 2. Improved GNSS Heading System with Inertial and Magnetic Field Sensors for Small-sized Launcher Applications: J. Roth, K. Kaschwich, G.F. Trommer, Karlsruhe Institute of Technology, Germany

3:05 3. Enhanced Kalman Filter for RISS/GPS Integrated Navigation using Gaussian Process Regression: M.M. Atia, Trusted Positioning Inc, and Queen’s University, Canada; A. Noureldin, Royal Military College and Queen’s University, Canada; M. Korenberg, Queen’s University, Canada

Break 3:35 p.m. – 3:55 p.m.

4:00 4. Monitoring Measurement Noise Variance for High Integrity Applications: S. Khanafseh, S. Langel, F-C. Chan, M. Joerger, B. Pervan, Illinois Institute of Technology

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ION Annual Awards & Fellows Banquet, 7:00 p.m. – 9:00 p.m., Pacific Ballroom A/B
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4:30  5. Carrier Phase Based Attitude Determination and Integer Ambiguity Resolution with Gaussian Distributed a Priori Information and Kalman Filtering: P. Jurkowski, Advanced Navigation Solutions – AMCONAV, Germany; P. Henkel, Technical University Munich, Germany; C. Guenther, German Aerospace Center, Germany


Alternates


Session C3: QZSS
2:00 p.m. – 5:30 p.m., Pacific Ballroom C


2:35  2. QZSS L-Band Navigation Payload: T. Takahashi, T. Moriguchi, NEC Corporation, Japan; K. Ohara, NEC Engineering Ltd., Japan; H. Noda, S. Kogure, M. Kishimoto, Japan Aerospace Exploration Agency, Japan


Break 3:35 p.m. – 3:55 p.m.

4:00  4. Orbit and Clock Determination of QZS-1 Based on the CONGO Network: P. Steigenberger, Technical University Munich, Germany; A. Hauschild, O. Montenbruck, German Aerospace Center DLR, Germany; C. Rodriguez-Solano, U. Hugentobler, Technical University Munich, Germany

4:30  5. Operation of Sub-Meter Class Augmentation System and Demonstration Experiments with Quasi-Zenith Satellite “MICHIBIKI”: R. Iwama, SPAC, Japan; H. Soga, K. Odagawa, NEC, Japan; Y. Masuda, T. Osawa, A. Ito, M. Matsumoto, TECS, Japan

5:00  6. Regional Satellite Navigation System with MSAS and QZSS: H. Yamada, T. Sakai, K. Ito, Electronic Navigation Research Institute, Japan

Alternate

1. Examination of the GPS Receiver for Small Drifting Buoys Using QZS: H. Irie, Nagaoka University of Technology, Japan; M. Shimada, The Tsurumi Seiki Co. Ltd., Japan; K. Morishita, Kumamoto University, Japan

ION Annual Awards & Fellows Banquet, 7:00 p.m. – 9:00 p.m., Pacific Ballroom A/B
Wednesday Morning, February 1  
8:30 a.m. - 12:00 p.m.

Session A4: Maritime Applications
8:30 a.m. – 12:00 p.m., Pacific Ballroom C

8:35 1. Optimal Waterway and Harbor Navigation of Large Vessels: A.H. Zorn, Stanford University; M. West, University of Illinois at Urbana-Champaign

9:05 2. Performance Assessment of the Recent NDGPS Recap – Initial Static Results: G.W. Johnson, Alion Science & Technology; P.E. Swaszek, University of Rhode Island; R.J. Hartnett, US Coast Guard Academy


Break 10:05 a.m. – 10:25 a.m.


11:00 5. The Preliminary Study on Development of DGPS Service Techniques Based on Terrestrial Digital Multimedia Broadcasting: K-T. Kim, K-D. Park, H-I. Kim, Inha University, South Korea

11:30 6. Sandoway House Nature Center - Geomatics Support for Quantifying Ground Water Seepage to the Coast: T. Walker, E. Watts, C. Crouzet, Florida Atlantic University; S. Krupa, South Florida Water Management District; D. Leone, L. Gibson, M. Berber, Florida Atlantic University

Session B4: Atmospheric Effects
8:30 a.m. – 12:00 p.m., Pacific Ballroom E/F

8:35 1. Precise Measurements of Ionospheric Delay Gradient at Short Baselines Associated with Low Latitude Ionospheric Disturbances: S. Saito, S. Fujita, T. Yoshihara, Electronic Navigation Research Institute, Japan

9:05 2. Results from Automated Ionospheric Data Analysis for Ground-Based Augmentation Systems (GBAS): J. Lee, Tetra Tech AMT, USA; S. Jung, M. Kim, Korea Advanced Institute of Science and Technology, South Korea; J. Seo, S. Pullen, Stanford University

9:35 3. GPS Carrier Phase Detrending Methods and Performances for Ionosphere Scintillation Studies: F Niu, Y. Morton, W. Pelgrum, Miami University

Break 10:05 a.m. – 10:25 a.m.


11:00 5. Decadal, Seasonal, and Diurnal Variability of Ionospheric Total Electron Content (TEC) Over the Indian Subcontinent Derived from Geodetic GPS Network: M.S.M. Vijayan, K. Shimna, S. Jade, CSIR C-MMACS, India


Informal Luncheon, 12:00 p.m. – 1:00 p.m., Rose Garden (outside)
In case of inclement weather, this function will be held in the Pacific Ballroom A/B.
Wednesday Morning, February 1  
8:30 a.m. – 12:00 p.m.

Session C4: Remote Sensing Using GNSS
8:30 a.m. – 12:00 p.m., Pacific Ballroom D

8:35  1. Development and Testing of a Miniaturized Dual-Frequency Software-Defined GPS Receiver for Space Applications: A.J. Joplin, T.E. Humphreys, E.G. Lightsey, University of Texas at Austin


9:35  3. Ionosphere Real Time Monitoring System using Septentrio GNSS Receivers: G. Nykiel, M. Figurski, Military University of Technology, Poland

Break 10:05 a.m. – 10:25 a.m.


11:00 5. Automated Ionospheric Front Velocity Estimation Algorithm for Ground-Based Augmentation Systems: E. Bang, S. Jung, J. Lee, Korea Advanced Institute of Science and Technology, South Korea; J. Seo, S. Pullen, Stanford University


Informal Luncheon, 12:00 p.m. – 1:00 p.m., Rose Garden (outside)
In case of inclement weather, this function will be held in the Pacific Ballroom A/B.
Session A5: Aviation Applications
1:00 a.m. – 4:10 p.m., Pacific Ballroom E/F

1:05  1. A Gaussian Mixture Model for Error Distributions Used in Assessing RAIM Performance: C.A. Shively, The MITRE Corporation/CAASD


2:05  3. An Avionics-Based GNSS Integrity Augmentation System for Safety-Critical and Mission-Critical Applications: R. Sabatini, Cranfield University, UK; T. Moore, C. Hill, University of Nottingham, UK


Alternates
1. Towards Full GAST-D Capability - Flight Testing DLR’s Experimental GBAS-Station: M. Felux, T. Dautermann, B. Belabbas, German Aerospace Center, Germany


Session B5: GNSS Modernization
1:00 a.m. – 4:10 p.m., Pacific Ballroom D

1:05  1. Study of Multiplex Techniques for Compass B1-C Signal Design: L. Zhu, Z. Yao, M. Lu, Z. Feng, Tsinghua University, China


2:05  3. Application of Kalman Filter to Beidou/GPS Joint-Positioning for Software Receiver: X. Zhang, Y. Wang, X. Cui, Z. Feng, Tsinghua University, China

2:40  4. Real Time Advanced Receiver Autonomous Integrity Monitoring in the DLR’s Multi-Antenna GNSS Receiver: M. Rippl, German Aerospace Center DLR, Germany

3:10  5. Independent URA Monitor With RAIM for LPV-200 Using GPS or/and Galileo: C.A. Shively, B. Bian, R. Braff, R. Conker, M. Bakry El-Arini, The MITRE Corporation/CAASD


Alternates
1. Estimation and Precision Analysis of Earth Rotation Parameters from GPS Measurements: Z. He, X. Yang, Z. Li, National Time Service Center, Chinese Academy of Sciences, China; Z. Cheng, Shanghai Astronomical Observatory, CAS, China

Refreshments will be available in the registration area at 2:30 p.m.

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3. Around the World for 26 Years – A Brief History of the NGA Monitor Station Network: B.A. Renfro, D. Munton, R.G. Mach, ARL, The University of Texas at Austin; R. Taylor, National Geospatial-Intelligence Agency

Session C5: Receivers & Antenna Technology
1:00 a.m. – 4:10 p.m., Pacific Ballroom C


3:10 5. Real-time Implementation of VDLL in an Open Source GNSS Receiver – Design, Tests and Results: X. Zhang, X.Q. Zhan, Shanghai Jiao Tong University, China


Alternates

1. Vector Tracking Based Architecture for Robust and High-Sensitivity GNSS Receivers: K. Sun, Hefei University of Technology, China

2. Performance Analysis and Verification of Novel FLL GNSS Signal Tracking Loop Architecture: Y. Liu, J. Zhang, T. Jin, R. Xue, Beihang University, China

3. GPS-L1C Leading to the All-Constellation GNSS Receivers: P.G. Mattos, STMicroelectronics, UK; F. Pisoni, STMicroelectronics, Italy
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