# The Institute of Navigation
## 2009 International Technical Meeting
### January 26-28, 2009

**Disney’s Paradise Pier Hotel**
**Anaheim, California**

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### FIRST FLOOR
- Pacific Ballroom B
- D
- C
- A
- Pacific Ballroom C
- Pacific Ballroom D
- Crystal Cove Room

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### SECOND FLOOR
- Pacific Ballroom B
- Pacific Ballroom C
- Pacific Ballroom D
- Pacific Ballroom A

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### The Institute of Navigation
#### 2009 International Technical Meeting

#### Plenary Session

**Monday, January 26, 9:00 a.m. – 12:00 p.m., Pacific Ballroom B**

**Welcome and Introductions**

- Dr. Christopher Hegarty
  - ION® President
  - The MITRE Corporation

- James Simpson
  - ION® General Chair
  - NASA Goddard Space Flight Center

- Patricia Doherty
  - ION® Program Chair
  - Boston College Institute for Scientific Research

**Plenary Session:** GNSS Technology: A Path to Sustainable Economic and Social Benefits for Developing Countries

- **U.S. Activities to Promote Global Use of GNSS:** Ken Hodgkins, U.S. State Department
- **IGS – Building Capacity in Developing Countries:** Ruth Neilan, Jet Propulsion Laboratory
- **Getting There Without Getting Lost: GNSS, SDI and Addressing in Non-Cadastral Jurisdictions:** Dr. Chukwudzie Ezighalike, United Nations Economic Commission for Africa (ECA)
- **National Positioning, Navigation, and Timing Architecture:** Karen Van Dyke, U.S. Dept. of Transportation Research and Innovative Technology Administration/Volpe Center

**Scientific Applications of the Galileo System:** Dr. Bertram Arbesser-Rastburg, ESA-ESTEC, The Netherlands

**The International Federation of Surveyors (FIG) – Our Role and How FIG and ION Can Co-operate:** Mikael Lilje, International Federation of Surveyors (FIG)

**Informal Luncheon, 12:00 p.m. – 1:30 p.m., Redondo/San Diego/Santa Monica Rooms (second floor)**

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### Technical Session Overview

<table>
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<tr>
<th>Date</th>
<th>Pacific Ballroom B</th>
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<tr>
<td>Monday, January 26</td>
<td>8:00 a.m. – 12:00 p.m.</td>
<td>9:00 a.m. – 12:00 p.m.</td>
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<td>Tuesday, January 27</td>
<td>9:00 a.m. – 12:00 p.m.</td>
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<td>Wednesday, January 28</td>
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<td>Thursday, January 29</td>
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**Pacific Ballroom B**
- **A1:** GNSS for Global Development
- **A2:** Emerging Navigation Technologies
- **A3:** Interference and Spectrum Management
- **A4:** Aviation Applications

**Pacific Ballroom C**
- **B1:** Enhanced and Developing GNSS Systems
- **B2:** Applications in Surveying, Geodesy, Science and Timing
- **B3:** Algorithms and Methods 1 (Signal Processing)
- **B4:** Classified Session

**Pacific Ballroom D**
- **C1:** e-Navigation Workshop
- **C2:** Civil and Marine Applications
- **C3:** Algorithms and Methods 2 (Data Processing)
- **C4:** GNSS Receiver and Antenna Technology 1

**Pacific Ballroom A**
- **D1:** Space Weather Monitoring
- **D2:** Integrated Navigation Systems
- **D3:** Urban and Indoor Navigation Technology
- **D4:** GNSS Receiver and Antenna Technology 2

**OFFSITE/BOEING**
- **B4:** Classified Session
- **C4:** GNSS Receiver and Antenna Technology 1

**Note:**

- 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.
Monday Afternoon, January 26

A1: GNSS for Global Development
2:00 p.m. – 5:30 p.m., Pacific Ballroom C

1. Youth on GNSS Beyond Navigation in Developing Countries: S. Wan, R. Suresh, S.Y. Chung, B. Thakore, J. Rivera, Space Generation Advisory Council, Austria
2:05

2. The Benefits of Scientific Instrumentation in Africa: E. Yzigeng, M.B. Moldwin, University of California, Los Angeles
2:35

3:05

Break 3:35 p.m. – 3:55 p.m.

4. Challenges to Implementation of GNSS for Aviation Applications in Africa: A.O. Akala, University of Lagos, Nigeria; P.H. Doherty, Boston College, USA; C.S. Carrano, Atmospheric and Environmental Research Inc., USA; L.L.N. Amaeshi, University of Lagos, Nigeria
4:00

5. The Low-latitude Ionosphere Sensor Network (LISN): C.E. Valladares, Institute for Scientific Research/Boston College
4:30

5:00

Alternate

A2: Emerging Navigation Technologies
2:00 p.m. – 5:30 p.m., Pacific Ballroom A

2:05

2. An Investigation into the Feasibility of using a Modern Gravity Gradiometer Instrument for Passive Aircraft Navigation and Terrain Avoidance: M. Rogers, R. Huffman, Air Force Institute of Technology
2:35

3:05

Break 3:35 p.m. – 3:55 p.m.

4:00

4:30

5:00

Alternate
1. Long-term Accuracy of Camera and IMU Fusion-based Navigation Systems: C.N. Taylor, Brigham Young University
3. Distributed Multi-Sensor Fusion for Improved Collaborative GPS-denied Navigation: S. Wu, J. Kaba, S-C. Mau, Sarnoff Corporation; T. Zhao, Intuitive Surgical, Inc.

Break 3:35 p.m. – 3:55 p.m.

Wednesday Afternoon, January 28

Session E3: Autonomous Vehicle Navigation
2:00 p.m. – 5:05 p.m., Pacific Ballroom A

2:05

2. A Closed-form Method for the Attitude Determination Using GNSS Doppler Measurements: B. Park, S. Jeon, C. Koe, Seoul National University, South Korea
2:35

3:05

4. Cycle Ambiguity Reacquisition in UAV Applications Using a Novel GPS/INS Integration Algorithm: S. Lurigel, S. Khanafesh, F-C. Chan, B. Pervan, Illinois Institute of Technology
3:35

5. Guided K-9 Tracking Improvements Using GPS, INS, and Magnetometers: J. Miller, D. Bevly, Auburn University
4:05

4:35

Alternate
1. Improved MAV Attitude Estimation Through Coupled Acceleration Estimation: B.B. Ready, C.N. Taylor, Brigham Young University

E4: GNSS Receiver and Antenna Technology 2
2:00 p.m. – 4:35 p.m., Pacific Ballroom C

1. The Adaptive Vector Tracking Loop Design for High Dynamic Situations: K-H. Kim, J-H. Song, G-I. Joe, Konkuk University, South Korea
2:05

2. Performances of a New Correlation Algorithm for a Platform-independent GPS Software Receiver: G. Walchli, M. Baracchi-Frei, C. Botteron, P.A. Farine, University of Neuchatel, Switzerland
2:35

3. Design of a Frequency Domain Receiver Compatible for Galileo and GPS L1 Signals: H. Kim, B. Park, J. Cho, Seoul National University, South Korea
3:05

4. Standardization of Definitions for Weapons-Based GPS Receiver Timelines: W. Trach, Jr., M.M. McGregor, J.M. Sebast, R.L. Lessman, Naval Research Laboratory
3:35

5. Vector Delay/ Frequency Lock Loop Implementation and Analysis: B. Park, S. Jeon, C. Koe, Seoul National University, South Korea
4:05

Alternate
1. Refreshments will be available in the registration area at 3:35 p.m.
Wednesday Afternoon, January 28

E1: Ground and Satellite Based Augmentation Systems
2:00 p.m. – 5:05 p.m., Pacific Ballroom B

2:05 1. Improved Iono PHMI Calculation for SBAS Systems: C. Mayer, German Aerospace Center, Germany; J. Blanch, Stanford University
2:35 2. WAAS Performance Improvement in Mexico: E. Parades, N. Pandya, T. Schepm, Raytheon
4:05 5. EGNS Status Update: Programme, Technical Status, Service Provision and Future Prospects: C. Seynat, C. Villie, GNS Supervisory Authority, Belgium; D. Flament, F. Torán, EGNS Project Office, ESA, France

Alternates
2. An Improved Method on GIVE Calculation in Multi-constellation Navigation Systems: W. Shen, Z. Jun, L. Rui, Beihang University, China
3. Optimizing the Evaluation of Estimation Algorithm about the Fault Detection and Exclusion (FDE) in the WAAS: R.B. Zhao, R. Li, B. Shao, Z.G. Huang, Beihang University, China
4. Development of an Ionospheric Delay Model with Plasma Bubbles for GBAS: S. Saito, T. Yoshihara, N. Fujii, Electronic Navigation Research Institute, Japan

E2: Marine Applications
2:00 p.m. – 5:05 p.m., Pacific Ballroom D

2:05 1. Experimental Results of Relative Speeds and Distances in STS Lightering by Application of GPS-based Systems: Y. Too, E. Pedersen, K. Tatsami, N. Kouguchi, Norwegian University of Science and Technology, Norway
2:35 2. Differential Equation of the Loxodrome on a Rotational Surface: S. Kos, University of Rijeka, Faculty of Maritime Studies, Croatia; R. Filjar, The Royal Institute of Navigation, Croatian Branch, Croatia; M. Hess, University of Rijeka, Faculty of Maritime Studies, Croatia
3:05 3. USGC Test and Evaluation of AIS Binary Messages for Enhanced VTS Operations: I. Gonin, W-Y. Chen, H-W. Tsao, National Taiwan University, Taiwan; X. Zhang, R. Li, Beihang University, China; S. Kos, Faculty of Maritime Studies, Croatia; R. Filjar, Institute of Scientific Research, Boston College USA; P.H. Doherty, Institute of Scientific Research, Boston College USA; Avidyne Corporation, USA; G. Lachapel, The MITRE Corporation

Alternates
1. Researches on the AIS Information Sharing and Serving System: Z. Xinggu, W. Wucai, P. Guojun, H. Xiaobing, Navigation Institute of Jimei University, China

Monday Afternoon, January 26

A3: Interference and Spectrum Management
2:00 p.m. – 5:30 p.m., Pacific Ballroom D

2:05 1. Evaluation of Requirements for the IDM PNT Interference Reports and Central Data Repository: J. Merrill, DHS Geospatial and PNT Working Groups

Break 3:35 p.m. – 3:55 p.m.

4:00 4. NAWC-AD Ground Testing Installed Systems for Interference: P. Cook, Air Combat Environment Test & Evaluation
5:00 6. Systemic Interference Mitigation with a Combined Repeater/Pseudolite Approach for Indoor Positioning: A. Vervisch-Picos, N. Samarna, Institute TELECOM, Telecom & M SudParis, France

Alternates
2. Two Approaches for GPS Interference Annulling: W-Y. Chen, H-W. Tsao, National Taiwan University, Taiwan; W-L. Mao, Formosa University, Taiwan
3. Pseudorange Multipath Mitigation Technique Based on a Subcarrier x PRN Code Replica: N. Jardak, N. Samarna, IT TELECOM SudParis, France

A4: Aviation Applications
2:00 p.m. – 5:30 p.m., Pacific Ballroom B

2:05 1. The Role of Global Positioning System (GPS) in Future Aviation Safety in Nigeria: A.O. Akala, University of Lagos, Nigeria; P.H. Doherty, Institute of Scientific Research, Boston College USA; C.S. Carruto, Atmospheric and Environmental Research Inc., USA; V. Amaeshi, University of Lagos, Nigeria
3:05 3. Analysis of a Real-Time Genetic NIORAM Implementation on a WAAS Beta 3 Receiver: A. Joseph, ArcHyne Corporation, USA; G. Lachapel, University of Calgary, Canada

Break 3:35 p.m. – 3:55 p.m.

4:00 4. Ramose RAIM: A Multiple-Failure Detection Algorithm Design for Civil Aviation: X. Zhang, R. Li, Z. Huang, Beihang University, China; Y. Zhu, Aviation Data Communication Corporation, China
4:30 5. A Probabilistic Assessment on the Range Consensus Algorithm (RANCO): M. Rippl, G. Schroth, B. Behabib, M. Moehr, German Aerospace Center, Germany
5:00 6. Carrier Phase Relative RAIM Algorithms and Protection Level Derivation: L. Gratton, M. Joerger, B. Pervan, Illinois Institute of Technology

Alternates
2. Barometer Error Analysis: Modeling and Correction In RDFS Airborne Application: G. Sun, Beijing University of Aeronautics and Astronautics, China
3. New Techniques for Multi-mode Satellite Navigation Receiver: R. Li, Beihang University, China; Y. Wang, Aviation Data Communication Corporation, China; J. Zhang, Y. Zhu, Beihang University, China

Refreshments will be available in the registration area at 3:35 p.m.
Tuesday Morning, January 27

B1: Enhanced and Developing GNSS Systems
8:30 a.m. – 12:00 p.m., Pacific Ballroom B

9:05 2. An Optimized RAIM Approach and Performance Characterization in the Presence of non-Gaussian Error Sources: J. Dillelio, Pepperdine University
Break 10:05 a.m. – 10:25 a.m.

11:00 5. Precise Orbit Determination of Galileo/Giove-A Satellite using Double Differences of Carrier Phase Measurements between Constellations of GPS/Galileo and Initial Results: H. Su, Thales Alenia GmbH, Germany; B. Zierenmann, CAR System GmbH, Germany
Alternates

1. GNSS Signal Verification with a High Gain Antenna — Calibration Strategies and High Quality Signal Assessment: S. Theodoret, S. Eker, M. Gantz, M. Meunier, L. Kolbeck, German Aerospace Centre, Germany; J. Furtimans, European Space Agency
2. Comparison Between the Future GPS LIC and GALLEO E1 OS Signals Data Message Performance: A. Garcia Pena, ENAV, France; J.-L. Darmidaux, S. Coraza, Thales Alenia Space, France; C. Macabiau, A.C. Escher, ENAV, France; M.-L. Bouchert, Ecole Nationale Supérieure d’Électrotechnique, d’Électronique, d’Informatique, d’Hydraulique et des Télécommunications, France; L. Ries, F. Carvalho, Centre National d’Études Spatiales, France

B2: Applications in Surveying, Geodesy, Science & Timing
Co-sponsored by IAG Commission 4
8:30 a.m. – 12:00 p.m., Pacific Ballroom C

8:35 1. The Contribution of GNSS CORS Infrastructure to the Modernization of Geodesy: M. Sidler, University of Calgary, Canada; R. Neilson, NASSafe Propagation Laboratory, UNH, C. Rizzo, University of New South Wales, Australia
9:05 2. The Impact of ITF 2005 and Absolute Antenna Phase Center Variations on the NAREF Regional Reference Frame: M. Prazewski, M.R. Dryer, Natural Resources Canada, Canada
9:35 3. Temporal and Spatial Decorrelation Error Reduction by a Compact Network RTK: B. Park, C. Kee, Seoul National University, South Korea
Break 10:05 a.m. – 10:25 a.m.

10:30 4. Variable Length LMS Adaptive Filter for Carrier Phase Multipath Mitigation: H. Liu, National University of Defense Technology, China; C.O. Yi, S. Zhang, L. Ge, C. Rizzo, University of New South Wales, Australia
11:00 5. Real Time UWB Error Estimation in a Tightly-Coupled GPS/UBWB RTK Positioning System: G.D. MacGougan K. O’Reed, University of Calgary, Canada
Alternates

1. The Latest Development of the Integration Technology of GPS/PDA/GIS Application in Land Management in China: Q. Wang, F. Fei, S. Pan, Southeast University, China
3. Ground Based LIDAR Georeferencing using Dual GPS Antenna Attitude: B. Wilkinson, A. Mohamed, Geomatics Program, University of Florida

Wednesday Morning, January 28

D3: Urban and Indoor Navigation Technology
8:30 a.m. – 12:00 p.m., Pacific Ballroom B

8:35 1. Satellite-to-Indoor Broadband Channel Measurements at 1.51 GHz: T. Jost, W. Wang, German Aerospace Center, Germany
9:05 2. Design and Performance of a Minimum-Variance Hybrid Location Algorithm Utilizing GPS and Cellular Received Signal Strength Inputs for Positioning in Dense Urban Environments: D.S. De Lorenzo, S.C. Lo, P.K. Enge, Stanford University; M. Feuerstein, T. Bhattacharya, S. Spain, Z. Kang, Polaris Wireless
Break 10:05 a.m. – 10:25 a.m.

10:30 4. Feasibility Study of Pseudolite Techniques Using Signal Transmission Delay and Code Offset: S.-H. Im, G.I. Lee, Konkuk University, South Korea
11:00 5. Vision Aided Navigation and Targeting with Multiple Micro Air Vehicles: J.K. Bingham, M.J. Veth, Air Force Institute of Technology
Alternates

2. WPI Precision Locator: Antenna Geometry Estimation Using a Robust Multilaterization Technique: B. Woodacre, D. Cyganski, J. Duckworth, V. Amendolare, D. Cyganski, Worcester Polytechnic Institute

D4: GNSS Receiver and Antenna Technology 1
8:30 a.m. – 12:00 p.m., Pacific Ballroom C

8:35 1. New 3d Four Constellation High Performance Wideband Choke Ring Antenna: J. Walford, C. Waese, A. Kostadinov, N. Brown, Leica Geosystems, Switzerland
9:05 2. An Improved Method to Decode GPS L2C/L5 Navigation Message: Combination of the Inner and the Outer Channel Codes: A. Garcia Pena, Ecole Nationale de l’Aviation Civile, France; M.-L. Bouchert, Ecole Nationale Supérieure d’Électrotechnique, d’Électronique, d’Informatique, d’Hydraulique et des Télécommunications, France; A.C. Escher, M. Macabiau, Ecole Nationale de l’Aviation Civile, France; L. Ries, F. Carvalho, Centre National d’Études Spatiales, France; S. Coraza, J.-L. Darmidaux, Thales Alenia Space, France
9:35 3. Synthetic Aperture GPS Signal Processing: Concept and Feasibility Demonstration: A. Soloviev, University of Florida; F. van Graas, S. Guanawarden, Ohio University; M. Miller, Air Force Research Laboratory
Break 10:05 a.m. – 10:25 a.m.

10:30 4. Wave Measurement System Using GPS Software Receiver and Antenna Array: S. Okuda, Y. Ara, Marine Technical College, Japan; N. Kouchi, C. Iwan, Kobe University, Japan
Alternates

1. Position/Velocity-Correlator based Vector Tracking Techniques: S.-H. Im, G.I. Lee, Konkuk University, South Korea
2. Integration of A-GPS and IEEE 802.15.4a Chip Spread Spectrum for Seamless Positioning: Y.-S. Kim, G.I. Lee, Konkuk University, South Korea

Lunch is on your own.

Annual Awards Luncheon, 12:00 p.m. – 2:00 p.m., Redondo/San Diego/Santa Monica (second floor)
**D1: Space Weather Monitoring**
8:30 a.m. – 12:00 p.m., Pacific Ballroom D


9:05 2. Efficient Ionospheric Model using Wavelet for Geomagnetic Storms: Y. Sohn, H. Yun, C. Koo, Seoul National University, South Korea

9:35 3. Assimilating Ground and Space-Based GPS Measurements Using JPL/USC GAIM to Monitor Ionospheric Storms: S. Kwon, S. Sivananthan, JPL/Caltech, M. Risi, C. Voorn, University of Calgary, Canada

Break 10:05 a.m. – 10:25 a.m.

10:30 4. Ionospheric Effects on GNSS Applications for Solar Cycle 24: S. Skone, F. Man, F. Ghafoori, R. Tiwani, University of Calgary, Canada


11:30 6. Space Weather Monitoring by Ground and Space Based GNSS Measurements: N. Jakowski, C. Mayer, C. Berries, V. Williken, German Aerospace Center, Germany

Alternates
1. Computerized Ionospheric Tomography for Enhanced Ionospheric Phenomena using Different GNSS Constellations: O. Al-Farisek, S. Skone, University of Calgary, Canada
2. Real Time Ionosphere Monitoring from Network Brazilian for Continuous Monitoring of GNSS (RBMC): C. Rodrigues de Aguiar, P. de Oliveira Camargo, W.R. Dal Pox, Sao Paulo State University, Brazil

**D2: Integrated Navigation Systems**
8:30 a.m. – 12:00 p.m., Pacific Ballroom A

8:35 1. A Novel Yaw Rate Sensor Bias Error Containment Method Using Other Low-Cost Vehicle Sensors: C. Baznayzake, General Motors Research and Development, USA

9:05 2. Constrained GPS/INS Integration Based on Rotation Angle for Attitude Update and Dynamic Models for Position Update: E. Edwan, S. Kneidelik, J. Zhou, O. Loffeld, University of Siegen, Germany


Break 10:05 a.m. – 10:25 a.m.

10:30 4. An Improved Low-cost GPS/INS Integrated System Based on Embedded DSP Platform: J. Zhang, S. Kneidelik, O. Loffeld, ZESS, University of Siegen, Germany

11:00 5. Detecting Systematic Biases and GNSS/INS Drifts in LiDAR Data: A. Habib, A.P. Kersting, K.I. Bang, University of Calgary, Canada


Alternates
1. Optimized Algorithm of Dynamic Kalman Filtering for GPS/INS: Z. Wang, Z. You, W. Dong, College of Electrical Engineering, Sichuan University, China
2. Improvement and Implement of Map Matching Algorithm Based on C-measure: Z. Wang, W. Zhang, B. Qiao, College of Electrical Engineering, Sichuan University, China

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**Tuesday Morning, January 27**

**B3: Algorithms and Methods 1 (Signal Processing)**
8:30 a.m. – 12:00 p.m., Pacific Ballroom A

8:35 1. Zero Mean Noise Processes that do not Appear to be Zero Mean: V.S. Reinhardt, Raytheon Space and Airborne Systems

9:05 2. A Novel Scalar Adaptive Filter for Mitigating the Cycle Slip: J.K. Lim, C.G. Park, Seoul National University, South Korea


Break 10:05 a.m. – 10:25 a.m.


11:00 5. Bayesian Receiver Autonomous Integrity Monitoring Technique: H. Pesonen, R. Piché, Tampere University of Technology, Finland

11:30 6. Improving Optimality of Deeply Coupled Integration of GPS and INS: S. Sivananthan, ARCON Corporation; J. Weitzen, University of Massachusetts

Alternates
1. Multiple Branch Delay Lock Loop Comparison for Simulated BOC Tracking in Multipath Environments: X. Hu, E.S. Lohan, Tampere University of Technology, Finland; I. Groh, S. Sand, German Aerospace Center, Germany; M. Renfors, Tampere University of Technology, Finland
2. Improved Methods for Satellite to Indoor Channel Multipath Modeling: Y. Liu, J. Tian, Q. Honglei, BellHang University, China; G.A. Vecchione, M. Toledo, GMV, Spain
3. A Novel Wireless Network-Based Carrier-Aided DGPS Algorithm Design and Implementation: H-W. Chen, Y-T. Chiang, F-R. Chang, H-S. Wang, National Taiwan University, Taiwan
4. A Method of Clock Modeling and Forecasting Using Kalman Filter With Parameters Restricted: G. Sun, Beijing University of Aeronautics and Astronautics, China

Lunch is on your own.

**B4: The Evolution of the GPS Security Architecture 1 (Classified)**
8:30 a.m. – 12:30 p.m., Offsite/Boeing

8:30 a.m. – 11:30 a.m., Offsite/Boeing

1. Introduction to the GPS Security Architecture Evolution During the Past Three Decades, From the Early Y-Code Development to M-Code Modernization: M. Lopez, Overlook Systems Technologies

2. Visions of GPS Chief Engineers, Past and Present, from the USAF GPS Wing: J. Scheerer, Lockheed Martin; R. Reaser, Raytheon, D. Goldstein, USAF GPS Wing


4. Selective- Availability/Anti-Spoofing (SA/AS) — The Beginning of SA/AS: The Aerospace Corporation

Alternates
1. Multiple Branch Delay Lock Loop Comparison for Simulated BOC Tracking in Multipath Environments: X. Hu, E.S. Lohan, Tampere University of Technology, Finland; I. Groh, S. Sand, German Aerospace Center, Germany; M. Renfors, Tampere University of Technology, Finland
2. Improved Methods for Satellite to Indoor Channel Multipath Modeling: Y. Liu, J. Tian, Q. Honglei, BellHang University, China; G.A. Vecchione, M. Toledo, GMV, Spain
3. A Novel Wireless Network-Based Carrier-Aided DGPS Algorithm Design and Implementation: H-W. Chen, Y-T. Chiang, F-R. Chang, H-S. Wang, National Taiwan University, Taiwan
4. A Method of Clock Modeling and Forecasting Using Kalman Filter With Parameters Restricted: G. Sun, Beijing University of Aeronautics and Astronautics, China

Lunch is on your own.

To attend this session you must 1) have registered for the conference and paid the $80 classified session fee; and 2) have had your visit request/clearance approved by the Boeing Security Office (Clara North, P: 714-896-4962; fax: 714-896-1946, E-mail: clara.north@boeing.com).

Shuttle busses to Boeing will depart from Disney’s Paradise Pier Hotel at 7:15 a.m. and return at 5:30 p.m. (there will be no mid-day shuttles). Driving directions/maps will be available in the registration area. Lunch will be provided at Boeing.
e-Navigation is currently defined as:

*e-Navigation* is the harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth-to-berth navigation and related services for safety and security at sea and protection of the marine environment.

The workshop will include several invited speakers to discuss current developments that are intended to support the e-Navigation initiative such as the Automatic Identification System (AIS), radionavigation systems (GNSS, eLoran), electronic chart systems, vessel reporting systems, satellite tracking and others. Those attending will be invited to share their views.