ION GNSS 2010

ONSITE PROGRAM

September 21-24, 2010
Tutorials: Sept. 20 & 21, 2010

Oregon Convention Center
Portland, Oregon

www.ion.org

CGSIC Symposium September 20 & 21

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Flash photography, personal video and audio taping of the sessions are prohibited. As a courtesy to others, please set your cell phones to vibrate.

Registration Hours

Monday, Sept. 20
4:00 p.m. - 7:00 p.m.

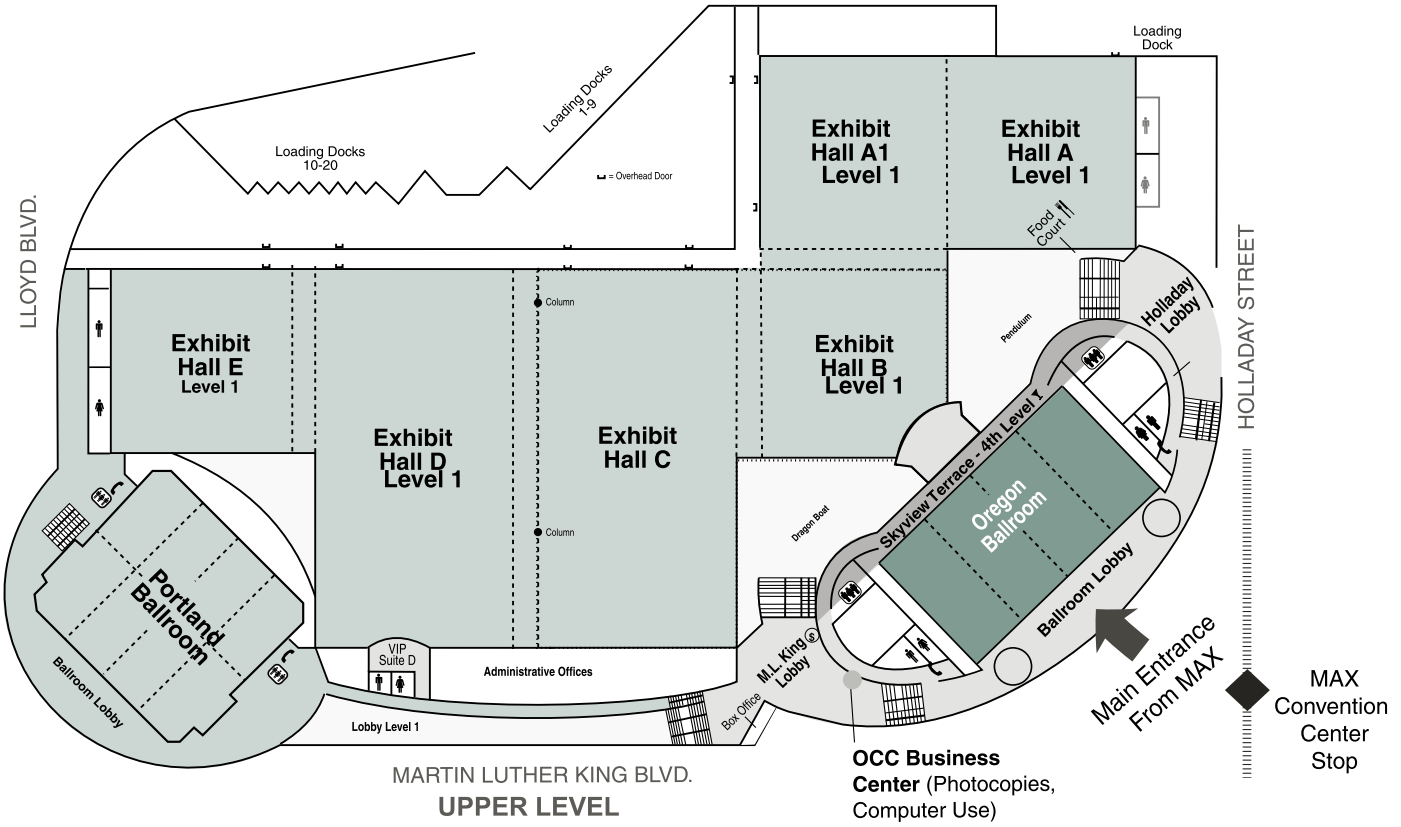
Tuesday, Sept. 21
8:00 a.m. - 7:30 p.m.

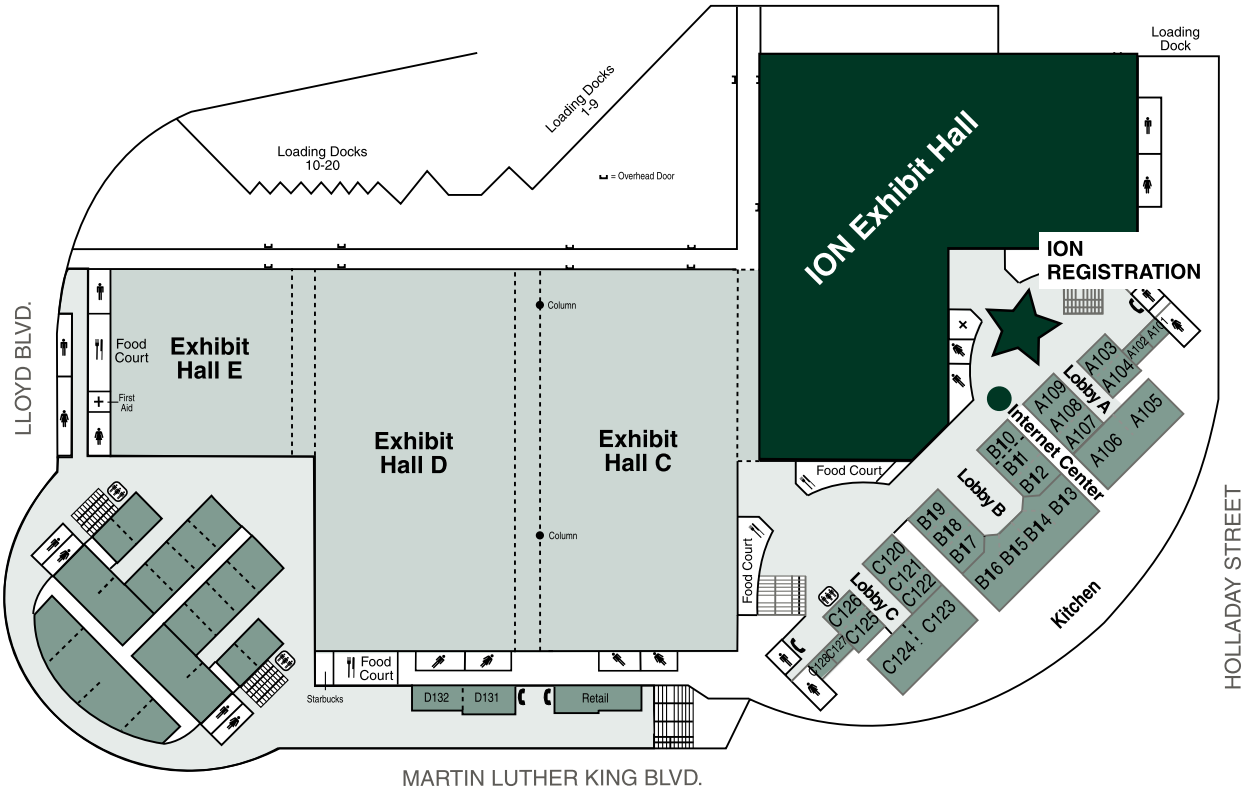
Wednesday, Sept. 22
8:00 a.m. - 12:15 p.m. &
1:45 p.m. - 5:00 p.m.

Thursday, Sept. 23
8:00 a.m. - 12:15 p.m. &
1:45 p.m. - 5:00 p.m.

Friday, Sept. 24
8:00 a.m. - 12:00 p.m.

Oregon Convention Center





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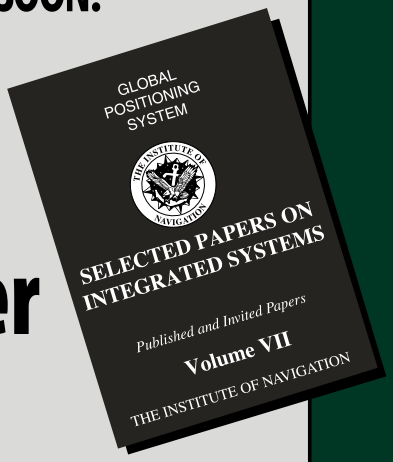

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Contents

Registration Hours ..... Front Cover
Convention Center Floor Plan ..... Inside Front Cover
Thank You Show Supporters 3
CGSIC Program 4
ION Plenary Session 5
Panel Discussions ..... 6 – 7
Technical Sessions ..... 8 – 19
Special Events and Programs/Conference Information 20
Getting Around Portland 21
ION GNSS 2010 Exhibitor Locator Map 22
ION GNSS 2010 Exhibitors ..... 23 – 25
Pre-registered Conference Attendees ..... 26 – 30
Evaluation Form ..... Inside Back Cover
Conference Overview ..... Back Cover

50th Meeting of the Civil GPS Service Interface Committee at the ION GNSS 2010 Conference

Oregon Convention Center • Portland, Oregon 20-21 • September 2010

Monday, 20 September

08:00 – Registration

Monday Morning Concurrent Sessions 09:00 –12:30

Room B110
1a: International Information Session

Chair IISC: John Wilde, *DW International*

09:00 **Welcome/Opening:** Karen Van Dyke, *Department of Transportation RITA, Chair, CGSIC*

09:05 **Introductions:** John Wilde, *Chair of the International Information Subcommittee of the CGSIC*

- **ICAO PBN and APV Activities:** Mr. Ian Mallet, *CASA Australia*
- **Update on GNSS Activities in Japan:** Mr. Hiroshi Nishiguchi, *Japan GPS Council*

10:30–10:45 Break

- **GNSS in Russia:** Mr. Sergey Revnivykh, *Russian Federation*
- **Location as a Key Enabler for a Digital Society:** Prof. Terry Moore, *GRACE*
- **GNSS In-Band Interference Rejection:** Mr. Javad Ashjaee, *Javad*

Room B119
1b: U.S. States and Local Government Session

Chair USS&LGSC: Rudy Persaud, *Federal Highway Administration*

09:00 **Welcome Remarks:** CAPT Frank Parker, *Commanding Officer NAVCEN, Deputy Chair CGSIC*

09:05 **Introductions:** Rudy Persaud, *USDOT/Federal Highway Administration, Chair, U.S. States and Local Government Subcommittee of the Civil GPS Service Interface Committee*

09:15 **Nationwide Differential GPS Projects Status:** Lt. Bion Holbrook, *U.S. Coast Guard Navigation Center*

09:40 **GPS Activities within Maryland:** Joseph White, *Maryland State Highway Administration*

10:05 **Real-time GNSS Surveying in Oregon:** Ken Bays, *OR DOT*; Mark Armstrong, *OR Geodetic Advisor*

10:30–10:45 Break

10:45 **High Accuracy Nationwide Differential GPS:** James Arnold, *USDOT/Federal Highway Administration*

11:10 **"What's Going To Happen When High Precision GPS Is Cheap?":** Eric Gakstatter, *GPS World*

11:35 **"Integrating NDGPS and SBAS – An Optimal Real-time GPS Mapping Solution":** Jean-Yves Lauture, *Geneq inc. Montreal, Quebec Canada*

12:00 **Wrap-up and Nomination for Co-chair and Secretary**

Monday Afternoon Concurrent Sessions 14:00 –17:30

Room B110
2a: Timing Session

Chair: Dr. Wlodzimierz Lewandowski, *BIPM*
Co-Chair: Victor Zhang, *NIST*

14:00 **Introduction:** Wlodzimierz Lewandowski, *BIPM*

14:20 **Report from NIST:** Victor Zhang, *NIST*

14:50 **Report from USNO:** Demetrios Matsakis, *USNO*

15:20 Break

15:40 **ITU Works on New Definition of UTC:** Ron Beard, *NRL- to be confirmed*

15:55 **Report on UN International Committee on GNSS:** Wlodzimierz Lewandowski, *BIPM*

16:10 **Update on Time and Navigation Exhibition at the Smithsonian:** Carlene E. Stephens, *National Museum of American History - to be confirmed*

16:25 **Discussion**

Room B119
2b: Surveying, Mapping and Geosciences Session

Chair: Giovanni Sella, *NOAA-National Geodetic Survey*

CORS User Forum Topics to be Discussed:

- **Revised Datum Definition for NAD83**
- **Absolute Antenna Calibrations**
- **Real-Time Positioning**

Speakers:

Jake Griffiths, *Spatial Reference System Division, NOAA National Geodetic Survey*

Andria Bilich, *Geodetic Research Division, NOAA National Geodetic Survey*

William (Bill) Henning, *SM&GSC Deputy Chair, NOAA National Geodetic Survey*

Tuesday, 21 September

08:00 – Registration

CGSIC Plenary Session Room B110 09:00 –17:30

09:00 **Welcome/Opening:** Karen Van Dyke, *Department of Transportation RITA, Chair, CGSIC*

09:05 **Meeting Overview:** CAPT Frank Parker, *Commanding Officer NAVCEN, Deputy Chair*

09:10 **Key Note Address: CGSIC Past, Present, and Future:** James T. Doherty, *CAPT (ret) USCG, Senior Analyst, Institute for Defense Analyses (IDA) Science & Technology Division*

09:30 **U.S. National Space-Based PNT Update:** Col. Robert M. Hessin, *Deputy Director, U.S. National Coordination Office for Space Based PNT*

09:50 **GPS Program Update:** Col. Bernard J. Gruber, *Commander U.S. Air Force GPS Wing*

10:10 **GPS Constellation Status and Performance:** LtCol Michael T. Manor, *U.S. Air Force, 2SOPS*

10:30 Break

10:45 **GPS International Activities:** David A. Turner, *Deputy Director, Office of Space and Advanced Technology, U.S. Department of State*

11:10 **U. S. Interference Detection & Mitigation Plan (IDM):** John Merrill, *GIS/PNT Program Manager, U.S. Department of Homeland Security Geospatial Management Office*

11:35 **Q/A Panel**

Lunch is on your own 12:00–13:30

13:30 **WAAS and LAAS Program Status:** Leo Eldredge, *GNSS Program Manager, Federal Aviation Administration, U.S. Department of Transportation*

13:50 **NDGPS Program Update:** Timothy Klein, *U.S. Department of Transportation, RITA*

14:10 **National PNT Architecture Update:** Karen Van Dyke, *Department of Transportation RITA*

14:30 **GNSS Evolutionary Architecture Study Update:** Leo Eldredge, *GNSS Program Manager, Federal Aviation Administration, U.S. Department of Transportation*

14:50 **GPS User Perspective –"Addiction; The First Annual Meeting of Accuracy Anonymous":** Alan Cameron, *GPS World Magazine*

15:10 **TBD**

15:30 **SVN-49 and SVN-62 Anomalies:** LtCol Stephen Steiner, *Chief Engineer, GPS Wing*

16:10 **Q/A Panel (Presenters)**

16:30 Break

16:45 **Subcommittee Reports**

Report from International Information Subcommittee: John Wilde, *DW International*

Report from Timing Subcommittee: Dr. Wlodzimierz Lewandowski, *BIPM*

Report from U.S. States and Local Government Subcommittee: Rudy Persaud, *FHWA*

Report from Surveying, Mapping, and Geosciences Subcommittee: Giovanni Sella, *NGS*

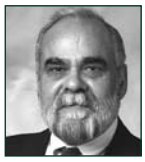
Tuesday Afternoon's Refreshments are Provided Compliments of:

Plenary Session

Tuesday, September 21

Oregon Ballroom — 6:30 p.m. – 9:00 p.m.

Welcome, Meeting Highlights and Introduction of Technical Chairs



Satellite Division Chair:
Dr. Pratap Misra,
The MITRE Corporation

ION GNSS 2010 General Chair:
Prof. Naser El-Sheimy,
University of Calgary, Canada

ION GNSS 2010 Program Chair:
Patricia Doherty,
Boston College

The "Big Three" Issues for GPtS: Sustainment, Robustness, Interchangeability

This session will focus on the "Big Three" international issues for GPtS (Global Positioning and timing Service). A discussion of the specific issues and the overall benefits of insuring availability ("sustainment"), reducing interference, and providing for total interchangeability with other GNSS systems will be led by Dr. Brad Parkinson. Visions for implementing improvements together with potential obstacles will be further explored by the plenary panel of experts in these fields.

The final presentation will center on the benefits of national and international outreach programs that encourage the use of GNSS in various applications and for socio-economic benefit in developing and underdeveloped countries.

Keynote

The Big Three Issues for GPtS: *Dr. Bradford Parkinson, Stanford University*

Plenary Panelists

GNSS Sustainment: The Availability Challenge: *Dr. Paul Massatt, The Aerospace Corporation*

GNSS Robustness: The Interference Challenge: *Mr. Phil Ward, Navward GPS Consulting*

GNSS Interchangeability: International GNSS Cooperation and Progress Towards Complete Interchangeability: *Mr. David Turner, Department of State*

The Impact of GNSS on U.S. PNT Applications Around the World: *Dr. Mikel Miller, Air Force Research Laboratory*

Keynote Speaker, and Panel Moderator

Dr. Bradford Parkinson,
Stanford University, GPS Laboratory

Plenary Panelists

Dr. Paul Massatt,
The Aerospace Corporation

Mr. Phil Ward,
Navward GPS Consulting

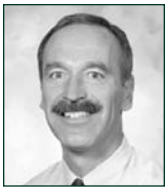
Mr. David Turner,
U.S. Department of State

Dr. Mikel Miller,
Air Force Research Laboratory

Wednesday Morning,
September 22
8:30 a.m. – 12:15 p.m.
Room C123-124

PANEL DISCUSSION

Program Updates: GPS, GLONASS, Galileo, IRNSS, QZSS



Moderator:
Dr. John Betz,
The MITRE Corporation

This session provides an update on satellite-based navigation systems in operation or under development. A representative for each system will provide a system overview, summarize current or planned characteristics and performance, report recent programmatic events, update schedule and plans, and summarize ongoing interactions with other service providers. Questions from the audience are encouraged.

Panel Participants:

1. Commander Bernard Gruber, *GPS Wing*
2. Dr. Sergey Revnivykh, *Deputy Director General Central Institute of Machine Building, Russia*
3. Rene Oosterlinck, *European Space Agency, France*
4. Dr. Suresh V. Kibe, *Indian Space Research Organization, India (invited)*
5. Dr. Hiroaki Maeda, *Lighthouse Technologies, Japan*

Informal Luncheon
Exhibit Hall
12:15 p.m. – 1:15 p.m.

Wednesday Afternoon,
September 22
1:45 p.m. – 5:30 p.m.
Room C123-124

PANEL DISCUSSION

Program Updates: High Integrity Systems

Moderator:
Dr. Frank van Graas,
Ohio University

This session provides an update on high-integrity augmentations to, or components of, satellite-based navigation systems in operation or under development. Presentations include system overviews, current and planned characteristics and performance, and program status reports. Questions from the audience are encouraged.

Panel Participants:

1. Deborah Lawrence, *WAAS Program Manager, Federal Aviation Administration*
2. Dr. Didier Flament, *Head of EGNOS Mission and System Engineering, European Space Agency, France*
3. Michinobu Utsunomiya, *MTSAT, Civil Aviation Bureau Japan (invited)*
4. Carlos Rodriguez, *LAAS Program Lead, Federal Aviation Administration*
5. Tim Murphy, *Technical Fellow, Boeing Commercial Airplane Group*

Wednesday Evening,
September 22
5:30 p.m. – 6:30 p.m.
Room C123-124

PANEL DISCUSSION

Galileo IS SIS ICD Exchange of Views with Industry: The European Commission wishes to discuss with industry concerns regarding this document; in particular relating to licensing agreements.

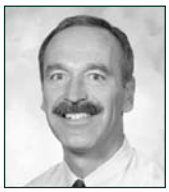
Chair: Michel Bosco, *Deputy Head of Unit ENTR.F.3, European Commission*

Exhibitor Hosted Reception
Exhibit Hall
7:00 p.m. – 9:00 p.m.

Thursday Morning,
September 23
8:30 a.m. – 12:15 p.m.
Room C123-124

PANEL DISCUSSION

Deep Indoor Navigation— Which Technologies Will Prevail?



Moderator:
Dr. John Betz,
The MITRE Corporation

This session addresses potential approaches for indoor location in deep indoor environments where signals from space may be unusable. Many different approaches are being proposed and developed for deep indoor environments, some relying on installed infrastructure, some on enhancements of navigation devices, some on using signals of opportunity. While the ultimate solution may be a blend of technologies, not all of the approaches being considered may survive the technical and commercial challenges involved. A panel of international experts will describe various approaches, discuss their advantages and disadvantages, and provide their views on the ultimate solution set in a series of prepared presentations, augmented by panel discussion and interaction with the audience.

Panel Participants:

1. Dr. Frank van Diggelen, *Broadcom Corporation*
2. Greg Turetsky, *SiRF*
3. Dr. Stewart Cobb, *Novariant Corporation*
4. Prof. Changdon Kee, *Seoul National University, South Korea*
5. Dr. Farshid Alizadeh-Shabdiz, *Skyhook Wireless, Inc.*
6. Dr. Hiroaki Maeda, *Lighthouse Technologies, Japan*
7. Todd Young, *Rosum Corporation*

Informal Luncheon
Exhibit Hall
12:15 p.m. – 1:15 p.m.

Thursday Afternoon
September 23
1:45 p.m. – 5:30 p.m.
Room C123-124

PANEL DISCUSSION

50th Anniversary of Kalman Filtering

Moderator:
Dr. Mohinder S. Grewal,
California State University, Fullerton

The Kalman filter is arguably one of the most notable algorithms of the 20th century. This session discusses the history of the application of the Kalman filter to GNSS applications and introduces cutting edge applications. A new form of Kalman filter will be presented that is useful for operational implementation in applications where stability and throughput requirements stress traditional implementations. State of the art applications of aided navigation using GNSS with inertial sensors will be discussed. The panelists bring a wide range of GNSS application experience using Kalman filters and encourage questions from the audience.

Panel Participants:

1. Angus Andrews, *Rockwell Science Center (Ret.)*
2. Jack Taylor, *The Boeing Company*
3. Jim Kain, *GeoVantage, Inc.*
4. Dr. Jay Farrell, *University of California Riverside*
5. Dr. Mark Petovello, *University of Calgary, Canada*
6. Mike Vaujin and Dr. Jason Kyle, *Raytheon Missile Systems*

Friday Morning
September 24
8:30 a.m. – 12:15 p.m.
Room C123-124

PANEL DISCUSSION

Common Frequencies vs. Frequency Diversity in Civil Signals — What is the Right Choice?

Moderator:
Dr. Chris Hegarty,
The MITRE Corporation

This session provides a forum for discussion of civil signal design efficacy from a user perspective. Panel members with expertise in GNSS user equipment will discuss advantages and disadvantages of alternative civil signal design choices, including the title choice, and offer suggestions for service providers to better address the needs of the user community. The format will include short prepared presentations, panel discussion, and questions from the audience.

Panel Participants:

1. Thomas Morley, *NovAtel, Inc., Canada*
2. Ron Hatch, *Navcom Technology, Inc.*
3. *Dr. Paul Kintner, Cornell University*
4. Dr. Gary McGraw, *Rockwell-Collins*
5. Bruce Peetz, *Trimble*
6. Dr. Tony Pratt, *Orbstar Consultants, UK*

Awards Luncheon
Oregon Ballroom
12:15 p.m. – 1:45 p.m.

Friday Afternoon
September 24
1:45 p.m. – 5:00 p.m.
Room C123-124

PANEL DISCUSSION

The Use of GNSS in Emergency Services

Moderator:
Don McGarry,
The MITRE Corporation

This session will discuss current and future applications for GNSS in the Emergency Services domain. This panel will give GNSS developers a chance to interact directly with GNSS users to gain insight into the applications, challenges, and future plans for this dynamic area. Panel members with experience and research in Emergency Services, Disaster Management Systems, and geo-spatial information systems will present invited papers and take questions from the audience.

Panel Participants:

1. Dr. Jeffrey Waters, *SPAWAR Systems Pacific*
2. Kevin McGinnis, *National Association of State EMS Officials*
3. Gun Akkor, *Patton Electronics*
4. Terry Eby, *RedSky Technologies*

Other Upcoming Events

Autonomous Weapons Summit and GNC Challenges for Miniature Autonomous Systems Workshop

October 25-27, 2010

Emerald Coast Conference Center
Fort Walton Beach, FL

See www.ion.org/aws for Program Updates

The Institute of Navigation

2011 International Technical Meeting

January 24-26, 2011

Catamaran Resort Hotel
San Diego, California

CURRENT TECHNOLOGIES FUTURE TRENDS

www.ion.org for updates

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Room B113-116
Session B1: 8:30 a.m. – 12:15 p.m.

GNSS Algorithms & Methods 1

Dr. Mathieu Joerger, *Illinois Institute of Technology*

Mangesh Chansarkar, *CSR/SiRF*

1. 8:35 **Novel Multipath Mitigation Methods using a Dual Polarization Antenna:** P.D. Groves, Z. Jiang, P.A. Cross, *University College London, UK*; L. Lau, *Institut De Geomatica, Spain*; Y. Adane, I. Kale, *University of Westminster, UK*
2. 8:57 **Maximum Likelihood Estimation for Joint GPS and Multipath Angle of Arrivals Using a Contractive Map:** M. Brenneman, J. Morton, *Miami University*
3. 9:20 **A New Approach Based on SAGE Algorithm for Multipath Mitigation in GNSS Receivers:** S. Rougerie, *ONERA/CNES/Thales Alenia Space, France*; G. Carrier, *ONERA, France*; L. Ries, *CNES, France*; F. Vincent, R. Pascaud, *SAE, France*; E. Corbel, M. Monnerat, *Thales Alenia Space, France*
4. 9:43 **ADIBEAM: Adaptive Digital Beamforming for Galileo Reference Ground Stations:** J. Lopez-Vicario, *Universitat Autonoma de Barcelona, Spain*; F. Antreich, *DLR, Germany*; M. Barcelo, *Universitat Autonoma de Barcelona, Spain*; N. Basta, *DLR, Germany*; J.M. Cebrian, *INDRA, Spain*; M. Cuntz, *DLR, Germany*; O. Gago, L. Gonzales, *TTI*; M.V.T. Heckler, *DLR, Germany*; C. Lavin, *TTI*; M. Manosas, *UAB, Spain*; J. Picanyol, *INDRA, Spain*; G. Seco-Granados, *Universitat Autonoma de Barcelona, Spain*; M. Sgammini, *DLR, Germany*; F. Amarillo, *ESA, The Netherlands*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Reliable Integer Ambiguity Resolution with Multi-frequency Mixed Code Carrier Combinations:** P. Henkel, C. Guenther, *Technical University Munich, Germany*
6. 11:03 **A Compensation Filter Design for Accurate GPS Attitude Determination:** R. Ahohe, *University of Minnesota*
7. 11:26 **Long Baseline Relative Positioning with Estimating Ionosphere and Troposphere Gradients:** T. Yanase, H. Tanaka, M. Ohashi, Y. Kubo, S. Sugimoto, *Ritsumeikan University, Japan*
8. 11:48 **Positioning Techniques with Two GNSS Satellites Over Time:** Y.K. Tan, *University of New South Wales, Australia*

Alternates

1. **Kalman-Filter-based Integer Ambiguity Resolution Strategy for Long-baseline RTK with Ionosphere and Troposphere Estimation:** T. Takasu, A. Yasuda, *Tokyo University of Marine Science and Technology, Japan*
2. **A Single Frequency Multi-antenna GNSS/IMU Solution for Attitude Determination Applications:** P. Dabove, M. De Agostino, *Politecnico di Torino, Italy*; G. Giorgi, *Delft University of Technology, The Netherlands*; A.M. Manzino, *Politecnico di Torino, Italy*; P.J.G. Teunissen, *Curtin University of Technology, Australia*
3. **On Hilbert Huang Transform and its Application to GNSS Signal Multipath Characterization:** A. Hirrle, E. Engler, *German Aerospace Center, Germany*

Green text indicates student award winner.

Room A105-106
Session C1a: 8:30 a.m. – 10:05 a.m.

Autonomous Vehicles

Dr. Changdon Kee, *Seoul National University, South Korea*

Dr. Jason Rife, *Tufts University*

1. 8:35 **Optimization of Vehicle Positioning System Architectures for Future Automotive Applications:** H-G. Buesing, A. Sasse, T. Scheide, P. Hecker, *Technische Universitaet Braunschweig, Germany*
2. 8:57 **Performance of a GPS-INS System with Stationary Updates:** A. Ramanandan, A. Chen, J.A. Farrell, S. Suvarna, *University of California, Riverside*
3. 9:20 **Integrity Monitoring of Vision-Based Automotive Lane Detection Methods:** C. Mario, J. Rife, *Tufts University*
4. 9:43 **Sequential Tuning Method of Stability Derivatives Using Single Antenna GPS Receiver:** J. Kim, A. Cho, H. No, C. Kee, *Seoul National University, South Korea*

Alternates

1. **Terrain Characterization and Feature Extraction for Automated Convoys:** S.M. Martin, J.J. Dawkins, W.E. Travis, D.M. Bevly, *Auburn University*
2. **Low-Cost Navigation System Development and Validation using an Low-Cost IMU Integrated with a GPS/Galileo Software Receiver:** M. Bento, D. Sanroma, B. Eissfeller , *University FAF Munich, Germany*
3. **High Performance RTK for Small UAVs:** M.R. Phillips, K.L. Johnson, T.D. Arthur, M.S. Braasch, *Ohio University;* K.M. Scheff, *Naval Research Laboratory*

10:05-10:35 Break, Refreshments in Exhibit Hall

Room A105-106
Session C1b: 10:35 a.m. – 12:15 p.m.

RAIM and/or Multi-Constellation RAIM

Boubeker Belabbas, *DLR, German Aerospace Center, Germany*

Dr. Boris Pervan, *Illinois Institute of Technology*

1. 10:40 **Analysis of RAIM Using Multi-Constellation To Provide LPV-200 Service Worldwide:** Y.C. Lee, T. Cashin, *The MITRE Corporation/CAASD*
2. 11:03 **Prototyping Advanced RAIM for Vertical Guidance:** J. Blanch, T. Walter, P. Enge, *Stanford University;* J.P. Fernow, *The MITRE Corporation*
3. 11:26 **Advanced RAIM Scheme and its Evaluation for Non-aeronautical Environments:** J. Simon, J. Vazquez, A. Madrazo, A. Cezón, *GMV, Spain;* W. Enderle, *European Commission*
4. 11:48 **First User RAIM Integrity and Interference Mitigation Tests Results with upgraded German Galileo Test Range GATE:** G. Heinrichs, E. Löhnert, E. Wittmann, *IFEN GmbH, Germany*

Alternates

1. **Analysis of Performances of NIORAIM Algorithm Implementation in a Real Multiconstellation GPS+GLONASS Monitoring System in APV Phases of Flight:** P.M.S. Viola, F.C.L. Sfarzo, *TRS S.P.S., Italy*
2. **Analyzing RAIM Performance for an MEO/GEO Hybrid GNSS Constellation:** H. Xu, *University of New South Wales, Australia/Shanghai Jiao Tong University, China;* J. Wang, *University of New South Wales, Australia;* X. Zhan, *Shanghai Jiao Tong University, China*

Informal Luncheon, Exhibit Hall, 12:15 p.m. – 1:15 p.m.

Room B110-112
Session D1: 8:30 a.m. – 12:15 p.m.
Atmospheric Sciences

Dr. Gary Bust, *Atmospheric & Space Technology Associates*

Dr. Giorgiana De Franceschi, *Upper Atmosphere Physics Istituto Nazionale di Geofisica e Vulcanologia, Italy*

1. 8:35 **Local Ionosphere Model Estimation from Dual-Frequency GNSS TEC Data:** R.H. Mitch, M.L. Psiaki, *Cornell University*
2. 8:57 **Observing Traveling Ionospheric Disturbances Caused by Tsunamis Using GPS TEC Measurements:** D. Galvan, A. Komjathy, *NASA Jet Propulsion Laboratory, California Institute of Technology;* M. Hickey, *Embry Riddle Aeronautical University;* J. Foster, *University of Hawaii;* A.J. Mannucci, *NASA Jet Propulsion Laboratory, California Institute of Technology*
3. 9:20 **Time Frequency Analysis of Tropospheric Wet Delay Series Monitored by GPS Network PPP Technique During Extreme Rainfalls:** W-C. Peng, K-Y. Peng, K-W. Chiang, *National Cheng-Kung University, Taiwan*
4. 9:43 **Using Ionospheric Imaging Combined with Feature Tracking to Automate Identification and Tracking of Polar-cap Plasma Patches:** R. Burston, *Royal Observatory of Belgium, Belgium;* K. Hodges, *NERC Centre for Earth Observation, Belgium;* I. Astin, *University of Bath, UK;* N. Bergeot, C. Bruyninx, J-M. Chevalier, *Royal Observatory of Belgium, Belgium*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Investigation of High-latitude Ionospheric Scintillations Observed in the Canadian Region:** R. Tiwari, F. Ghafoori, O. Al-Fanek, O. Haddad, S. Skone, *University of Calgary, Canada*
6. 11:03 **Temporal Decorrelation of GPS Satellite Signals due to Multiple Scattering from Ionospheric Irregularities:** C.S. Carrano, *Boston College;* K.M. Groves, *Air Force Research Laboratory*
7. 11:26 **GPS Absolute and Relative Positioning with Stochastic Ionosphere Estimation:** H.A. Marques, J.F. Galera Monico, *UNESP, Brazil;* M. Aquino, *University of Nottingham, UK;* H.K. Kuga, *INPE, Brazil*
8. 11:48 **Atmospheric Drag at 800km Altitude from Earth Surface:** B. Wong, K. Zhang, *RMIT University, Australia; J. Sang, EOS Space Systems, Australia*

Alternates

1. **A Single Frequency Algorithm to Detect Ionospheric Depletions Over the Indian Region:** M. Cueto, I. Hidalgo, E. Sardón, *GMV, Spain;* G. Um, M. Bailey, *Raytheon*
2. **The Implementation of the Cornell Ionospheric Scintillation Model for Testing GPS Receiver Phase Tracking Loops into the Spirent GNSS Simulator, and Model Performance Analysis:** M. Aquino, Z. Elmas, C. Hill, T. Moore, *University of Nottingham, UK;* S. Smith, M. Mirza, M. Holbrow, *Spirent Communications, UK*
3. **Elimination of Superimposed Multipath Effects on Scintillations Index on Solar Quite Ionosphere at Low Latitude Over the Kenyan Airspace from a Ione Positioned SCINDA System:** J.O. Olwendo, P. Baki, C. Mito, *University of Nairobi, Kenia;* P. Doherty, *Boston College*
4. **Development of True Real-time Slant Tropospheric Delay Monitoring System:** T. Iwabuchi, C. Rocken, *GPS Solutions Inc., USA;* A. Wada, M. Kanzaki, *NGS, Japan*

Room A107-109
Session E1: 8:30 a.m. – 12:15 p.m.
Urban & Indoor Navigation Technology 1

Dr. Daniele Borio, *University of Calgary, Canada*

Dr. Farshid Alizadeh, *Skyhook Wireless*

1. 8:35 **Spatial/Temporal Characterization of the GNSS Multipath Fading Channels:** N. Sadrieh, A. Broumandan, G. Lachapelle, *University of Calgary, Canada*
2. 8:57 **Power Levels and Second Order Statistics for Indoor Fading Using a Calibrated A-GPS Software Receiver:** S. Satyanarayana, D. Borio, G. Lachapelle, *University of Calgary, Canada*
3. 9:20 **Satellite to Indoor Channel Characterization with Implementation in a GNSS Software Simulator:** I. Bartunkova, M. Paonni, B. Eissfeller, *University FAF Munich, Germany*
4. 9:43 **GNSS Signal Simulations in Urban Environments:** A. Steingass, B. Krach, F. Schubert, *German Aerospace Center, Germany;* M. Crisci, R. Prieto-Cerdeira, *European Space Agency, The Netherlands*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Snapshot Software Receiver for GNSS in Weak Signal Environments. An Innovative Approach for Galileo E5:** S. Carrasco-Martos, G. López-Risueño, D. Jiménez-Baños, J. Vicente Perelló, *European Space Agency (ESTEC), The Netherlands;* E. Gill, *Delft University of Technology, The Netherlands*
6. 11:03 **An Ultra-Sensitive Software GPS Receiver for Timing and Positioning:** N. Kishimoto, J. Vavrus, L.R. Weill, *Magellan Systems Japan*
7. 11:26 **Research of Nonlinearity Effects Based on Indoor-pseudolite Positioning System:** X. Wan, J. Dou, X. Zhan, C. Zhai, *Shanghai Jiao Tong University, China*
8. 11:48 **Stationary, Cyclostationary and Nonstationary Analysis of GNSS Signal Propagation Channel:** S. Satyanarayana, *University of Calgary, Canada*

Alternates

1. **Implementation of Receiver of Indoor Positioning System Based on UWB:** J. Xu, X. Lu, *National Time Service Center, Chinese Academy of Sciences, China*
3. **A New Approach for Ultra-Tight Integration of GNSS and Vision-Aided MEMS IMU:** M. Sahmoudi, V. Calmettes, V. Barraut, B. Priot, *University of Toulouse, France*

Green text indicates student award winner.

Room B117-119
Session F1: 8:30 a.m. – 12:15 p.m.
Pedestrian Navigation

Dr. Jan Skaloud, *Swiss Federal Institute of Technology, Switzerland*

Helena Leppäkoski, *Tampere University of Technology, Finland*

1. 8:35 **New Pedestrian Trajectory Simulator to Study Innovative Yaw Angle Constraints:** C. Ascher, C. Kessler, A. Maier, P. Crocoll, G.F. Trommer, *Karlsruhe Institute of Technology, Germany*
2. 8:57 **In-Situ Stride Length Estimation Using a Kinetic Model of Human Gait:** C. Matthews, Y. Ketema, D. Gebre-Egziabher, *University of Minnesota – Twin Cities*
3. 9:20 **Assessment of Indoor Magnetic Field Anomalies using Multiple Magnetometers:** M.H. Afzal, V. Renaudin, G. Lachapelle, *University of Calgary, Canada*
4. 9:43 **Vision-aided IMU for Pedestrian Navigation:** C. Hide, *University of Nottingham, UK;* T. Botterill, M. Andreotti, *University of Canterbury, New Zealand*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Non-conventional INS/GNSS Integration for Qualitative Motion Analysis in Caregiving Applications:** P. Molina, I. Colomina, *Institute of Geomatics, Spain;* M. Troger, B. Hofmann-Wellenhof, *TeleConsult Austria;* C. Aguilera, *European GNSS Supervisory Authority, Belgium*
6. 11:03 **Towards Arbitrary Placement of Multi-sensors Assisted Mobile Navigation System:** X. Zhao, S. Saeedi, *University of Calgary, Canada;* Z. Syed, C. Goodall, *Trusted Positioning Inc., Canada*
7. 11:26 **Test Results for Indoor Positioning Solution using MEMS Sensor Enabled GPS Receiver:** M. Chowdhary, M. Jain, R. Srivastava, *SiRF Technology*
8. 11:48 **A Novel EMG-based Stride Length Estimation Method for Pedestrian Dead Reckoning:** W. Chen, *University of Science and Technology of China, China*

Alternates

1. **Ambiguity-free Carrier Phase Based Indoor Positioning System using Single Transmitter:** T. Lee, *Korea Institute of Science and Technology, South Korea;* H. So, C. Kim, S. Jeon, G. Kim, C. Kee, *Seoul National University, South Korea*
2. **Integrated Particle Swarm Optimization and Kalman Filter for Indoor Navigation Applications:** A.S. Ali, N. El-Sheimy, *University of Calgary, Canada*
3. **Adaptive Methods of Kalman Filtering for Personal Positioning Systems:** E. Pullido Herrera, H. Kaufmann, *Vienna University of Technology, Austria*

Green text indicates student award winner.

Informal Luncheon, Exhibit Hall, 12:15 p.m. – 1:15 p.m.

Room A107-109
Session A2: 1:45 p.m. – 5:30 p.m.

GPS IIF: From Inception to Launch

Frank Czopek, *Boeing*

Capt. John Buckreis, *U.S. Air Force GPS Wing*

1:50 **1. Operation Readiness to Support GPS IIF:** J. Taylor, *Boeing*; T. Duffy, *2SOPS*

2:12 **2. GPS IIF Processing at the Eastern Launch Site:** W. Causey, *The Aerospace Corporation;* R. Pederson, *Boeing*

2:35 **3. Execution and Results for IIF Test and Evaluation Master Plan (TEMP) Bottom-Up/Top-Down/On the Ground to On Orbit Testing:** S. Brennan, R. Villanueva, P. Brion, D. McCray, G.G. Gallegos, G.D. Harris, *GPS Wing*; E. Watts, C. Watts, A. Chamberlin, A. Ravi, C. Prunean, J. Powers, *Boeing*; A. Tetewsky, J. Anszperger, V. O'Brien, J. Ross, C.W. O'Grady, *SAIC*; G. Okerson, *SRI*; D. Bakeman, *The Aerospace Corporation*

2:58 **4. GPS IIF Acquisition History: Control Segment Replacement and Road to First IIF SV Launch:** H. Brown Jr., R.L. Gaede, *Boeing*; B. Louie, *GPSW*; R. Jackson, *The Aerospace Corporation*

3:25-3:55 Break, Refreshments in Exhibit Hall

4:00 **5. Overview of the GPS IIF Satellite:** F.M. Czopek, *Boeing*

4:23 **6. Control Segment Implementation of SAASM: A Programmatic Perspective:** R.L. Gaede, C.J. Hoecker, *Boeing*; S. Taft, *19SOPS*; J. Wong, *The Aerospace Corporation*; L. Sukri, *Lockheed Martin*

4:46 **7. GPS IIF L5 Transmitter Design and Qualification:** P.F. Dahlgren, F.M. Czopek, *Boeing*

5:08 **8. GPS Block IIF Rubidium Atomic Frequency Standard Life Test:** F. Vannicola, R. Beard, J. White, K. Senior, A. Kubik, D. Wilson, *U.S. Naval Research Laboratory*

Alternates

1. **Model 4410 Space Qualified Cesium Beam Frequency Standard:** R. Lutwak, P. Cash, *Symmetricom*; E. Watts, *Boeing*
2. **Rubidium Frequency Standard for the GPS IIF Program and Modifications for the RAFS MOD Program:** R.T. Dupuis, T.J. Lynch, J.R. Vaccaro, *PerkinElmer Optoelectronics*; E. Watts, *Boeing*

Room B110-112
Session B2: 1:45 p.m. – 5:30 p.m.

GNSS Simulation and Testing

Jeff Martin, *Spirent Federal*

Paul Benshoof, *746th Test Squadron*

1:50 **1. End-to-End GPS Multi-Platform Integrated System Testing for MUE:** A. Trunzo, P. Benshoof, *746th Test Squadron;* R. DiEsposti, P. Guggenbuehl, M. Markota, J. Hewlett, *NAVAIR;* S. Mahmood, *U.S. Air Force*

2:12 **2. Global Navigation Satellite System Implications for Civil Users:** J. Potukuchi, *SAIC;* P. Bauer, LinQuest; J. Rios, *Raytheon*

2:35 **3. GNSS Receiver Performance: Dependency on Receiver Make, Model, & Sky View:** C. Basnayake, *General Motors Research & Development*

2:58 **4. Fluctuation: A Novel Approach To GNSS Receiver Testing:** A. Mitelman, *Cambridge Silicon Radio, Sweden*

3:25-3:55 Break, Refreshments in Exhibit Hall

4:00 **5. A New GNSS Multi Constellation Simulator: NAVYS:** G. Artaud, A. de Latour, J. Dantepal, L. Ries, *CNES, France;* E. Senant, *Thales Alenia Space, France;* N. Maury, J-C. Denis, *ELTA, France;* J. Tournay, O. Fudulea, *Altran, France*

4:23 **6. Modifications to GPS Reference Station Antennas to Reduce Multipath:** A. Kerkhoff, C.P. Petersen, R.B. Harris, A. Pickard, *Applied Research Laboratories, The University of Texas at Austin*

4:46 **7. Wide Band Single/Dual-Channel RF Record and Playback for Multi-Constellation Analysis:** M-A. Fortin, I. Ilie, *Ecole de technologie superieure, Canada;* D. Fortin, *Averna, Canada*

5:08 **8. Development of a Software-based Multi-GNSS Observable Simulator:** S. Bisnath, A. Dolgansky, A. Szeto, *York University, Canada*

Room A105-106
Session C2: 1:45 p.m. – 5:30 p.m.

Enhanced and Developing Systems

Prof. Per Enge, *Stanford University*

Young Shin Park, *Stanford University*

1:50 **1. Alternative Positioning, Navigation, and Timing (APNT) Services Research Development Program:** M. Harrison, R. Kenagy, R. Lilly, *Aviation Management Associates;* L. Eldredge, M. Narins, *Federal Aviation Administration;* D. Chapman, R. Loh, *Innovative Solutions International;* V. Massimini, R. Niles, *The MITRE Corporation;* P. Enge, S. Lo, *Stanford University*

2:12 **2. Robust Time Transfer from Space to Backup GPS:** D. Whelan, *Boeing Integrated Defense Systems;* G. Gutt, *iKare Inc.;* P. Enge, *Stanford University*

2:35 **3. Characterizing Multipath for Upcoming Navigation Systems with Satellites in Geostationary Orbits:** S. Ramakrishnan, D. Akos, P. Enge, *Stanford University*

2:58 **4. Potentials for GNSS Signal Enhancements — An Assessment of the Impact of Satellite Imperfections on the Navigation Performance of Todays and Future GNSS:** M. Meurer, S. Thoelert, S. Erker, O. Montenbruck, *German Aerospace Center (DLR), Germany*

3:25-3:55 Break, Refreshments in Exhibit Hall

4:00 **5. Initial Results on Nominal GPS L5 Signal Quality Based upon Factory Measurements of a Block IIF Transmitter:** C.J. Hegarty, *The MITRE Corporation*

4:23 **6. A Comprehensive Methodology for Assessing Radio Frequency Compatibility for GPS, Galileo and COMPASS:** W. Liu, L. Liu, X. Zhan, *Shanghai Jiao Tong University, China*

4:46 **7. Radio Frequency Compatibility Assessment of COMPASS New Signals:** L. Zhu, X. Cui, M. Lu, Z-M. Feng, *Tsinghua University, China*

5:08 **8. Next Generation GPS Ground Control Segment (OCX) Navigation Design:** W. Bertiger, Y. Bar-Sever, N. Harvey, K. Miller, J. Weiss, *Jet Propulsion Laboratory;* L. Doyle, T. Solorzano, *ITT;* A. Stell, *Raytheon*

Alternates

1. **Effect of SVN49 (PRN01) on Position and Time Accuracy for Single- and Dual-Frequency Users:** M.B. El-Arini, R. Conker, D. O'Laughlin, C. Hegarty, *The MITRE Corporation*
2. **Advanced Navigation Architectures for Galileo: Orbit Determination and Clock Monitoring:** M. Sánchez, J.A. Pulido, *DEIMOS Space S.L., Spain;* F. Soualle, *Astrium GmbH, Germany;* F. Amarillo, *ESA-ESTEC, The Netherlands*
3. **LPV200 Achievement with SBAS by Using Extreme Value Theory:** J-M. Azaïs, S. Gadat, *Toulouse III University, France;* B. Rols, J-C. Lévy, *Thales Alenia Space, France;* C. Mercadier, *Claude Bernard Lyon, I University, France;* N. Suard, *CNES, French Space Agency, France*

Wednesday Evening, September 22
5:30 p.m. – 6:30 p.m.
Room C123-124

PANEL DISCUSSION

Galileo IS SIS ICD Exchange of Views with Industry: The European Commission wishes to discuss with industry concerns regarding this document; in particular relating to licensing agreements.

Chair: Michel Bosco, *Deputy Head of Unit ENTR.F.3, European Commission*

ION/AAAS Government Fellows Information Booth
6:30 p.m. – 7:30 p.m.
Exhibit Hall Entrance

Help shape policy in Washington D.C. Meet with, and talk to, former ION government fellows and learn about the many benefits of participating in the program. This may be the perfect fit for you now, or in the future!

Exhibitor Hosted Reception, Exhibit Hall, 7:00 p.m. – 9:00 p.m.

Room B117-119
Session D2: 1:45 p.m. – 5:30 p.m.
Remote Sensing with GNSS & Integrated Sensors

Dr. José Caro, *GMV, Spain*

Prof. James Garrison, *Purdue University*

1. 1:50 **The Calibration Methodology of a Low Cost Land** Vehicle Mobile Mapping System: Y-H. Li, *National Cheng Kung University, Taiwan*
2. 2:12 **Low-Cost Post-Mission Positioning and Orientation Solution for Land-Based Mobile Mapping Using Nonlinear Filtering:** J. Georgy, *Trusted Positioning Inc., Canada;* A. Noureldin, *Royal Military College of Canada/Queen's University, Canada*
3. 2:35 **Testing Sub-decimeter, Kinematic Wide-Area Positioning for Airborne LiDAR Surveys Using the CORSnet-NSW Network:** O.L. Colombo, *UMBC/NASA Goddard;* S. Brunker, *Network Mapping, UK;* G. Jones, V. Janssen, *NSW LPMA, Australia;* C. Rizos, *University of New South Wales, Australia*
4. 2:58 **The ROSA Radio-Occultation Receiver: Missions and Next Generation Evolution:** L. Marradi, A. Zin, E. Mangolini, F. Belgiovane, L. Scaciga, S. Zago, S. Landenna, *Thales Alenia Space Italia, Italy;* V. DeCosmo, *ASI, Agenzia Spaziale Italiana, Italy*

3:25-3:55 Break, Refreshments in Exhibit Hall

5. 4:00 **Soil Moisture Estimation using Land-reflected GPS L2C Bi-static Radar Measurements:** A. Azmani, S. Reboul, J.B. Choquel, M. Benjelloun, *University Lille Nord de France, France*
6. 4:23 **Error Propagation in Ionospheric Image-based Parameter Estimation:** S. Datta-Barua, *San Jose State University;* G. Bust, G. Crowley, *Atmospheric & Space Technology Research Associates*
7. 4:46 **InSAR Atmospheric Delay Mitigation with GPS; Case Study IZMIT Earthquake Interferograms:** M.U. Altin, *Istanbul Technical University, Turkey;* L. Ge, *University of New South Wales, Australia;* E. Tari, *Istanbul Technical University, Turkey*
8. 5:08 **The SGR-ReSI - A New Generation of Space GNSS Receiver for Remote Sensing:** M. Unwin, R. de Vos van Steenwijk, *SSTL, UK;* C. Gommenginger, *NOCS, UK;* C. Mitchell, *University of Bath, UK;* S. Gao, *Surrey Space Centre, UK*

Alternates

1. **Open Loop Tracking of Radio Occultation Signals from an Airborne Platform:** T.D. Lulich, *Emergent Space Technologies;* J.L. Garrison, J.S. Haase, Y-M. Yang, J. Voo, *Purdue University;* F. Xie, *Jet Propulsion Laboratory;* P. Muradyan, *Purdue University*
2. **A Low-Cost Direct Geo-referencing System for UAV-based Disaster Management Image Acquisition:** S. Du, Y. Gao, *University of Calgary, Canada*
3. **Fusion of Laser Scanning and ZUPT for Improved Geolocation of Electromagnetic Sensors for Unexploded Ordnance Detection:** C.K. Toth, L. Li, X. Wang, D.A. Grejner-Brzezinska, *The Ohio State University*

Green text indicates student award winner.

Room A103-104
Session E2a: 1:45 p.m. – 3:25 p.m.
Consumer Applications

Dr. Shaowei Han, *Unicore Communications, Inc., China*

Dr. Jari Syrjärinne, *Nokia, Inc., Finland*

1. 1:50 **Robust First Fix Performance in Urban Areas:** Y-C. Chien, W.G. Yau, W-H. Ting, Z-H. You, H-J. Chen, A-B. Chen, Y-W. Ting, C-W. Chen, W-C. Tsai, *MediaTek Inc., Taiwan*
2. 2:12 **Multi-sensor GNSS Tight Hybridisation for Indoor Positioning:** J.M. Lorga, P.F. Silva, J.S. Silva, *DEIMOS Engenharia, Portugal;* T.F.R. Silva, J.M. Gonçalves, *INOV-INESC Inovacao, Portugal*
3. 2:35 **A Low-Cost Multiple Sensor Monitoring System for Paralympics Wheelchair Competition:** H. Xu, K. Zhang, E. Fu, M. Zhu, S. Wu, A. Subic, *RMIT University, Australia*
4. 2:58 **GNSS Position Computation Without Ephemeris Data:** J. de Salas, F. van Diggelen, *Broadcom*

Alternates

1. **Off-board Positioning using an Efficient GNSS SNAP Processing Algorithm:** D. Rosenfeld, E. Duchovny, *CellGuide Ltd., Israel*
2. **Impact of GNSS Signal Degradation within a Vehicle Environment:** M. Czerep, B. Weinstein, D. Akos, *University of Colorado*

3:25-3:55 Break, Refreshments in Exhibit Hall

Room A103-104
Session E2b: 3:55 p.m. – 5:30 p.m.
Regulatory Service Applications (Road User Charging, etc.)

Peter F. MacDoran, *Loctronix Corporation*

Joaquín Cosmen, *GMV, Spain*

1. 4:00 **The Possibility and Added-Value of Authentication in Future Galileo Open Signal:** H. Vicente de Castro, E. Safipour, G. van der Maarel, *Logica, The Netherlands*
2. 4:23 **Quantifying and Demonstrating GNSS and EGNOS Benefits in Regulated Road Pricing Applications:** F. Diani, G.G. Calini, *European GNSS Supervisory Authority, Belgium;* P. Hamet, *European Commission, Belgium*
3. 4:46 **Groundwork for GNSS Integrity Monitoring in Urban Road Applications. The Road User Charging Case:** D. Salos, *TeSA/ENAC, France;* A. Martineau, C. Macabiau, *ENAC, France;* D. Kubrak, *Thales Alenia Space, France;* B. Bonhoure, *CNES, France*
4. 5:08 **PUMA: Detection and Mitigation of GNSS Deception by Combination of Odometric Dead Reckoning and GNSS Observations for Vehicles:** H. Niedermeier, B. Eissfeller, *University FAF Munich, Germany;* O. Pozzobon, *Qascom, Italy;* R. Grzeszczyk, *Automex, Poland*

Alternate

1. **Performance Aspects of Navigation Systems for GNSS-Based Road User Charging:** R. Toledo-Moreo, *Technical University of Cartagena and University of Murcia, Spain;* J. Santa, B. Úbeda, C. Piñana-Díaz, M.A. Zamora-Izquierda, A.F. Gómez-Skarmeta, *University of Murcia, Spain*

Room B113-116
Session F2: 1:45 p.m. – 5:30 p.m.
LBS Technology and Applications

Dr. Heidi Kuusniemi, *Finnish Geodetic Institute, Finland*

Christopher Wilson, *Tele Atlas*

1. 1:50 **A Network Selection and Optimization Approach for Ground-based Positioning Systems:** F. Sadi, R. Klukas, A.S. Milani, *University of British Columbia Okanagan, Canada*
2. 2:12 **Development of a Real Time Indoor Location Based Service Test Bed:** L-T. Hsu, W-M. Tsai, S-S. Jan, *National Cheng Kung University, Taiwan*
3. 2:35 **Results of IMES Implementation for Seamless Indoor Navigation and Social Infrastructure Platform:** D. Manandhar, H. Torimoto, *GNSS Technologies Inc., Japan*
4. 2:58 **Geofencing for Safety Applications:** W. Ait-Cheik-Bihi, A. Nait-Sidi-Moh, M. Bakhouya, J. Gaber, M. Wack, *Universite de Tecknologie de Belfort-Montbeliard, France;* Y. Alexandre, *Geoposis, France*

3:25-3:55 Break, Refreshments in Exhibit Hall

5. 4:00 **Demonstration of Inter-Vehicle UWB Ranging to Augment DGPS for Improved Relative Positioning:** M.G. Petovello, K. O'Keefe, B. Chan, *University of Calgary, Canada*
6. 4:23 **Positioning Enhancement with Double Differencing and DSRC:** N. Alam, A.T. Balaei, A.G. Dempster, *University of New South Wales, Australia*
7. 4:46 **Innovative Positioning System of the Soldier/Fire-fighter Based on the Creative Infra of the IR-UWB:** S.Y. Cho, Y.W. Choi, *ETRI, South Korea*
8. 5:08 **Dynamic Indoor Positioning with the Handover Algorithm:** F. Alsehly, R. Mohd Sabri, Z. Sevak, T. Arslan, *The University of Edinburgh, UK*

Alternates

1. **Reference for Indoor Location Systems Using Gyroscope and Quadrature Incremental Encoder:** O. Pekkalin, H. Leppäkoski, *Tampere University of Technology, Finland;* L. Iozan, *Technical University of Cluj-Napoca, Romania;* J. Hautamäki, J. Collin, J. Takala, *Tampere University of Technology, Finland*
2. **Geo-Coordinate Free Guidance and Navigation:** D. Qiu, *Sigtem Technology, Inc.;* M. Miller, S. DeVilBiss, T. Nguyen, *Air Force Research Laboratory;* C. Yang, *Sigtem Technology, Inc.*

ION/AAAS Government Fellows Information Booth
6:30 p.m. – 7:30 p.m.
Exhibit Hall Entrance

Help shape policy in Washington D.C. Meet with, and talk to, former ION government fellows and learn about the many benefits of participating in the program. This may be the perfect fit for you now, or in the future!

Exhibitor Hosted Reception, Exhibit Hall, 7:00 p.m. – 9:00 p.m.

Room B117-119
Session A3: 8:30 a.m. – 12:15 p.m.

Integrating System Capabilities at the GPS Wing (Invited Papers Only)

Frederick Roberts, *Science Applications International Corporation*

8:35 **1. System Engineering Approach for GPS Civil Signal Monitoring:** N. Shohara, A. Hale, *SAIC*

9:20 **2. Enterprise Information Assurance Integration:** G. Johnson, *SAIC;* M. Lopez, *Overlook Systems Technologies*

9:43 **3. A Novel Approach to GPS System-Level Testing:** G. Schroeder, *Booz Allen Hamilton;* E. Weston, P. Herre, *SAIC;* B. Chadil, *LinQuest*

10:05-10:35 Break, Refreshments in Exhibit Hall

10:40 **4. GPS Capability Delivery Planning and Analysis:** J. Silvas, J. McCanless, *Booz Allen Hamilton;* C. Williams, *U.S. Air Force GPS Wing*

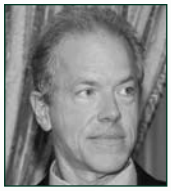
11:26 **Panel Discussion: GPS Integrated System Test:**

Moderator: M. Fish, *SAIC*

Panel Participants:
G. Harris, M. Bourne, R. Claderwood, *SAIC;* P. Neal, *LinQuest;* G. Schroeder, R. Nicholson, *Booz Allen Hamilton*

Room B110-112
Session B3: 8:30 a.m. – 12:15 p.m.

New Product Announcements



Alan Cameron, *GPS World Magazine*

Michael Swiek, *U.S. GPS Industry Council*

8:35 **1. Super-Sensitive Software GNSS-Receiver:** R. Budnik, *SPIRIT DSP, Russia*

8:57 **2. GNSS Absolute Antenna Calibration at the National Geodetic Survey:** A. Bilich, G. Mader, *National Geodetic Survey*

9:20 **3. An Adaptive Digital Beamformer for Compact GNSS Antenna Arrays:** A.J. Thommesen, M.R. Carter, *QinetiQ, UK*

9:43 **4. The Leica Viva GS15 — An All-in-One GNSS Receiver:** P. Fairhurst, B. Richter, U. Glueckert, *Leica Geosystems, Switzerland*

10:05-10:35 Break, Refreshments in Exhibit Hall

10:40 **5. SX-NSR 2.0 — A Multi-frequency and Multi-sensor Software Receiver with a Quad-band RF Front End:** N. Falk, T. Hartmann, H. Kern, B. Riedl, T. Pany, R. Wolf, J. Winkel, *IFEN GmbH, Germany*

11:03 **6. An Innovative EGNOS/EDAS-based System to Generate Advanced Solutions in the Winter Service Technology:** G. Falco, *Politecnico di Torino, Italy;* P. Mulassano, F. Dominici, G. Marucco, A. Defina, K. Charqane, *Istituto Superiore Mario Boella, Italy*

11:26 **7. Positioning Platform for Low-cost, Accurate, Infrastructure-free Machine Control:** Z. Syed, *Trusted Positioning Inc., Canada;* A. Noureldin, *Royal Military College of Canada/Queen's University, Canada;* N. El-Sheimy, *University of Calgary, Canada*

11:48 **8. Complete Real-Time GLONASS Product Line from the Global Differential GPS (GDGPS) System:** L. Romans, Y. Bar-Sever, W. Bertiger, J. Weiss, *Jet Propulsion Laboratory, California Institute of Technology*

Alternates

1. **Digital GNSS Signal Recorder, Generator, and Simulator for Receiver Test, Qualification, and Certification:** A. Ruegamer, M. Overbeck, S. Koehler, G. Rohmer, Fraunhofer IIS, Germany; P. Berglez, E. Wasle, J. Seybold, *TeleConsult Austria GmbH, Austria*
2. **Next Generation Software-based GPS Receiver for Real-World Applications:** F. Yuen, Z. Liu, *Baseband Technologies Inc.*
3. **A Precise Low-cost GPS/GIS Handheld:** Y. Zhang, S. Lee, *Nexteq Navigation Corporation, Canada*
4. **ACC-GPSGLS:** High Performance GPS-GLONASS Receiver: S.N. Shankara-Murthy, C. Jayaram, T. Marathe, S. Tantry, *Accord Software and Systems Pvt. Ltd, India*

Room A107-109
Session C3: 8:30 a.m. – 12:15 p.m.

Aviation Applications

Randall Kenagy, *Aviation Management Associates*

Jennifer Campbell, *Innovative Solutions International*

8:35 **1. The Multivariate Constrained LAMBDA Method for Single-epoch, Single-frequency GNSS-based Full Attitude Determination:** G. Giorgi, *Delft University of Technology, The Netherlands*

8:57 **2. Operational Implementation of EGNOS and LPV Approaches in Aviation in Europe:** J. Murcia, L. Chocano, *INECO, Spain;* P. Haro, *Aena, Spain;* H. de With, *European GNSS Supervisory Authority;* R. Farnworth, *Eurocontrol, France*

9:20 **3. Multi SBAS Interoperability Flight Trials with A380:** L. Azoulai, S. Virag, R. Leinekugel-Le-Cocq, *Airbus, France;* C. Germa, B. Charlot, *Thales Alenia Space, France*

9:43 **4. Validation of the WAAS RNAV and VNAV Approach Precision by Using Category A and B Aircraft with Commercial WAAS Receiver:** Y-R. Huang, R. Xiao, J. Fagan, *The University of Oklahoma*

10:05-10:35 Break, Refreshments in Exhibit Hall

10:40 **5. Feasibility Analysis of GPS III-A/B Integrated with an Inertial System to Provide CAT IIIB Services:** Y.C. Lee, C.A. Shively, *MITRE/CAASD*

11:03 **6. Protection Level Calculation for Least Squares GPS Attitude Determination:** T-Y. Yang, S-S. Jan, *National Cheng Kung University, Taiwan*

11:26 **7. Containment Limits for Free-Inertial Coast:** J. L. Farrell, *VIGIL, Inc.;* F. van Graas, *Ohio University*

11:48 **8. Evaluation of Stereo Based Visual Odometry for Navigation in GPS-denied Environments:** A. Dhar, S. Saripalli, *Arizona State University*

Alternate

1. **The Performance Improvement of a Low Cost GPS/INS Integration System Using a Single-Antenna GPS Based Attitudes:** A. Cho, H. No, H. Yun, J. Kim, C. Kee, *Seoul National University, South Korea*

Green text indicates student award winner.

Informal Luncheon, Exhibit Hall, 12:15 p.m. – 1:15 p.m.

PANEL DISCUSSION • Deep Indoor Navigation – Which Technology Will Prevail? • See page 6

Room A103-104
Session D3: 8:30 a.m. – 12:15 p.m.

Surveying & Geodesy

Dr. Robert Weber, *Vienna University of Technology, Austria*

Dr. Andria Bilich, *National Geodetic Survey*

1. 8:35 **Combining CORS Networks, Automated Observations and Processing, for Network RTK Integrity Analysis and Deformation Monitoring:** P. Drummond, *Trimble Navigation Ltd., New Zealand*
2. 8:57 **Operational Performance RTK Positioning when Accounting for the Time Correlated Nature of GNSS Phase Errors:** C. Miller, K. O'Keefe, Y. Gao, *University of Calgary, Canada*
3. 9:20 **Professional Care of GNSS Handheld with Internal Antenna: What Position Accuracy One Can Expect:** G. Zyryanov, I. Artushkin, D. Ivanov, E. Sunitsky, *Ashtech, Russia*
4. 9:43 **New Algorithms for Filtering GPS Time Series in Earth Science Applications:** F. Cannavo, M. Mattia, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Detection of Millimetric Amplitude Periodic Displacement using one GPS Receiver:** R.E. Schaal, A.P.C. Larocca, *University of Sao Paulo, Brazil*
6. 11:03 **Evaluation of High-rise Building Response to Wind Loads Using GPS Kinematic Positioning:** X. Li, L. Ge, I. Gilbert, A. Z. Hu, *University of New South Wales, Australia*
7. 11:26 **The Development of a Tightly-coupled INS/GPS Sensors Fusion Scheme Using Adaptive Kalman Filter:** G-Y. Yao, K-Y. Chen, Y-W. Huang, K-W. Chiang, *National Cheng Kung University, Taiwan*
8. 11:48 **WGS 84 Modernization:** B. Wiley, R. Wong, N. Pavlis, C. Rollins, *National Geospatial-Intelligence Agency*

Alternates

1. **Precipitation Forecast Using GPS for Hydropower Station:** L. Chang, X. He, *Hohai University, China;* M. Liu, *Shanghai Center for Satellite Remote-sensing and Application, China*
2. **Monitoring the Movements of a Skyscraper Using INS/GPS Integrated Systems During Light Earthquakes:** C-Y. Li, C-Y. Chiang, K-W. *Chiang, National Cheng Kung University, Taiwan*
3. **Concepts to Limit Convergence Time of GPS-based Precise Point Positioning (PPP):** A. Karabatic, R. Weber, *Vienna University of Technology, Austria;* K. Huber, Ch. Abart, F. Heuberger, *Institute of Navigation and Satellite Geodesy TU-Graz, Austria;* Ph. Berglez, J. Seybold, *Teleconsult Austria;* Ch. Klug, *WienEnergie, Austria*
4. **GNSS/INS Integration in Vehicular Urban Navigation:** A. Angrisano, *University Parthenope of Naples, Italy;* M. Petovello, *University of Calgary, Canada;* G. Pugliano, *University Parthenope of Naples, Italy*

Room A105-106
Session E3: 8:30 a.m. – 12:15 p.m.

GPS and GLONASS Modernization and Other Emerging GNSS (Galileo, QZSS, IRNSS, COMPASS)

Dr. Sergey Karutin, *Russian Space Systems, Russia*

Javier Perez Bartolomé, *European Commission, Belgium*

1. 8:35 **Impact of GPS Block IIR Space Vehicle Lifetime on Constellation Sustainment:** W. Marquis, *Lockheed Martin*
2. 8:57 **New Developments for NGA Monitor Stations and Real-Time Ephemeris:** L. Weingarth, S. Simmons, H. Young, J. Saffel, C. Minter, E. Gow, *National Geospatial-Intelligence Agency*
3. 9:20 **GLONASS Development Strategy:** Y. Urlichich, V. Subbotin, G. Stupak, V. Dvorkin, S. Karutin, A. Povaliev, *Russian Space Systems, Russia*
4. 9:43 **ETS-VIII Precise Orbit and Clock Estimation Experiments:** R. Nakamura, T. Inoue, S. Nakamura, *Japan Aerospace Exploration Agency, Japan;* S. Katagiri, *Fujitsu Ltd., Japan;* S. Noppanakeepong, *King Mongkut's Institute of Technology* Ladkrabang, Thailand; Y. Feng, *Queensland University of Technology, Australia*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **GDOP Research and Simulation in a CAPS-GPS/CAPS-Galilleo SBAS:** T. Han, X. Lu, F. Cheng, *National Time Service Center, Chinese Academy of Sciences, China;* J. Dou, *North West University, China*
6. 11:03 **Modified Binary Coded Symbol Modulation and Its Application for COMPASS:** W. Liu, C. Zhai, X. Zhan, Y. Zhang, *Shanghai Jiao Tong University*
7. 11:26 **First GPS IIF Satellite in the Air: Observation and Performance Analysis:** G.X. Gao, J. Blanch, T. Walter, P. Enge, *Stanford University*
8. 11:48 **Assisted GNSS — Traditional and Vectorized: Implementation and Performance Results:** T. Chu, *Peking University, China;* D. Akos, *University of Colorado, Boulder*

Alternates

1. **Evaluation and Calibration of Receiver Inter-channel Biases for RTK-GPS/GLONASS:** H. Yamada, T. Takasu, N. Kubo, A. Yasuda, *Tokyo University of Marine Science and Technology, Japan*
2. **Receiver Compatibility of POCET Signal Combining:** P. Dafesh, R. Bow, T. Fan, J. Hsu, *The Aerospace Corporation*
3. **New Signals in the Sky — A High Gain Antenna Analysis of GPS IIF, COMPASS and GLONASS:** S. Erker, S. Thoelert, M. Meurer, J. Furthner, *German Aerospace Center (DLR), Germany*

Room B113-116
Session F3: 8:30 a.m. – 12:15 p.m.

Land Based Applications

Sandra Kennedy, *NovAtel Inc., Canada*

Dr. Chaminda Basnayake, *General Motors Research & Development*

1. 8:35 **High Precision Positioning in Difficult GPS Environments for Cooperative Vehicle Safety Applications:** A. Soloviev, *University of Florida;* Z. Popovic, Y. Mochizuki, *Honda R&D Americas, Inc.*
2. 8:57 **Performance Evaluation of Range Information Provided by Dedicated Short-Range Communication (DSRC) Radios:** J. Allen, D. Bevly, *Auburn University*
3. 9:20 **Performance Evaluation of Compact MEMS IMU/GPS Tight Coupling with IMU Aided Tracking Loop:** P. Ye, G. Du, X. Zhan, C. Zhai, *Shanghai Jiao Tong University, China*
4. 9:43 **Low-Cost Sensor Fusion Dead Reckoning using a Single-Frequency GNSS Receiver Combined with Gyroscope and Wheel Tick Measurements:** A. Somieski, Ch. Hollenstein, E. Favey, C. Schmid, *u-blox AG, Switzerland*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Application of Particle Filters for Vehicle Positioning using Road Maps:** P. Davidson, J. Collin, *Tampere University of Technology, Finland;* J. Raquet, *U.S. Air Force Institute of Technology;* J. Takala, *Tampere University of Technology, Finland*
6. 11:03 **GPS-Aided Land Based Navigation and Precision Farming Applications: Improving GPS Solutions by Means of MEMS IMU and Low Cost Sensors:** C. Castagnetti, *University of Modena and Reggio Emilia, Italy;* L. Biagi, *Politecnico of Milan, Italy;* A. Capra, *University of Modena and Reggio Emilia, Italy*
7. 11:26 **Common-Mode Error Removal and Integrity for GNSS-Based Collaborative Navigation:** X. Xiao, J. Rife, *Tufts University*
8. 11:48 **Validation of an Affordable Real Time Lane-level Positioning System for Cooperative Vehicle-infrastructure Systems:** P. Rodríguez de Andrés, *Logica Nederland B.V., The Netherlands;* D. Bétaille, *Laboratoire Central des Ponts et Chaussées - Centre de Nantes, France;* R. Toledo-Moreo, *University of Murcia, Spain*

Alternates

1. **Dynamic Modeling for Land Mobile Navigation Using Low-Cost Inertial Sensors and Least Squares Support Vector Machine Learning:** A. Kealy, *The University of Melbourne, Australia;* K. Fragos, V. Gikas, *University of Athens, Greece*
2. **Bridging Integrated GPS/INS Systems with Geospatial Models for Car Navigation Applications:** M. Attia, A. Moussa, N. El-Sheimy, *University of Calgary, Canada*
3. **A Self Calibrating Attitude Determination System for Precision Farming using Low-Cost IMU and Carrier-phase DGPS:** Y. Geng, *Porto University, Portugal*

Informal Luncheon, Exhibit Hall, 12:15 p.m. – 1:15 p.m.

PANEL DISCUSSION • Deep Indoor Navigation – Which Technology Will Prevail? • See page 6

Room A103-104
Session A4a: 1:45 p.m. – 4:45 p.m.

NATO Military PNT & NAVWAR (Invited Papers Only)

Raymond Swider, *Office of Assistant Secretary of Defense*

Jean-Philippe Saulay, *NATO HQ Consultation, Command & Control Staff, Belgium*

1. 1:50 **Overview of NATO Navigation Sub-Committee and its PNT and NAVWAR Activities:** J-P. Saulay, *NATO HQ, Belgium*
2. 2:35 **GPS Precise Positioning Service Equipment Authorization Office (PECO) and Military Standard Order (MSO) Certification:** K. Kovach, X. Tran, *The Aerospace Corporation*; J. Tomaszewski, *U.S. Air Force GPS Wing;* J. Stripling, *Epsilon Systems*

3:25-3:55 Break, Refreshments in Exhibit Hall

3. 4:00 **European GNSS Security, the Galileo Public Regulated Service and PRS/GPS Dual Mode Operations:** N. Davies, *QinetiQ, UK;* G. Black, *Logica, UK;* P. Campagne, *FDC, France*

Room A103-104
Session A4b: 4:50 p.m. –5:30 p.m.

Results of the ION's 2010 Robotic Lawn Mower Competition

Don Venable, *2010 Robotic Lawn Mower Competition Chair, AFRL*

1. 4:55 **Overview of the 2010 Robotic Lawn Mower Competition:** D. Venable, *ION's 2010 Robotic Lawn Mower Competition Chair, AFRL*
2. 5:08 **CWRU-Cutter C: Case Western Reserve University's Autonomous Lawn Mower Design and Performance Review:** B. Hughes, A. Smith, A. Schepelmann, D. Bennett, H. Snow, *Case Western University Mechanical Engineering Department*

Room A105-106
Session B4: 1:45 p.m. – 5:30 p.m.

Software Receivers

Dr. David De Lorenzo, *Stanford University*

Timo Jokitalo, *Fastrax, Finland*

1. 1:50 **A Multi-Purpose Software GNSS Receiver for Automotive Applications:** H-G. Buesing, U. Haak, P. Hecker, *Institute of Flight Guidance, Germany*
2. 2:12 **Channel Context Detection and Signal Quality Monitoring for Vector-based Tracking Loops:** T. Lin, C. O'Driscoll, G. Lachapelle, *University of Calgary, Canada*
3. 2:35 **Efficient GNSS Signal Acquisition with Massive Parallel Algorithms using OpenCL on GPUs:** B. Riedl, T. Pany, R. Wolf, J. Winkel, *IFEN GmbH, Germany*
4. 2:58 **Tracking AltBOC with the ipexSR Software Receiver:** D. Dötterböck, C. Stöber, F. Kneißl, B. Eissfeller, *University FAF Munich, Germany;* T. Pany, *IfEN GmbH, Germany*

3:25-3:55 Break, Refreshments in Exhibit Hall

5. 4:00 **A Direct-Sampling Digital-Downconversion Technique for a Flexible, Low-Bias GNSS RF Front-end:** J. York, J. Little, *University of Texas Applied Research Laboratories*
6. 4:23 **Fast Direct Acquisition of the L2 CL Code Through Utilizing the Code Properties and Wiener Filtering Techniques:** N.I. Ziedan, *Zagazig University, Egypt*
7. 4:46 **Real-Time Software Receiver for GPS Controlled Reception Pattern Antenna Array Processing:** Y-H. Chen, *National Cheng Kung University, Taiwan;* S. Ramakrishnan, D.S. De Lorenzo, *Stanford University, USA;* J-C. Juang, *National Cheng Kung University, Taiwan;* P. Enge, *Stanford University*
8. 5:08 **The GPS Assimilator: A Method for Upgrading Existing GPS User Equipment to Improve Accuracy, Robustness, and Resistance to Spoofing:** T. Humphreys, J. Bhatti, *The University of Texas at Austin;* B. Ledvina, *Coherent Navigation*

Alternates

1. **Batch Processing for Efficient Base-Band Operations in Real-time GNSS Software Receivers:** G. Waelchli, M. Baracchi-Frei, C. Botteron, P-A. Farine, *Ecole Polytechnique Féderale Lausanne, Switzerland*
2. **Design and Capability Analyze of High Dynamic Carrier Tracking Loop Based on UKF:** S. Han, X. Chen, W-X. Meng, *Harbin Institute of Technology, China*
3. **Development of a Dual Frequency Software-based GNSS Receiver:** P. Berglez, J. Seybold, *TeleConsult Austria GmbH, Austria;* B. Geiger, M. Soudan, C. Vogel, C. Abart, A.P. Singh, B. Hofmann-Wellenhof, *Graz University of Technology, Austria*

Room A107-109
Session C4: 1:45 p.m. – 5:30 p.m.

GNSS Space Based Augmentation Systems (SBAS)

Laurent Azoulai, *Airbus, France*

Dr. John Studenny, *CMC Electronics, Inc., Canada*

1. 1:50 **PRN1/SVN049 L5 Payload Drawback and PRN27 Outage on the 30th of June 2009: GNSS Receiver Reactions and Lessons Learnt:** N. Suard, *Centre National d'Etudes Spatiales, France*
2. 2:12 **The EGNOS Services Provision within the Single European Sky - The Start of the Safety-of-Life Services:** J. De Blas, *ESSP SAS, Spain*
3. 2:35 **The EGNOS Service to Provide Ground Based Access to EGNOS: EDAS Beta Test Findings:** R. Blasi, *European GNSS Supervisory Authority, GSA, Belgium;* A.J. Gavin Alarcon, J. Yarza Garagorri, *GMV, Spain;* F.J. Jimenez Roncero, J.R. Lopez Perez, *AENA, Spain;* D. De Greef, *ESSP;* M. Pesce, *VVA Consulting*
4. 2:58 **SACCSA - SBAS in CAR/SAM Region: Feasibility Analysis:** A. Cezón, M. Cueto, I. Hidalgo, *GMV, Spain;* L. Andrada, *AENA, Spain*

3:25-3:55 Break, Refreshments in Exhibit Hall

5. 4:00 **Kriging as a Means of Improving WAAS Availability:** L. Sparks, *Jet Propulsion Laboratory California Institute of Technology;* J. Blanch, *Stanford University*
6. 4:23 **WAAS Offline Monitoring:** S. Gordon, C. Sherrell, *Federal Aviation Administration;* B.J. Potter, *ASRC*
7. 4:46 **Vertical Protection Level Equations for Dual Frequency SBAS:** T. Walter, J. Blanch, P. Enge, *Stanford University*
8. 5:08 **Canadian WAAS Performance Investigation for Disturbed Ionospheric Conditions:** O. Haddad, O. al-Fanek, S. Skone, *University of Calgary, Canada*

Alternates

1. **Computing SBAS Protection Levels with Consideration of All Active Messages:** T. Sakai, K. Matsunaga, K. Hoshinoo, *Electronic Navigation Research Institute, Japan;* T. Walter, *Stanford University*
2. **The Role of the ESSP in Monitoring EGNOS Performance:** S.C.E. Lacarra, R. Roldán, *ESSP SAS, Spain*
3. **Prediction of SBAS Integrity Performance using PORIMA Algorithm:** H. Su, W. Ehret, *Thales ATM GmbH, Germany*
4. **Expected Performance of Single and Dual Frequency SBAS:** T. Sakai, K. Matsunaga, K. Hoshinoo, *Electronic Navigation Research Institute, Japan;* T. Walter, *Stanford University*

Room B117-119
Session D4a: 1:45 p.m. – 3:25 p.m.
Marine Navigation

Dr. David Dodd, *University of New Brunswick, Canada*

Dr. Gene Terray, *Woods Hole Oceanographic Institution*

1. 1:50 **Seabed Mapping on an Earth Centered Earth Fixed (ECEF) Geocentric Reference Frame. Cooperative Validation with the US Navy and Brazilian Navy in Guanabara Bay, Rio de Janeiro:** A.M. Oliveira Jr, *Brazilian Directorate of Hydrography and Navigation and Universidade Federal Fluminense, Brazil;* E.N. Arroyo-Suarez, *U.S. Naval Oceanographic Office, Brazil;* A.M. Ramos, M.F.R. Arentz, *Brazilian Directorate of Hydrography and Navigation, Brazil*
2. 2:12 **Tidal Datum Determination and VDatum Evaluation with a GNSS Buoy:** B. Hocker, *David Evans and Associates, Inc.;* N. Wardwell, *John Oswald and Associates, Inc.*
3. 2:35 **A Primary Research and Practice to Determine Tide Height using PPP and Satellite Altimeter:** X. Luo, J. Gao, X. Jin, Z. Wu, *The Second Institute of Oceanography, China*
4. 2:58 **Achieving Precise Navigation in a GPS Denied Littoral Environment using 3-D Sonar and Feature Extraction Algorithms:** W.R. Woodward, R. Webb, *UrsaNav, Inc.;* J.N. Markiel, *The Ohio State University*

Alternates

1. **Collaborative Underwater Navigation Based on Integration of Acoustic and IMU Measurements:** D.A. Grejner-Brzezinska, *The Ohio State University;* W.J. Deninger, D.J. Medley, *Yotta Navigation Corporation*
2. **Monitoring the Performance of GNSS and its Augmentations:** M. De Voy, A. Grant, N. Ward, M. Bransby, *General Lighthouse Authorities of the United Kingdom and Ireland*

3:25-3:55 Break, Refreshments in Exhibit Hall

Room B117-119
Session D4b: 3:55 p.m. – 5:30 p.m.
Timing & Scientific Applications

Prof. Richard B. Langley, *University of New Brunswick, Canada*

Dr. Eric Phelps, *MIT Lincoln Laboratory*

1. 4:00 **Four Dimensional RTK Positioning: Algorithms and Performance Analysis of Relative Clock Solutions:** Y. Feng, *Queensland University of Technology, Australia;* B. Li, *Tongji University, China*
2. 4:23 **A Flexible Low-cost Time Synchronizer for GNSS/INS Integration:** G. Du, L. Wang, C. Zhai, X. Zhan, *Shanghai Jiao Tong University, China*
3. 4:46 **The WAAS/L5 Signal for Robust Time Transfer:** D.S. De Lorenzo, S.C. Lo, J. Seo, *Stanford University, USA;* Y-H. Chen, *National Cheng Kung University, Taiwan;* P.K. Enge, *Stanford University, USA*
4. 5:08 **Orbit Determination for the CanX-2 Nanosatellite Using Intermittent GPS Data:** E. Kahr, S. Skone, *University of Calgary, Canada*

Alternate

1. **Analysis of GPS Timing Errors under Limited Sky View Conditions:** S.N. Shankara-Murthy, N. Beechanahalli, S. Gowda, S. Bhaskar, *Accord Software and Systems Pvt. Ltd., India*

Room B110-112
Session E4: 1:45 p.m. – 5:30 p.m.
Integrity Monitoring for Next Generation Applications

Prof. Washington Ochieng, *Imperial College London, UK*

Jean-Christophe Levy, *Thales Alenia Space, France*

1. 1:50 **Autonomous Isotropy-Based Integrity Using GPS and GLONASS:** M. Azaola, D. Calle, C. Moriana, A. Mozo, R. Píriz, *GMV, Spain*
2. 2:12 **Integrity Monitoring for Carrier Phase Ambiguities:** S. Feng, W. Ochieng, *Imperial College London, UK;* J. Samson, M. Tossaint, *ESA ESTEC, The Netherlands;* M. Hernandez-Pajares, J.M. Juan, J. Sanz, A. Aragón-Angel, P. Ramos, *Polytechnic University of Catalonia, Spain;* M. Jofre, *CTAE, Spain*
3. 2:35 **Integrity Assessment of a Maritime Carrier Phase Based GNSS Augmentation System:** D. Minkwitz, S. Schluter, *German Aerospace Center (DLR), Germany*
4. 2:58 **Receiver Autonomous Integrity Monitoring for GPS Attitude Determination with Carrier Phase FD/FDE Algorithms:** X-L. Su, *Shanghai Jiao Tong University, China*

3:25-3:55 Break, Refreshments in Exhibit Hall

5. 4:00 **Optimization of Position Domain Relative RAIM for Weak Geometries:** Y. Jiang, J. Wang, N. Knight, W. Ding, *University of New South Wales, Australia*
6. 4:23 **A Non-Traditional Approach to Analysis of Signal Structure Anomalies Observed in PRN 21:** J. Little, J. York, D. Munton, *ARL, University of Texas*
7. 4:46 **Reliability Estimation for Analyzing and Improving Multi-sensor Multi-network Positioning:** H. Kuusniemi, J. Liu, L. Pei, Y. Chen, R. Chen, *Finnish Geodetic Institute, Finland*
8. 5:08 **Integrity of a Tightly Coupled GPS/DR/DEM System for a Range of Mission Critical ITS Applications:** Y. Zheng, M. Quddus, *Loughborough University, UK*

Alternates

1. **Real-Time Spoofing Detection in a Narrow-Band Civil GPS Receiver:** B.W. O'Hanlon, J.A. Bhatti, T.E. Humphreys, M.L. Psiaki, *Cornell University*
2. **Regional Integrity Monitoring – A Next Generation Monitoring Receiver Prototype:** Th. Lueck, J. Winkel, M. Bodenbach, O. Balbach, N. Falk , E. Goehler, T. Hartmann, A. Naumann, *IFEN GmbH, Germany;* J. C. de Mateo, *ESA, France*
3. **Extended RAIM for Spoofing Detection and Mitigation:** B.M. Ledvina, I. Miller, *Coherent Navigation*
4. **GNSS Integrity - Current Status and Challenges:** W. Chen, X. Ding, *Hong Kong Polytechnic University, Hong Kong*
5. **Evaluation of Direct Signal Cancelation:** C. Stöber, F. Kneißl, D. Dötterböck , T. Pany, B. Eissfeller, *University FAF Munich, Germany*

Room B113-116
Session F4: 1:45 p.m. – 5:30 p.m.
Urban & Indoor Navigation Technology 2

Logan Scott, *Consulting*

Dr. Chris Bartone, *Ohio University*

1. 1:50 **GNSS Positioning Enhancement Based on Statistical Modeling in Urban Environment:** I. Mendoume, M. Charbit, B. Godefroy, J-B. Prost, *Telecom-ParisTech, France*
2. 2:12 **Estimation of Multipath Range Error for Detection of Erroneous Satellites:** T. Iwase, N. Suzuki, *Toyota Central R&D Labs., Japan;* Y. Watanabe, *Denso Corp., Japan*
3. 2:35 **An OFDM Based Indoor GPS Retransmission System:** Y. Guo, R. Horton, P. Coiner, *GPS Source Inc.*
4. 2:58 **Study of Two Sferic Position Location Mechanisms:** D. Qiu, *Sigtem Technology, Inc.;* T. Nguyen, *Air Force Research Laboratory;* C. Yang, *Sigtem Technology, Inc.*

3:25-3:55 Break, Refreshments in Exhibit Hall

5. 4:00 **Non-Linear Position Estimation of Ad-hoc Network Nodes Using Passive Time Difference Measurements:** N. Vo, K. Johnson, *U.S. Army CERDEC*
6. 4:23 **Monocular Localization Using a Gimbaled Laser Range Sensor:** D. J. Yates, M.J. Veth, *Air Force Institute of Technology*
7. 4:46 **Robust Integration of GPS into a Vision-Aided Navigation System for Urban and Indoor Operations:** D. Venable, J. Campbell, *Air Force Research Laboratory;* A. Soloviev, *University of Florida;* J. Kresge, *Air Force Institute of Technology*
8. 5:08 **Modeling Residual Errors of GPS Pseudoranges by Augmenting Kalman Filter with PCI for Tightly-Coupled RISS/GPS Integration:** U. Iqbal, *Queen's University, Canada;* J. Georgy, *Trusted Positioning Inc., Canada;* M.J. Korenberg, *Queen's University, Canada;* A. Noureldin, *Royal Military College of Canada/ Queen's University, Canada*

Alternates

1. **Optical Mouse-Based Odometry and Heading for Indoor Navigation:** B. Brown, *Cedarville University;* K.A. Fisher, *Air Force Institute of Technology*
2. **Evaluation of a Pedestrian Walking Status Awareness Algorithm for a Pedestrian Dead Reckoning:** M.S. Lee, S.H. Shin, C.G. Park, *Seoul National University, South Korea*
3. **Error Analysis of Vision-Based Navigation System Using GPS DOP Concept:** D.H. Won, S. Sung, Y.J. Lee, *Konkuk University, South Korea*

Room A103-104
Session A5: 8:30 a.m. – 12:15 p.m.

Military GPS & Host Applications Integrations for Robust PNT Solutions

Doug Taggart, *Overlook Systems Technologies*

1. 8:35 **Simulation Study of UWB-OFDM SAR for Navigation Using a Kalman Filter:** K. Kauffman, J. Raquet, *Air Force Institute of Technology;* Y. Morton, D. Garmatyuk, *Miami University*
2. 8:57 **PPS Positioning in Weak Signal GPS Environments:** A. Brown, S. Stankevich, B. Johnson, R. Cogburn, *NAVSYS Corporation*
3. 9:20 **A Scaleable Positioning, Navigation, and Timing Gateway for New and Legacy Shipboard Systems:** W.R. Woodward, R. Webb, *UrsaNav, Inc.*
4. 9:43 **Antenna Configurations for a C-Band GNSS:** C. Bartone, *Ohio University;* T. Stansell, *Stansell Consulting*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **The Double IMU Measurement for the Precise UXO Geolocation System:** J.K. Lee, C. Jekeli, *The Ohio State University*
6. 11:03 **NavFire Guidance System — An Integrated Next Generation SAASM GPS Guidance Package for Future Weapons Systems:** W. Trach, J.T. Nielson, *Rockwell Collins, Inc.*
7. 11:26 **Performance of a Next Generation Integrated Multi-Sensor Time-Space Position Information (TSPI) System:** M. Smearcheck, M.J. Veth, *Air Force Institute of Technology*
8. 11:48 **Combining Multiple FRPA for Anti-jam Functionality in GPS Receivers:** I.J. Gupta, T-H. Lee, *The Ohio State University*

Alternates

1. **Self-Calibration of GNSS Antennas on Moving Platforms:** A.J. O'Brien, I.J. Gupta, *The Ohio State University*
2. **Precision RF Ranging as an Aid to Integrated Navigation Systems:** D.W.A. Taylor, B.D. Farnsworth, *ENSCO, Inc.*

Room B110-112
Session B5: 8:30 a.m. – 12:15 p.m.

Precise Point Positioning & Network RTK

Dr. Kyle O'Keefe, *University of Calgary, Canada*

Dr. Donghyun Kim, *University of New Brunswick, Canada*

1. 8:35 **An Alternative Network RTK Approach Based on Undifferenced Observation Corrections:** M. Ge, *German Research Centre for Geosciences, Germany;* X. Zou, Wuhan University, China; G. Dick, *German Research Centre for Geosciences, Germany;* W. Jiang, *Wuhan University, China;* J. Wickert, *German Research Centre, Germany;* J. Liu, *Wuhan University, China*
2. 8:57 **Functional Models of Ordinary Kriging for Medium Range Real-time Kinematic Positioning Based on the Virtual Reference Station Technique:** A.M. Al-Shaery, S. Lim, C. Rizos, *University of New South Wales, Australia*
3. 9:20 **Implementation of Wide-Area Broadcast NRTK on a Communication Satellite Platform:** L. Yang, C. Hill, T. Moore, *The University of Nottingham, UK*
4. 9:43 **Standardising the GLONASS Network RTK Correction Format:** P. Grgich, F. Takac, *Leica Geosystems, Switzerland*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Real-time PPP with Undifferenced Integer Ambiguity Resolution, Experimental Results and Demonstrations:** D. Laurichesse, F. Mercier, J-P. Berthias, *CNES, France*
6. 11:03 **Antenna Rotation and its Effects on Kinematic Precise Point Positioning:** S. Banville, H. Tang, *University of New Brunswick, Canada*
7. 11:26 **Analysis of the Integer Property of Ambiguity and Characteristics of Code and Phase Clocks in PPP using a Decoupled Clock Model:** J. Shi, Y. Gao, *University of Calgary, Canada*
8. 11:48 **Absolute Precise Kinematic Positioning Using GPS and GLONASS:** B.W. Tolman, A.Kerkhoff, D. Rainwater, D. Munton, J. Bank, *Applied Research Laboratories, The University of Texas at Austin*

Alternates

1. **Testing GNSS Network Positioning Based on the Internet — A Case Study in Brazil:** D.B. Marra Alves, J.F. Galera Monico, M.H. Shimabukuro, *Universidade Estadual Paulista, Brazil;* L.F. Sapucci, *CPTEC/INPE, Brazil;* P.S. de Oliveira Junior, *Universidade Estadual Paulista, Brazil*
2. **From Network RTK to Precise Point Positioning with Rapid Ambiguity Resolution: Competitive or Complementary?:** J. Geng, X. Meng, A.H. Dodson, F.N. Teferle, *Institute of Engineering Surveying and Space Geodesy, UK*
3. **A New Method to Design Broadcasting Schedules for Compact-RTK Corrections: Reducing GNSS Temporal Decorrelation Error:** I. Jang, *Korea Aerospace Industries, Ltd., South Korea;* B. Park, J. Song, C. Kee, *Seoul National University, South Korea*
4. **Precise Point Positioning with GPS, GLONASS and GIOVE:** W. Cao, R.B. Langley, M. Santos, L. Urquhart, A. Hauschild, P. Steigenberger, O. Montenbruck, *University of New Brunswick, Canada*
5. **Real-time Corrections for Precise Point Positioning with Ambiguity Resolution in Japan and Surrounding Seas:** Z. Lukes, L. Mervart, C. Rocken, T. Iwabuchi, J. Johnson, *GPS Solutions Inc., USA;* M. Kanzaki, H. Kakimoto, A. Wada, H. Obata; *Nippon GPS Solutions Corp., Japan*

Room A107-109
Session C5: 8:30 a.m. – 12:15 p.m.

GNSS Ground Based Augmentation Systems (GBAS)

Jason Burns, *Federal Aviation Administration*

Matt Harris, *Boeing*

1. 8:35 **Equatorial Plasma Depletions Observed Over Brazil — Impact on Safety Critical GNSS Navigation:** T. Dautermann, C. Mayer, *German Aerospace Center, Germany*
2. 8:57 **Further Validation of GAST D Ionospheric Anomaly Mitigations:** T. Murphy, M. Harris, *Boeing;* S. Pullen, *Stanford University;* S. Saito, *Electronic Navigation Research Institute, Japan*
3. 9:20 **Carrier Phase Ionospheric Gradient Ground Monitor for GBAS with Experimental Validation:** S. Khanafseh, F. Yang, B. Pervan, *Illinois Institute of Technology;* S. Pullen, *Stanford University;* J. Warburton, *William J. Hughes FAA Technical Center*
4. 9:43 **Effects of External Ionosphere Anomaly Monitors on GNSS Augmentation Systems Studied with a Three-dimensional Ionospheric Delay Model — A Study for GBAS:** S. Saito, N. Fujii, *Electronic Navigation Research Institute, Japan*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Ranging Source Fault Detection Performance for Category III GBAS:** M. Brenner, F. Liu *Honeywell*
6. 11:03 **Fault Modeling for GBAS Airworthiness Assessments:** T. Murphy, Boeing; C. Shively, *The MITRE Corporation;* L. Azoulai, *Airbus, France;* M. Brenner, *Honeywell*
7. 11:26 **Long Term Monitoring of Ionospheric Anomalies to Support the Local Area Augmentation System (LAAS):** J. Lee, S. Jung, *Korea Advanced Institute of Science and Technology, South Korea;* S. Pullen, P. Enge, *Stanford University*
8. 11:48 **A Study of Severe Multipath Errors for the Proposed LAAS Airport Surface Movement Application:** Y.S. Park, S. Pullen, P. Enge, *Stanford University*

Alternates

1. **Evaluation of Dual-Frequency GBAS Performance using Data from Public Receiver Networks:** K. Suzuki, *NEC Corporation;* S. Pullen, P. Enge, *Stanford University;* T. Ono, *NEC Corporation*
2. **LAAS Integrity Study Based on Internal Reliability Theory:** Z. Wang, J. Zhang, Y. Zhu, R. Xue, BeiHang University, China
3. **DLR's GBAS Testbed for Future Air Ground Integration:** T. Dautermann, B. Belabbas, M. Rippl, S. Schlueter, V. Wilken, M. Meurer, *German Aerospace Center, Germany*
4. **GBAS Algorithm Performance in the Implementation of the Integrity Monitor Testbed in Taipei Flight Information Region:** S-J. Yeh, H-C. Hsu, A-L. Tao, Y-C. Lin, S-S. Jan, *National Cheng Kung University, Taiwan*
5. **A Study of Nominal Ionospheric Gradient for GBAS (Ground-based Augmentation System) in Japan:** T. Yoshihara, S. Saito, N. Fujii, *Electronic Navigation Research Institute, Japan*

Green text indicates student award winner.

Awards Luncheon, Oregon Ballroom, 12:15 p.m. – 1:45 p.m.

Room A105-106
Session D5: 8:30 a.m. – 12:15 p.m.
Space Applications

Dr. Oliver Montenbruck, *German Aerospace Center, Germany*

Dr. Suneel Sheikh, *ASTER Labs, Inc.*

1. 8:35 **Near Real Time Precise Orbit Determination for Radio Occultation and Altimetry Missions:** Y. Andres, *EDYMAC at EUMETSAT, Germany;* C. Marquardt, P.L. Righetti, *EUMETSAT, Germany*
2. 8:57 **GEO Satellite Positioning Using GPS Collective Detection:** B.K. Bradley, P. Axelrad, *University of Colorado Boulder;* J. Donna, S. Mohiuddin, *Charles Stark Draper Laboratory*
3. 9:20 **Autonomous Orbit Determination for Future GEO and HEO Missions:** J.M. Lorga, P.F. Silva, *DEIMOS Engenharia, Portugal;* F. Dovis, *Politecnico di Torino, Italy;* A. Di Cintio, *Carlo Gavazzi Space, Italy;* R. Jansson, *European Space Agency, The Netherlands*
4. 9:43 **Comparing the Extended and the Sigma Point Kalman Filters for Orbit Determination Modeling Using GPS Measurements:** P.C.P.M. Pardal, H.K. Kuga, *INPE, Brazil;* R. Vilhena de Morales, *UNESP, Brazil*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Study of GPS Reflections and Multipath During Hubble Servicing Mission 4 (STS-125):** R. Shah, M. Walker, J. Voo, J.L. Garrison, P. Stout, K. Pekkarinen, D. LeJeune, *Purdue University*
6. 11:03 **First In-orbit Results of the L2C-L1C/A GPS Receiver on Board the PROBA-2 Microsatellite:** S. Serre, *Thales Alenia Space, France;* F. Mercier, *CNES, France;* A. Garcia, *European Space Agency, The Netherlands;* M. Grondin, CNES, France; C. Boyer, H. Favaro, *Thales Alenia Space, France;* J-L. Gerner, *European Space Agency, The Netherlands;* J-L. Issler, *CNES, France*
7. 11:26 **Optimizing Tracking and Acquisition Capabilities for the CanX-2 Nanosatellite's COTS GPS Receiver in Orbit:** E. Kahr, K. O'Keefe, *University of Calgary, Canada*
8. 11:48 **GNSS-Reflectometry: Techniques for Scatterometric Remote Sensing:** P.J. Jales, *Surrey Space Centre, University of Surrey, UK*

Alternates

1. **Near Real Time Precise Orbit and Clock Determination for GLONASS:** J.P. Weiss, Y. Bar-Sever, W. Bertiger, S.D. Desai, C.M. Lane, L.J. Romans, *Jet Propulsion Laboratory, California Institute of Technology*
2. **Precise Orbit Determination of Spacecraft using GNSS Tracking Data from Multiple Antennas:** D. Kuang, W. Bertiger, S. Desai, B. Haines, *Jet Propulsion Laboratory, California Institute of Technology*
3. **Methods for Managing GPS Data Gaps Onboard Low-Earth-Orbiting Satellites:** M. Mander, S. Bisnath, *York University*
4. **GPS Based Relative Navigation for the TanDEM-X Mission - First Flight Results:** O. Montenbruck, M. Wermuth, R. Kahle, *DLR/GSOC, Germany*

Room B113-116
Session E5: 8:30 a.m. – 12:15 p.m.
Multi-Constellation User Receivers

Peter Grognard, *Septentrio Satellite Navigation, Belgium*

Neil Gerein, *NovAtel, Inc., Canada*

1. 8:35 **Development and Integration of a Robust Signal Tracking Module for the Triple-Frequency Dual-Constellation GAMMA-A Receiver:** C. Mongredien, M. Overbeck, G. Rohmer, M. Schauer, *Fraunhofer IIS, Germany*
2. 8:57 **Results from an Analytical Model for GNSS Receiver Implementation Losses:** C.J. Hegarty, A. Cerruti, *The MITRE Corporation*
3. 9:20 **Adding GLONASS to the GPS/Galileo Consumer Receiver, with Hooks for COMPASS:** P.G. Mattos, *ST Microelectronics R&D Ltd., UK*
4. 9:43 **Investigation of the Benefits of Combined GPS/GLONASS for High Sensitivity Receivers:** C. O'Driscoll, M.E. Tamazin, G. Lachapelle, *University of Calgary, Canada*

10:05-10:35 Break, Refreshments in Exhibit Hall

5. 10:40 **Lessons Learnt: The Development of a Robust Multi-Antenna GNSS Receiver:** M. Cuntz, A. Konovaltsev, M. Heckler, M. Meurer, A. Hornbostel, A. Dreher, *German Aerospace Center, Institute of Communications and Navigation, Germany;* L. Kurz, G. Kappen, T. G. Noll, *EECS RWTH Aachen, Germany*
6. 11:03 **GPS L1C: Enhanced Performance, Receiver Design Suggestions, and Key Contributions:** T. Stansell, *Stansell Consulting;* K. Hudnut, *USGS;* R. Keegan, *Integrated Positioning, LLC*
7. 11:26 **Cooperative multi-GNSS Tracking: A New Approach for Deep Hybridization of Multi-GNSS Signals:** M. Sahmoudi, ISAE, *University of Toulouse, France*
8. 11:48 **Comparison of Massive-Parallel and FFT Based Acquisition Architectures for GNSS-Receivers:** L. Kurz, T. Coenen, T.G. Noll, *RWTH Aachen University, Germany*

Alternates

1. **A USRP2-Based Multi-Constellation and Multi-Frequency GNSS Software Receiver System for Ionosphere Scintillation Studies:** S. Peng, *Virginia Tech;* Y. Morton, *Miami University*
2. **The Optimization of Algorithm and Implementation for Dual-Constellation Navigation Receiver:** T. Ma, X. C.M. Lu, Z. Feng, *Tsinghua University, China*
3. **Design Methodology for a Dual Frequency Configurable GPS Receiver:** M.H. Afzal, G. Lachapelle, *University of Calgary, Canada*

Room B117-119
Session F5: 8:30 a.m. – 12:15 p.m.
Portable Navigation Devices

Dr. Mahesh Chowdhary, *SiRF Technology, Inc./CSR*

Dr. Jari Syrjärinne, *Nokia, Inc., Finland*

1. 8:35 **GLANSER - An Emergency Responder Locator System (ERLS) for Indoor and GPS-Denied Applications:** R. McCroskey, P. Samanant, W. Hawkinson, S. Huseth, R. Hartman, *Honeywell International*
2. 8:57 **Using EGNOS with Standard GPS-equipped Mobile Phones:** F. Boullete, B. Kennes, *European GNSS Supervisory Authority, Belgium*
3. 9:20 **Reliable Real-Time Recognition of Motion Related Human Activities using MEMS Inertial Sensors:** K. Frank, *German Aerospace Center, Germany;* M.J. Vera-Nadales, *University of Malaga, Spain;* P. Robertson, M. Angermann, *German Aerospace Center, Germany*
4. 9:43 **Block Floating Point Arithmetic for Low-Energy GNSS-Receiver PVT-Estimation:** E. Tasdemir, G. Kappen, T.G. Noll, *RWTH Aachen University, Germany*

10:05-10:35 Break, Refreshments in Exhibit Hall

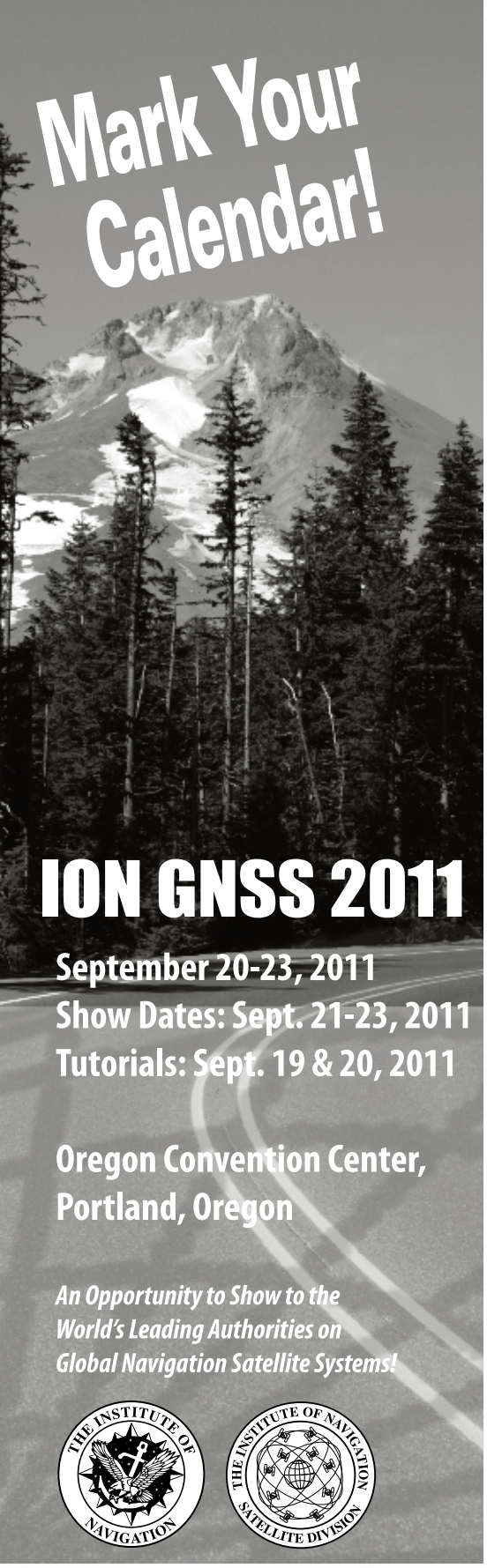
5. 10:40 **GPS Observability and Availability for Varied Antenna Locations Around the Human Body:** B. J. Bancroft, G. Lachapelle, *University of Calgary, Canada*
6. 11:03 **Thermal Vibration's Impacts on A GNSS Receiver in a Wireless Combo Chip:** T-Y. Chiou, C-Y. Lo, S-Y. Huang, S-T. Wu, *MediaTek Inc., Taiwan*
7. 11:26 **On the Development of a High-sensitive GPS/Galileo GNSS ASIC:** E. Göhler, R. Schnieder, J. Winkel, E. Löhnert, *IFEN GmbH, Germany*
8. 11:48 **Opportunistic Frequency Stability Transfer for Extending the Coherence Time of GNSS Receiver Clocks:** K.D. Wesson, K.M. Pesyna, T.E. Humphreys, *The University of Texas at Austin*

Alternates

1. **A Truly Portable, Low-cost, Accurate, Reliable and Infrastructure-free Mobile Navigator for Urban and Indoor Navigation:** C. Goodall, *Trusted Positioning Inc., Canada;* N. El-Sheimy, *University of Calgary, Canada*
2. **Time Signal Assisted GPS Receiver for Mobile Devices:** C. Kandziora, R. Weigel, *Friedrich-Alexander University, Germany*
3. **An Innovative Self-generated Assistance Technology for a High Sensitivity GPS Mobile Phone:** K-S. Huang, *MediaTek, Taiwan*
4. **Novel Embeded GPS User Antenna:** M. Lange, *The Aerospace Corporation*
5. **Development and Investigation of Real-time Hybrid Navigation System Using a DCM Based Integration Method:** J. Zhang, E. Edwan, J. Zhou, O. Loffeld, ZESS, *University of Siegen, Germany*

Green text indicates student award winner.

Awards Luncheon, Oregon Ballroom, 12:15 p.m. – 1:45 p.m.



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Room B110-112
Session B6: 1:45 p.m. – 4:50 p.m.

Statistical Signal Processing

Dr. Sanjeev Gunawardena, *Ohio University*

Dr. Sean McKenna, *The MITRE Corporation*

1. 1:50 **Performance Analysis of Collective Detection of Weak GPS Signals:** B.K. Bradley, P. Axelrad, *University of Colorado Boulder*; J. Donna, S. Mohiuddin, *C.S. Draper Laboratory*
2. 2:12 **A High Performance Code and Carrier Tracking Architecture For Ground-Based Mobile GNSS Receivers:** L.R. Weill, *Magellan Systems, Japan/ California State University*
3. 2:35 **Indoor Doppler Measurements and Velocity Characterization Using a Reference-Rover Software Receiver:** B. Aminian, V. Renaudin, D. Borio, G. Lachapelle, *University of Calgary, Canada*
4. 2:58 **Generalized Differential Signal Processing for Combined L1/L2C Acquistion:** T.H. Ta, *Politecnico di Torino, Italy*; M. Pini, *Istituto Superiore Mario Boella, Italy*; L. Lo Presti, *Politecnico di Torino, Italy*
5. 3:20 **Robust Post Detection Integration Techniques for GNSS Signal Detection:** J. Chandrasekhar, *Accord Software and Systems Pvt. Ltd., India*; C.R. Murthy, *Indian Institute of Science, India*
6. 3:42 **Extreme Value Theory based Integrity Monitoring for GNSS Augmentation Systems:** R. Xue, J. Zhang, Y. Zhu, *Beihang University, China*
7. 4:04 **Use of Neural Network for the Improvement of Particle Filter Performance in INS/GPS Integrated Navigation System During GPS Signal Outages:** A. Lee, *Program Management Office NAVY*
8. 4:26 **A Statistical-Based Ionosphere Scintillation Signal Simulation Model and A Variable Gain Adaptive Kalman Filter-Based Carrier Tracking Algorithm:** L. Zhang, *Beijing Institute of Technology, China/Miami University*; Y. Morton, *Miami University*

Alternates

1. **Gaussian Sum Filters and their Applications to GNSS/INS Integrated Algorithms:** T. Ishikawa, N. Munetomo, S. Higuchi, Y. Matsunaga, Y. Kubo, S. Sugimoto, *Ritsumeikan University, Japan*
2. **A Two Steps Differentially Coherent Acquisition of GNSS Weak Signals in Presence of Bit Sign Transitions:** K. Sun, *Politecnico di Torino, Italy*

Room A107-109
Session C6: 1:45 p.m. – 4:50 p.m.

Next Generation GNSS Integrity for Aviation

Deane Bunce, *Federal Aviation Administration*

Dr. Todd Walter, *Stanford University*

1. 1:50 **GPS Signal-in-Space Anomalies in the Last Decade:** L. Heng, G.X. Gao, T. Walter, P. Enge, *Stanford Univeristy*
2. 2:12 **Independent Control Segment URA Monitor for GPS IIIC With Application to LPV200 Integrity Requirements:** R. Braff, B. Bian, C. Shively, *The MITRE Corporation/CAASD*
3. 2:35 **Measuring Digital Signal Deformations on GNSS Signals:** G. Wong, R.E. Phelts, P. Enge, *Stanford University*
4. 2:58 **The European Global Safety of Life and Category I Precision Approach:** J. Daubrawa, H.L. Trautenberg, *EADS Astrium GmbH, Germany*
5. 3:20 **Integrity Analysis of Vector Tracking Architecture:** S. Bhattacharyya, D. Gebre-Egziabher, *University of Minnesota, Twin Cities*
6. 3:42 **Sequential Residual-Based RAIM:** M. Joerger, B. Pervan, *Illinois Institute of Technology*
7. 4:04 **A Practical Approach to RAIM-based Fault-Tolerant Position Estimation:** F-C. Chan, B. Pervan, *Illinois Institute of Technology*
8. 4:26 **Maximising LPV-200 Availability: An Application of the Ideal Protection Level to Absolute RAIM (ARAIM):** C.D. Milner, W.Y. Ochieng, *Imperial College London, UK*

Alternates

1. **On-Board Signal Integrity for GPS:** M.A. Weiss, *NIST Time and Frequency Division;* R. Beard, *Naval Research Laboratory;* P. Shone, *Federal Aviation Administration*
2. **Transforming Flight in the National Airspace System (NAS) of the United States: How Operational Changes are Realized to Meet Future Demand within the NAS:** S.L. Frodge, B. Holguin, *Federal Aviation Administration*
3. **Development of a Portable WAAS Data Acquisition Tool for Fixed and Rotary Wing Data Gathering:** Y-R. Huang, B. Douglas, J. Fagan, *The University of Oklahoma*
4. **New Integrity Concept and Performance Analysis of a GNSS/Radio Altimeter Integration for CAT-II/III Final Approach and Landing:** M. Felux, B. Braun, *German Aerospace Center, Germany*

Although there is no scheduled break, refreshments will be available from 3:00 p.m. – 3:30 p.m. in the first floor meeting room foyers.

PANEL DISCUSSION • The Use of GNSS in Emergency Services • See page 7

Room A103-104
Session D6: 1:45 p.m. – 4:50 p.m.

GNSS Algorithms & Methods 2

Dr. Alex Cerruti, *The MITRE Corporation*

Dr. Gonzalo Seco Granados, *Autonomous University of Barcelona, Spain*

1. 1:50 **A Modelled Eigenstructure Based Antenna Array Calibration Algorithm for GPS:** Z. Xu, M. Trinkle, D.A. Gray, *University of Adelaide, Australia*
2. 2:12 **Novel Calibration of Adaptive GNSS Antenna:** M. Cuntz, M. Meurer, *German Aerospace Center, Germany*
3. 2:35 **Design and Testing of an Intelligent GPS Tracking Loop for Noise Reduction and High Dynamics Applications:** A.M.M. Kamel Saeed, *University of Calgary, Canada*
4. 2:58 **PLL Phase Jitter Analysis and Minimisation:** F.A. Khan, A.G. Dempster, C. Rizos, *University of New South Wales, Australia*
5. 3:20 **Generalized Discriminator and its Applications in GNSS Signal Tracking:** J-C. Juang, T-L. Kao, *National Cheng Kung University, Taiwan*
6. 3:42 **GNSS Signal Tracking using a Bank of Correlators:** K.Q.Z. Chiang, M.L. Psiaki, *Cornell University*
7. 4:04 **A Novel Decision Directed Kalman Filter to Improve RTK Performance:** G. Van Meerbergen, A. Simsky, F. Boon, *Septentrio, Belgium*
8. 4:26 **An Open Loop Aided PLL for Post Processing GPS Signals under Ionosphere Scintillation Condition:** X. Mao, Y. Morton, L. Zhang, *Miami University*

Alternates

1. **On the Averaging Correlation for Satellite Acquisition in Software Defined Radio Receivers:** M. Soudan, B. Geiger, *Graz University of Technology, Austria*
2. **A FFT-Based Space-Differential Cooperative Algorithm for In-phase and Orthogonal Data/ Pilot Signal Acquisition:** Q. Wan, W. Meng, S. Han, *Harbin Institute of Technology, China*
3. **Implementation, Test and Validation of a Vector-Tracking-Loop with the ipex Software Receiver:** J-H. Won, B. Eissfeller, *University FAF Munich, Germany*
4. **A New Threshold Setting Method of GNSS Signal Acquisition under Near-Far Situation:** Y. Liu, J. Tian, Q. Honglei, *BeiHang University, China*

Green text indicates student award winner.

Room A105-106
Session E6: 1:45 p.m. –4:50 p.m.

Galileo System Design & Services, GPS/Galileo Interoperability

Stefano Binda, *ESA/ESTEC, The Netherlands*

Dr. Christoph Günther, *German Aerospace Center, Germany*

1. 1:50 **Galileo System Performances through Incremental Deployment and Early Service Demonstration:** D. Blonski, J. Hahn, *European Space Agency, The Netherlands;* V. Oehler, J.M. Krueger, J. Daubrawa, M.Kirchner, *EADS Astrium GmbH, Germany*
2. 2:12 **Impact on GMS Performance Derived from GIOVE Experimentations:** F. Bauer, *Thales Alenia Space, France;* V. Borrel, *EADS Astrium, Germany;* J. Giraud, C. Bourga, *Thales Alenia Space, France;* M. Crisci, M. Gestido, *ESTEC, The Netherlands*
3. 2:35 **GIOVE Experimentation Results for Galileo System Performance Simulations:** R. Braun, M. Kirchner, T. Beck, J. Daubrawa, J. Krüger, D. Oskam, V. Oehler, *EADS Astrium, Germany;* P. Waller, J. Hahn, D. Blonski, *ESA, The Netherlands*
4. 2:58 **Long Term and Multi-Receiver GPS/GIOVE Mixed PVT Experimentation:** B. Bonhoure, C. Boulanger, J. Marechal, *CNES, France*
5. 3:20 **Testing the TUR — A Performance Report on Septentrio's Galileo Test User Receiver:** R.J.P. van Bree, C.C.J.M. Tiberius, *Delft University of Technology, The Netherlands;* A. van den Berg, J.M. Sleewaegen, Septentrio Satellite Navigation, Belgium; R. Morgan-Owen, *European Space Agency, The Netherlands*
6. 3:42 **Performance Evaluation of Single Antenna Interference Suppression Techniques on Galileo Signals using Real-time GNSS Software Receiver:** A. Sicramaz Ayaz, R. Bauernfeind, *University FAF Munich, Germany;* J.G. Jang, LG Electronics, South Korea; *I. Kraemer, University FAF, Munich, Germany;* T. Pany, *Ifen, GmbH, Germany;* B. Eissfeller, *University FAF Munich, Germany*
7. 4:04 **In-Orbit Analysis of Antenna Pattern Anomalies of GNSS Satellites:** S. Thoelert, S. Erker, M. Meurer, *German Aerospace Center, Germany*
8. 4:26 **S-Band Signal Design Considering Interoperability and Spectral Separation:** J-J. Floch, *EADS Astrium, Germany;* F. Antreich, M. Meurer, *German Aerospace Center, Germany*

Alternates

1. **Galileo Ground Mission Segment Operations: From Design to Implementation:** E.F. van der Wenden, *ESA Galileo Project Office, The Netherlands;* M. Baguhl, *Thales ATM GmbH, Germany;* B.kl. Schlarmann, *ESA Galileo Project Office, The Netherlands*
2. **Galileo Performance Monitoring: The GIOVE Experience:** G. Galluzzo, *VEGA-SELEX Systems Integration Plc, UK/University of Glasgow, UK;* A. Hedqvist, R. Swinden, *VEGA- SELEX Systems Integration Plc, UK;* F. Gonzalez, J.P. Boyero, S. Binda, *European Space Agency/ESTEC, The Netherlands;* G. Radice, *University of Glasgow, UK*
3. **Upgraded GIOVE Experimentation Setup: Paving the Way for Galileo IOV:** G. Tobias, C. Garcia, A. Mozo, D. Rodriguez, *GMV, Spain*

Room B117-119
Session F6: 1:45 p.m. – 3:20 p.m.

Urban & Indoor Navigation Technology 3

Dr. Richard Klukas, *University of British Columbia Okanagan, Canada*

Dr. William R. Michalson, *Worcester Polytechnic Institute*

1. 1:50 **Dead-reckoning Aided RSSI Based Positioning System for Dynamic Indoor Environment:** W-W. Kao, *National Taiwan University of Science and Technology, Taiwan*
2. 2:12 **Motion Recognition Assisted Indoor Wireless Navigation on a Mobile Phone:** L. Pei, R. Chen, J. Liu, W. Chen, H. Kuusniemi, T. Tenhunen, T. Kröger, Y. Chen, *Finnish Geodetic Institute, Finland;* H. Leppäkoski, J. Takala, *Tampere University of Technology, Finland*
3. 2:35 **Accurate Mapping of Wi-Fi Access Point Location For Indoor Positioning:** R.M. Sabri, T. Arslan, *University of Edinburgh, UK*
4. 2:58 **Network-Based Collaborative Navigation for Ground-Based Users in GPS-Challenged Environments:** J.K. Lee, C. Toth, D.A. Grejner-Brzezinska, *The Ohio State University*

Alternates

1. **Active RFID Indoor Positioning and Navigation Based on Probability Method:** H. Tang, D. Kim, *University of New Brunswick, Canada*
2. **Development of a Tightly Coupled Wireless Acoustic Sensor Network Aided Inertial Navigation System for Indoor Navigation:** N. Baine, P. Desai, K.S. Rattan, *Wright State University*

Although there is no scheduled break, refreshments will be available from 3:00 p.m. – 3:30 p.m. in the first floor meeting room foyers.

Special Events & Programs

Wednesday, September 22

12:15 p.m. – 1:15 p.m., Exhibit Hall

Luncheon in the Exhibit Hall

This event is included with any type of conference registration. *See registration desk on-site to purchase tickets for guests.*

7:00 p.m. – 9:00 p.m., Exhibit Hall

Exhibitor Hosted Reception

Join this year's exhibitors as they host a social evening of information and cuisine. All exhibit booths will be open. Take this opportunity to review developments in GNSS technology, talk shop, get the specifics directly from the vendors, and learn about what has been happening in the GNSS marketplace during the past year. *This event is included with any type of registration. Spouses and traveling companions 21 and older are welcome.*

Thursday, September 23

12:15 p.m. – 1:15 p.m.

Luncheon in the Exhibit Hall

This event is included with any type of conference registration. *See registration desk on-site to purchase tickets for guests.*

Friday, September 24

12:15 p.m. – 1:45 p.m., Oregon Ballroom

Johannes Kepler & Bradford W. Parkinson Awards Luncheon

The coveted Johannes Kepler and Bradford W. Parkinson Awards will be presented at the ION GNSS awards luncheon.

The purpose of the Kepler Award is to honor an individual for sustained and significant contributions to the development of satellite navigation. All members of the ION are eligible. Please submit names for consideration with a supporting letter to the Satellite Division Awards Committee Chair via e-mail at meetings@ion.org or by fax at 1-703-366-2724 prior to June 30.

The Bradford W. Parkinson Award, which honors Dr. Parkinson for his leadership in establishing both the U.S. Global Positioning System and the Satellite Division of The Institute of Navigation, is given to an outstanding graduate student in the field of Global Navigation Satellite Systems. The award includes a personalized plaque and a $2,500 honorarium.

Any graduate student who is an ION member and is completing a degree program with an emphasis on GNSS technology, applications, or policy is eligible. Applications must be received by June 30. See **www.ion.org** for application requirements.

This event is included with a full conference registration. Tickets for partial registrants and guests may be purchased using the registration form in this program or by visiting the ION registration desk on-site.

Conference Information

Convention Center & Parking

The convention will be held at the Oregon Convention Center, 777 NE Martin Luther King Blvd., Portland, OR, 97212. Underground parking is currently available for $8 per day.

Transportation to the Airport

Taxi fare from the airport to downtown is approximately $50 each way.

MAX Light Rail: Portland's MAX light rail system connects the airport to all downtown hotels, The Oregon Convention Center and many tourist attractions. It is cheap, convenient, fast and easy to use. See map on page 2.

MAX Light Rail from the Airport to Downtown Hotels: Follow the light rail signs in the airport's baggage claim to the MAX Red Line. At the end of the terminal, just before you exit, you will find a wall mounted ticket machine. Ticket machines accept cash and credit cards. MAX ticket fare from the airport to all convention hotels is $2.30. You will find the light rail just outside the doors. MAX departs every 12-20 minutes Monday through Friday and every 14-28 minutes on Saturday and Sunday.

MAX Light Rail from Hotels to the Oregon Convention Center: The convention center is located across the street from MAX's Convention Center stop. Both the Red Line and the Blue Line run between the hotels and the convention center. Trains depart every 6-8 minutes from the Pioneer Square downtown stop and from the Convention Center stop. MAX is FREE in the downtown zone and easy to use.

Customize Your Conference Schedule

Once you are registered for the conference, visit the ION web site to build a customized schedule of conference papers you wish to attend. Visit the ION GNSS program at www.ion.org for details.

Session Papers Online

Registered attendees may download copies of session papers online for FREE. To access ION conference papers go to **http://www.ion.org/gnss2010** and follow the instructions. Access is only available to attendees who have a FULL REGISTRATION for the technical conference. Those who pre-registered for the conference will find their Registration ID on the back of their conference name badge.

Conference Proceedings

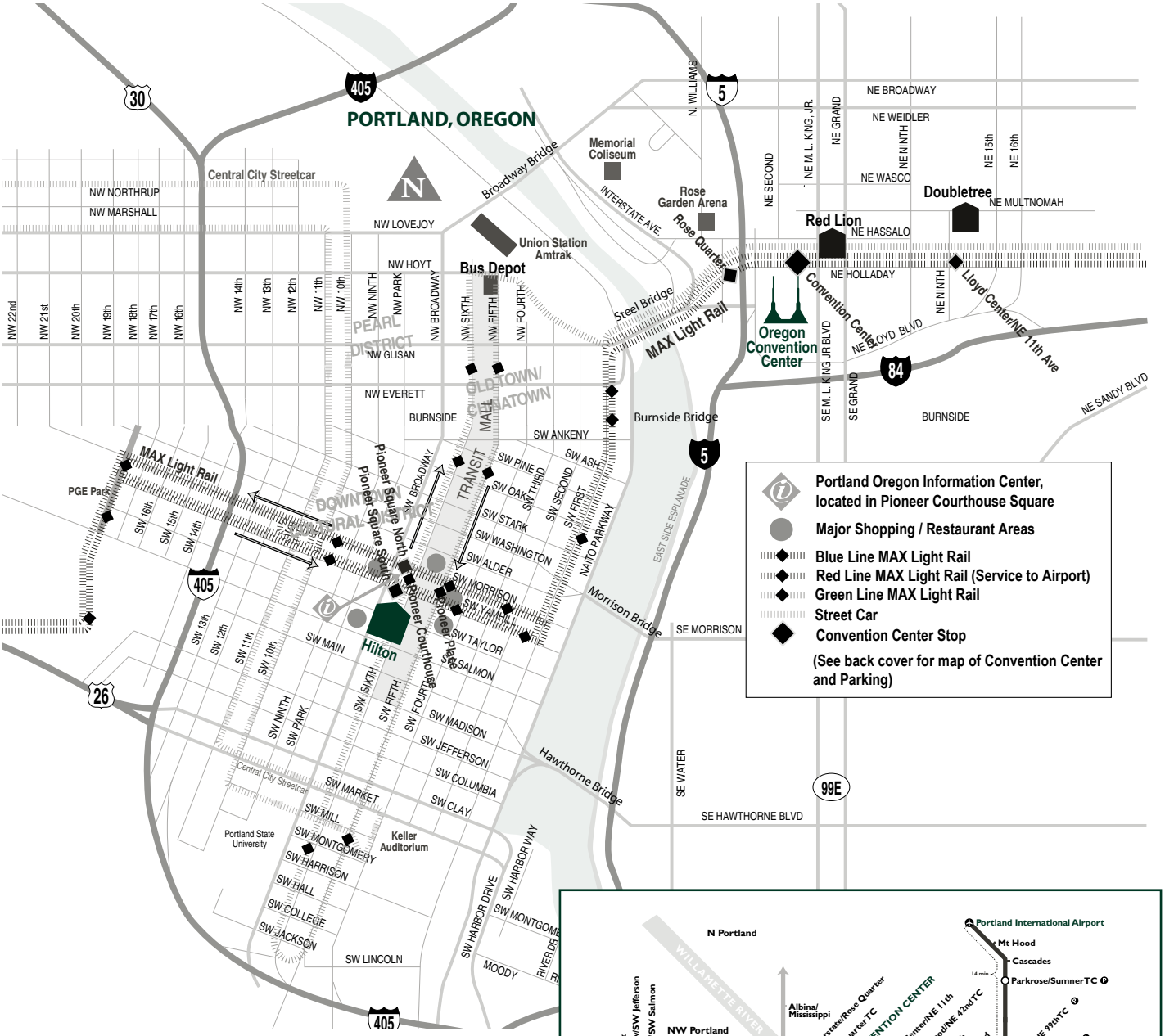
Official conference proceedings are scheduled for distribution in December to all eligible conference participants.

Other Services

An Internet Center will be provided at the Convention Center where you may send and retrieve e-mail.

A baggage/coat check will be offered in the registration area.

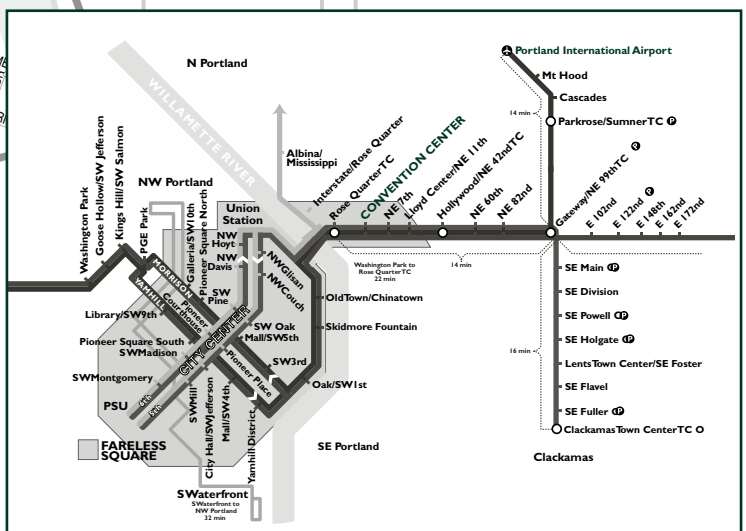
A job board will be available to post job openings.



Getting Around Portland

Getting around Portland is quick and easy, especially with MAX – Portland's light rail system. MAX connects Portland's downtown area (Hilton Hotel) to the Oregon Convention Center (OCC) and to the Portland International Airport. All MAX trains running between the OCC and downtown are FREE of charge. With MAX light rail service to the airport, meeting participants can connect directly to their flights from the convention center.

From the Airport: Follow the light rail signs in the airport's baggage claim to the MAX RED LINE. At the end of the terminal, just before you exit, you will find a wall mounted ticket machine. There are easy to follow instructions on the machine. MAX ticket fare from the airport to all convention hotels is $2.30. Ticket machines accept cash and credit cards. You will find a waiting light-rail car just outside the doors. MAX cars depart the airport every 12–20 minutes Monday through Friday (depending on the time of day) and every 14–28 minutes on Saturday & Sunday.



MAX Light-Rail System

From the Airport to Your Hotel

HOTEL	MAX STOP	TRANSIT TIME
Hilton	Pioneer Square	43 minutes
Doubletree	Lloyd Center/NE 11th Ave.	27 minutes
Red Lion	Convention Center	28 minutes

Oregon Convention Center

Exhibit Hours:

Wednesday, September 22:	**10:00 a.m. – 4:00 p.m. and 7:00 p.m. – 9:00 p.m.**
Thursday, September 23:	**9:00 a.m. – 5:00 p.m.**
Friday, September 24:	**9:00 a.m. – 12:00 p.m.**

SPONSOR THE ION's MINI-URBAN CHALLENGE

For information on sponsorship opportunities please contact:

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The Institute of Navigation
8551 Rixlew Lane, Suite 360
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Phone: 703-366-2723
Fax: 703-366-2724

E-mail: Lbeaty@ion.org

"Sponsoring the ION's Mini-Urban Challenge positions us as a leader in helping to shape and attract the next generation of talent."

Dr. Mikel Miller, AFRL

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Santa Clara, CA 95050
Phone: (408) 572-1103
Fax: (408) 572-1199
Web: www.ashtech.com
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Fax: (514) 842-7573
Web: www.averna.com
Booth: 318

Bavaria, Invest in Bavaria
U.S. Office for Economic Development
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Fax: (415) 362-1030
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Winchfield, Hampshire RG27 8BT UNITED KINGDOM
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FAA Global Navigation Satellite System Office
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Fax: (703) 465-9158
Web: http://gps.faa.gov
Booth: 620

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Booth: L

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201 Sandpointe Avenue, Suite 500
Santa Ana, CA 92707
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Fax: (714) 338-6717
Web: www.gpsworld.com
Booth: 217/219

GRACE (GNSS Research & Applications Centre of Excellence)
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Fax: +44 115 823 2330
Web: www.grace.ac.uk
Booth: 221

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Fax: (403) 259-8866
Web: www.hemispheregps.com
Booth: 617/619

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InterSense, Inc.
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Web: www.gdgps.net
Booth: 523

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Booth: 417/419

Lockheed Martin
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Denver, CO 80201
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Web: http://www.munich-satellite-navigation-summit.org/iongnss.php
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Fax: (310) 381-2001
Web: www.navcomtech.com
Booth: 720

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Fax: +86 10-8318-5859
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Booth: 323

Omnistar, Inc.
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Fax: (713) 785-5164
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Booth: 421

Overlook Systems Technologies, Inc.
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Vienna, VA 22182
Phone: (703) 972-4371
Fax: (703) 356-9029
Web: www.overlooksys.com
Booth: 722

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Booth: 717/719

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Fax: (512) 238-1135
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Booth: 622

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ATIA, MOHAMED	QUEENS UNIVERSITY	CANADA
AULD, JONATHAN	NOVATEL, INC.	CANADA
AVERIN, SERGEY	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
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BENSHOOF, PAUL	746TH TEST SQUADRON	HOLLOMAN AFB, NM
BENTLEY, ROBIN	COMDEV INC	CAMBRIDGE, ON
BERGLUND, MARK	JOINT NAVIGATION WARFARE CENTER	ALBUQUERQUE, NM
BERMAN, ZEEV	BERMAN CONSULTING & TRAINING LTD	ISRAEL
BERSTIS, KNUTE	NATIONAL COORDINATION OFFICE	SILVER SPRING, MD
BERTIGER, WILLIAM	JET PROPULSION LABORATORY	PASADENA, CA
BÉRUBÉ, MARIO	NATURAL RESOURCES CANADA	CANADA
BETZ, JOHN	THE MITRE CORPORATION	BEDFORD, MA
BEVLY, DAVID	AUBURN UNIVERSITY	AUBURN, AL
BHARADRRAJ, RISHI	PCTEL	BLOOMINGTON, IL
BHATIA, PAUL	GRACE	ITALY
BHATTACHARYYA, SUSMITA	UNIVERSITY OF MN	MINNEAPOLIS, MN
BHATTI, JAHSHAN	THE UNIVERSITY OF TEXAS AT AUSTIN	AUSTIN, TX
BILICH, ANDRIA	NATIONAL GEODETIC SURVEY / NOAA	BOULDER, CO
BINDA, STEFANO	EUROPEAN SPACE AGENCY	NETHERLANDS
BIRON, ANNIE	CANADIAN HYDROGRAPHIC SERVICE-QUEBEC	CANADA
BISNATH, SUNIL	YORK UNIVERSITY	CANADA
BLACKWELL, JULIANA	DEPT. OF COMMERCE/NOAA	SILVER SPRING, MD
BLANCH, JUAN	STANFORD UNIVERSITY	STANFORD, CA
BLANCO-LOSADA, CAROLYN	NAVTECHGPS	SPRINGFIELD, VA
BOEHM, DOUG	US NAVAL RESEARCH LABORATORY	WASHINGTON, DC
BONHOURE, BERNARD	CNES	FRANCE
BOOTH, JANET	THE BOEING COMPANY	SEATTLE, WA
BORIO, DANIELE	UNIVERSITY OF CALGARY	ITALY
BORRE, KAI	AALBORG UNIVERSITY	DENMARK
BOSCO, MICHEL	EUROPEAN COMMISSION	BELGIUM
BOUDREAU, HANK	TOPCON	BRIDGEWATER, MA
BOULLETE, FRANCOIS	GSA	BELGIUM
BOUREKAS, PHIL	SYMMETRICOM	SAN JOSE, CA
BOURGA, CHRISTOPHE	THALES ALENIA SPACE	FRANCE
BOUSHELL, SCOTT	SPACE-BASED PNT NCO	WASHINGTON, DC
BOUVET, DENIS	SAGEM DEFENSE ET SECURITE	FRANCE
BOWERS, MICHAEL	FAA, FLIGHT STANDARDS DIVISION	ANCHORAGE, AK
BOYER, DEREK	L3 INTERSTATE ELECTRONICS CORPORATION	ANAHEIM, CA
BOYNTON, FRANCK	NavtechGPS	SPRINGFIELD, VA
BRAASCH, MICHAEL	OHIO UNIVERSITY	ATHENS, OH
BRABEE, JOE	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
BRANDON, AMANDA	746TH TEST SQUADRON	HOLLOMAN AFB, NM
BRAUN, ROLAND	EADS ASTRIUM GMBH	GERMANY
BRENNER, MATS	HONEYWELL INT'L	MINNEAPOLIS, MN
BREWER, JAMES	746TH TEST SQUADRON	HOLLOMAN AFB, NM
BRIGGS, GRAHAM	TRIMBLE NAVIGATION	CORVALLIS, OR
BRIMBERRY, MICHAEL	BOOZ ALLEN HAMILTON, INC.	COLORADO SPRINGS, CO
BROADBENT, DAVID	NATIONAL INSTRUMENTS	AUSTIN, TX
BRONSON, RICHARD	CSR/SIRF	SAN JOSE, CA
BROUMANDAN, ALI	UNIVERSITY OF CALGARY	CANADA
BROWN, HARRY	THE BOEING COMPANY	HUNTINGTON BEACH, CA
BRUMFIELD, KEVIN	NGA	ARNOLD, MO
BRUNER, PHIL	NORTHROP GRUMMAN- NAV SYSTEMS DIV	WOODLAND HILLS, CA
BRZEZINSKA, DOROTA	THE OHIO STATE UNIVERSITY	COLUMBUS, OH
BUNCE, DEANE	FEDERAL AVIATION ADMINISTRATION	FREDERICK, MD
BURGETT, SCOTT	GARMIN INTERNATIONAL	OLATHE, KS
BURNS, JASON	FAA	WASHINGTON, DC
BURSTON, ROBERT	ROYAL OBSERVATORY OF BELGIUM	BELGIUM
BÜSING, HANS-GEORG	INS. OF FLIGHT GUIDANCE, TU BRAUNSCHWEIG	GERMANY
BUST, GARY	ASTRA	LA CONNER, WA
BUTLER, LEISA	SPECTRACOM	PETALUMA, CA
CAIN, JIMMY	CAIN & BARNES, LP	HOUSTON, TX
CALDERWOOD-FORESTER, ROBERTA	SAIC	BOSQUE FARMS, NM
CAMERON, ALAN	GPS WORLD MAGAZINE	SANTE ANA, CA
CAMPAGNE, PASCAL	GALILEO SERVICES / FDC	FRANCE
CAMPBELL, JENNIFER	INNOVATIVE SOLUTIONS INTERNATIONAL	VIENNA, VA
CARO, JOSE	GMV	SPAIN
CARRANO, CHARLES	BOSTON COLLEGE	CHESTNUT HILL, MA
CARROLL, BRENT	U.S. COAST GUARD C2CEN	PORTSMOUTH, VA
CASEY, GEORGE	GPS WORLD	CLEVELAND, OH
CASTAGNETTI, CRISTINA	UNIVERSITY OF MODENA AND REGGIO EMILIA	ITALY
CASTRO, HELENA	LOGICA	NETHERLANDS
CATMUR, RICHARD	SPIRENT COMMUNICATIONS	UNITED KINGDOM
CECILE, MONGREDIEN	FRAUNHOFER IIS	GERMANY
CERRUTI, ALESSANDRO	THE MITRE CORPORATION	BEDFORD, MA
CHAMSEDDINE, AHMAD	NOVATEL, INC.	CANADA
CHAN, FANG-CHENG	ILLINOIS INSTITUTE OF TECHNOLOGY	CHICAGO, IL
CHANG, ISAAC	BOEING	SEATTLE, WA
CHAPMAN, DARIN	INNOVATIVE SOLUTIONS INTERNATIONAL	VIENNA , VA
CHAPMAN, PHILLIP	TRIMBLE NAVIGATION	WESTMINSTER, CO
CHARBIT, MAURICE	TELECOM PARISTECH	FRANCE
CHARLTON, MARK	MITRE	COLORADO SPRINGS, CO
CHASE, DAVID	NGA	PEYTON, CO
CHEN, KUAN YUN	NATIONAL CHENG KUNG UNIVERSITY	TAIWAN (ROC)
CHEN, RUIZHI	FINNISH GEODETIC INSTITUTE	FINLAND
CHEN, SHAOHUA	BEIJING RESEARCH INSTITUTE OF TELEMETRY	CHINA
CHEN, WEI	UNIVERSITY OF SCIENCE AND TECHNOLOGY	CHINA
CHEN, XIAOMING	TRIMBLE TERRASAT GMBH	GERMANY
CHEN, YU-HSUAN	NATIONAL CHENG KUNG UNIVERSITY	TAIWAN (ROC)
CHENYUAN , CHIANG	NATIONAL CHENG KUNG UNIVERSITY	TAIWAN (ROC)
CHEUNG, LAURA	RAYTHEON	FULLERTON, CA
CHIANG, KAREN	CORNELL UNIVERSITY	ITHACA, NY
CHIOU, TSUNG-YU	MEDIATEK	TAIWAN (ROC)
CHIU, DESMOND	NAVCOM TECHNOLOGIES	TORRANCE, CA
CHO, AM	SEOUL NATIONAL UNIVERSITY	SOUTH KOREA
CHOI, KEVIN	NATIONAL GEODETIC SURVEY (NOAA)	SILVER SPRING, MD
CHOP, JOE	U.S. COAST GUARD - C2CEN	CHESAPEAKE, VA
CHOWDHARY, MAHESH	CSR / SIRF TECHNOLOGY	SAN JOSE, CA
CHOY, ALAN	THE AEROSPACE CORPORATION	EL SEGUNDO, CA
CHRISTMAS, DAN	NSWC CRANE	CRANE, IN
CHRISTOFFERS, JEFFREY	RAYTHEON	FULLERTON, CA
CHU, TIANXING	PEKING UNIVERSITY	BOULDER, CO
CHURCHILL, NORMAN	GLOBAL POSITIONING SYSTEMS WING	PETERSON AFB, CO
CLARK, JOHN	THE AEROSPACE CORPORATION	EL SEGUNDO, CA
CLARK, JOHN	CAST NAVIGATION LLC	TEWKSBURY, MA
CLARK, MATT	DELORME PUBLISHING INC	YARMOUTH, ME
CLARY, MILTON	OVERLOOK SYSTEMS TECHNOLOGIES, INC	VIENNA, VA
CLASS, PHILLIP	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
CLEVELAND, ALLEN	U. S. COAST GUARD C2CEN	PORTSMOUTH, VA
COBB, H. STEWART	NOVARIANT	PALO ALTO, CA
COLLETT, DAVE	LAND INFORMATION NEW ZEALAND	NEW ZEALAND
COLLINS, DARRON	SENSONOR TECHNOLOGIES	NORWAY
COLOMA, FRANCINE	CIRES/UNIV. OF CO	BOULDER, CO
COLOMINA, ISMAEL	INSTITUT DE GEOMÀTICA	SPAIN
CONNELL, ANDREW	RAKON AMERICA LLC	EGLIN, IL
COOKRO, DAN	HEMISPHERE GPS	SCOTTSDALE, AZ
CORDOVA, ADAM		GLENDALE, CA
CORDRUWISCH, KAI	WTD 61	GERMANY
COSMEN, JOAQUÍN	GMV	SPAIN
COSSABOOM, MATT	ROYAL MILITARY COLLEGE OF CANADA-NAVINST	CANADA
COSTER, ANTHEA	MIT HAYSTACK OBSERVATORY	WESTFORD, MA
COX, DUNCAN	DBC COMMUNICATIONS, INC.	MARBLEHEAD, MA
COZZENS, TRACY	GPS WORLD MAGAZINE	SANTE ANA, CA
CRAMPTON, PAUL	SPIRENT FEDERAL	YORBA LINDA, CA
CRESCIMBENI, RODOLFO	GSA	BELGIUM
CROP, OLIVIER	DGA	BELGIUM
CROWLEY, GEOFF	ASTRA, LLC.	SAN ANTONIO, TX
CRUZ, RAYMOND	ITT ES/GNSS	THOUSAND OAKS, CA
CUNTZ, MANUEL	DLR	GERMANY
CURRY, CHARLES	CHRONOS TECHNOLOGY LIMITED	UNITED KINGDOM
CUSTER, BRUCE	DOD	HALETHORPE, MD
CZOPEK, FRANK	BOEING	SEAL BEACH , CA

Pre-registered ION GNSS Attendees — As of September 9, 2010

DAFESH, PHIL	THE AEROSPACE CORPORATION	LOS ANGELES, CA
DAGGETT, JEFF	PCTEL	BLOOMINGDALE, IL
DAI, LIWEN	NAVCOM TECHNOLOGY, INC.	TORRANCE, CA
DALE, GORDON	NOVATEL INC.	CANADA
DALMENY, CALUM	CHRONOS TECHNOLOGY LIMITED	UNITED KINGDOM
DANISMAN, JAN	STATE OF BAVARIA US OFFICE NY	NEW YORK, NY
DATTA-BARUA, SEEBANY	SAN JOSE STATE UNIVERSITY	SAN JOSE, CA
DAUTERMANN, THOMAS	GERMAN AEROSPACE CENTER	GERMANY
DAVIDOFF, LARRY	THE BOEING COMPANY	SEALBEACH, CA
DAVIS, SCOTT	SYMMETRICOM	SANTA ROSA, CA
DAWKINS, JEREMY	AUBURN UNIVERSITY	AUBURN UNIVERSITY, AL
DE FALCIS, NINO	SPECTRATIME	AUSTIN, TX
DE LORENZO, DAVID	STANFORD UNIVERSITY	STANFORD, CA
DEGNER, DANETTE	NAVAIR	PATUXENT RIVER, MD
DEISTING, BAERBEL	MUNICH SATELLITE NAVIGATION SUMMIT	GERMANY
DELEON, DARREL	UNITED STATES AIR FORCE	SCHRIEVER AFB, CO
DEMPSTER, ANDREW	UNIVERSITY OF NEW SOUTH WALES	AUSTRALIA
DESAI, SHAILEN	JET PROPULSION LABORATORY	PASADENA, CA
DIAZ, JOSE	746 TS	HOLLOMAN AFB, NM
DIESPOSTI, RAYMOND	N/A	LAKEWOOD, CA
DIRKS, STEVE	USAF/2 SOPS	SCHRIEVER AFB, CO
DODD, DAVID	UNIVERSITY OF SOUTHERN MISSISSIPPI	STENNIS SPACE CENTER, MS
DOETTERBOECK, DOMINIK	UNIVERSITY FAF	GERMANY
DOHERTY, JIM	IDA	ALEXANDRIA, VA
DONFRANCESCO, MIKE	INTERSENSE INC.	BILLERICA, MA
DORSEY, ANGELA	JET PROPULSION LABORATORY	PASADENA, CA
DOWNING, BENJAMIN	MODERN TECHNOLOGY SOLUTIONS, INC.	BELLBROOK, OH
DRIVER, TED	ANALYTICAL GRAPHICS INC.	COLORADO SPRINGS , CO
DRONEBURG, TERRI	HAWK INSTITUTE FOR SPACE SCIENCES	POCOMOKE CITY, MD
DU, GANG	SHANGHAI JIAO TONG UNIVERSITY	CHINA
DU, XIN	PCTEL	BLOOMINGTON, IL
DUCHOVNY, EIRAN	CELLGUIDE LTD.	ISRAEL
DUFFY, TOM	USAF/2 SOPS	SCHRIEVER AFB, CO
DUMONT, ROBERT	TALLYSMAN WIRELESS INCORPORATED	CANADA
DUNCOMBE, STEVE	NOVATEL, INC.	CANADA
DUNKEL, WINFRIED	DFS DEUTSCHE FLUGSICHERUNG GmbH	GERMANY
DUPUIS, RYAN	PERKINELMER	SALEM, MA
DVORSKA, JOLANA	HONEYWELL INTERNATIONAL S.R.O.	CZECH REPUBLIC
DWORAK, BRAD	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
EAGER, MICHAEL	GPS WORLD	SANTE ANA, CA
EDGAR, CLYDE	AEROSPACE CORPORARTION	EL SEGUNDO, CA
EISSFELLER, BERND	UNIVERSITY OF THE FAF MUNICH	GERMANY
EL-ARINI, BAKRY	THE MITRE CORPORATION	MCLEAN, VA
ENGE, PER	STANFORD.UNIVERSITY	STANFORD, CA
ERKER, STEFAN	GERMAN AEROSPACE CENTER	GERMANY
ETIENNE, ERNESTO	FEDERAL AVIATION ADMINISTRATION	WASHINGTON, DC
FALCON , EDUARDO	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
FALK, NICO	IFEN GMBH	GERMANY
FARNSWORTH, BRADLEY	ENSCO, INC.	SPRINGFIELD, VA
FARRELL, JAMES	VIGIL, Inc.	SEVERNA PARK, MD
FARRELL, JAY	UNIVERSITY OF CALIFORNIA	RIVERSIDE, CA
FAVEY, ETIENNE	U-BLOX AG	SWITZERLAND
FEDORA, NEAL	SPIRENT FEDERAL SYSTEMS INC.	YORBA LINDA, CA
FEENEY, MIKE	SEPTENTRIO SATELLITE NAVIGATION	BELGIUM
FENG, SHAOJUN	IMPERIAL COLLEGE LONDON	UNITED KINGDOM
FENG, YANMING	QUEENSLAND UNIVERSITY OF TECHNOLOGY	AUSTRALIA
FENTON, PATRICK	NOVATEL INC.	CANADA
FERGUSON, KENDALL	TRIMBLE NAVIGATION, LTD.	STAFFORD, VA
FERRELL, BART	THE BOEING COMPANY	HUNTINGTON BEACH, CA
FESNAK, ALAN	GNOSTECH INC.	WARMINSTER, PA
FIFE, MARK	THE BOEING COMPANY	SEAL BEACH, CA
FISCHER, RICHARD	INSIDE GNSS MAGAZINE	SAUSALITO , CA
FISH, MARK	SAIC	MANHATTAN BEACH, CA
FISHER, DARREN	SPIRENT COMMUNICATIONS	UNITED KINGDOM
FISHER, KEN	AFIT/ENG	BELLBROOK, OH
FITTS, DAVID	C & C TECHNOLOGIES,INC	LAFAYETTE, LA
FLAMENT, DIDIER	EUROPEAN SPACE AGENCY	FRANCE
FLEMING, JOEY	GPSAT SYSTEMS AUSTRALIA	AUSTRALIA
FLEMING, JOHN	RAYTHEON	EL SEGUNDO, CA
FLINN, MICHAEL	US AIR FORCE-CRIIS	EGLIN AFB, FL
FLOCH, JEAN-JACQUES	ASTRIUM GMBH	GERMANY
FLOYD, THOMAS	U.S. ARMY COMMUNICATIONS	FORT MONMOUTH, NJ
FLY, BRIAN	HONEYWELL	CLEARWATER, FL
FONI, ANDREA	U-BLOX AG	SWITZERLAND
FORSBERG, CHARLES	FORSBEERG SERVICES LTD.	UNITED KINGDOM
FORSSELL, BÖRJE	NTNU, DEPT. OF ELECTR.&TELECOMM.	NORWAY
FORTIER, MATTHEW	SYSTRON DONNER	CONCORD, CA
FOSTER, CHRISTOPHER	ENSCO, INC.	SPRINGFIELD, VA
FRANZE, JAMES	SMSGT, USAF HQ /AFSPC	PETERSON AFB, CO
FREER, HARRISON	CONSULTANT	QUEENSBURY, NY
FROST, JOEL	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
FRUEHAUF, HUGO	THE HUGO FRUEHAUF COMPANY	LAGUNA NIGUEL, CA
FRY, KENT	JOINT NAVIGATION WARFARE CENTER	ALBUQUERQUE, NM
GAEB, MICHAEL	INSTITUTE OF NAVIGATION	GERMANY
GAEDE, REBECCA	BOEING COMPANY	SEAL BEACH, CA
GAKSTATTER, ERIC	GPS WORLD	SANTA ANA, CA
GALLIGAN, DAN	C & C TECHNOLOGIES,INC	LAFAYETTE, LA
GALVAN, DAVID	JET PROPULSION LABORATORY	PASADENA, CA
GALYEAN, PAUL	NAVCOM TECHNOLOGY	TORRANCE, CA
GAO, GRACE	STANFORD UNIVERSITY	STANFORD, CA
GAO, YANG	UNIVERSITY OF CALGARY	CANADA
GARIN, LIONEL	QUALCOMM	SANTA CLARA, CA
GARRISON, JAMES	PURDUE UNIVERSITY	WEST LAFAYETTE, IN
GATTI, GIULIANO	EUROPEAN SPACE AGENCY	NETHERLANDS
GE, MAORONG	GERMAN RESEARCH CENTER FOR GEOSCIENCES	GERMANY
GE, SHENGJIE	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
GEIL, GARY	SYMMETRICOM	SAN CLEMENTE, CA
GEORGY, JACQUES	TRUSTED POSITIONING INC.	CANADA
GEPPERT, STEPHEN	ROCKWELL COLLINS	CEDAR RAPIDS, IA
GEREIN, NEIL	NOVATEL, INC.	CANADA
GERTEN, GREG	ANALYTICAL GRAPHICS, INC	EXTON, PA
GHALAYINI, JUSTIN	ITT CORPORATION	FORT WAYNE, IN
GHISLAIN, LUNEAU	SAGEM DEFENSE SECURITE	FRANCE
GIBBONS, GLEN	INSIDE GNSS MAGAZINE	EUGENE, OR
GIBBONS, GREG	ITT GNSS	THOUSAND OAKS, CA
GIORGI, GABRIELE	DELFT UNIVERSITY OF TECHNOLOGY	NETHERLANDS
GIRARD, RICHARD	FAA, FLIGHT STANDARDS DIVISION	ANCHORAGE , AK
GISBERT, JOSE-VICENTE	ESA (EUROPEAN SPACE AGENCY)	NETHERLANDS
GLAZNER , RYAN	JT3, LLC	EDWARDS, AFB, CA
GLAZNER , RYAN	JT3, LLC	EDWARDS, AFB, CA
GLOAB, JIM	SYMMETRICOM	BEVERLY, MA
GLOCKER, MARKUS	TRIMBLE TERRASAT GMBH	GERMANY
GLUECKERT, ULF	LEICA GEOSYSTEMS	NORCROSS, GA
GLUTTING, MICHAEL	JAVAD GNSS, INC.	SAN JOSE, CA
GODKIN, INGRID	EUROPEAN COMMISSION	BELGIUM
GOLDBERG, JASON	BROADCOM	SANTA CLARA, CA
GOODALL, CHRIS	THE UNIVERSITY OF CALGARY	CANADA
GOODRICH, BRIAN	NAVCOM	TORRANCE, CA
GORDON, STEPHEN	FEDERAL AVIATION ADMINISTRATION	OKLAHOMA CITY, OK
GOSALVEZ, MARIO	SATEL SURVEY USA	CUPERTINO, CA
GOSHTCHEVSKY, CHRIS	RAFAEL	ISRAEL
GOTTZEIN, EVELINE	ASTRIUM SATELLITES	GERMANY
GOUSSAK, KENNETH	THE AEROSPACE CORPORATION	LOS ANGELES, CA
GOWER, ART	LOCKHEED MARTIN	ARLINGTON, VA
GRAMLING, CHERYL	NASA/ GODDARD SPACE FLIGHT CENTER	GREENBELT, MD
GRANT, ALAN	THE GENERAL LIGHTHOUSE AUTHORITIES	UNITED KINGDOM
GRAVES, MARC	NOVATEL, INC	CANADA
GRAY, JEFFERY	746TH TEST SQUADRON	ALAMOGORDO, NM
GREEN, GAYLORD	NAVASTRO COMPANY	LOS GATOS, CA
GREENLEE, JAMES	US DEPARTMENT OF DEFENSE	ALBUQUERQUE, NM
GREGOIRE, MARTIN	CANADIAN COAST GUARD	CANADA
GREWAL, MOHINDER	CAL STATE UNIVERSITY/FULLERTON	FULLERTON, CA
GRGICH, PAUL	LEICA GEOSYSTEMS	NORCROSS, GA
GRIGGS, ERIN	UNIVERSITY OF COLORADO	BOULDER, CO
GRINSPAN, YORAM	ISRAEL AEROSPACE INDUSTRIES	ISRAEL
GROGNARD, PETER	SEPTENTRIO SATELLITE NAVIGATION	BELGIUM
GROVES, PAUL	UNIVERSITY COLLEGE LONDON	UNITED KINGDOM
GRUBER, BERNARD	GPSW/CC	EL SEGUNDO, CA
GUBOREV, SERGEY	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
GUNAWARDENA, SANJEEV	OHIO UNIVERSITY	ATHENS, OH
GUNDERSEN, NINA	KONGSBERG SEATEX AS	NORWAY
GUO, YONGTAO	GPS SOURCE	PUEBLO WEST, CO
GUPTA, INDER	THE OHIO STATE UNIVERSITY	COLUMBUS, OH
GUSTAFSON, BO	DATAGRID	GAINESVILLE, FL
GUSTAFSON, LARS	DATAGRID	SWEDEN
GUTTERMAN, GIL	RAFAEL	ISRAEL
GYONGYI, MAARIT	EUROPEAN COMMISSION	BELGIUM
HAAK, ULRICH	TU BRAUNSCHWEIG	GERMANY
HADDAD, RANWA	AEROSPACE	LOS ANGELES, CA
HADDRELL, TONY	PINPOINT POSITIONING LTD	UNITED KINGDOM
HALL, BRANDON	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
HALL, DAVID	NATIONAL INSTRUMENTS	AUSTIN, TX
HALL, ELLEN	SPIRENT FEDERAL SYSTEMS	YORBA LINDA, CA
HAMILTON , RICK	U.S COAST GUARD NAV CENTER	ALEXANDRIA , VA
HAN, LAWRENCE	NASA	GREENBELT, MD
HAN, SHAOWEI	UNICORE COMMUNICATIONS	CHINA
HANSHENG, WANG	OLINKSTAR CO LTD	CHINA
HANSOTTER, ANDREAS	WORK MICROWAVE GMBH	GERMANY
HAQUE, TAHIRA	NOVATEL, INC.	CANADA
HARRIS, BENJAMIN	APPLIED RESEARCH LABORATORIES/UT AUSTIN	AUSTIN, TX
HARRIS, CHRIS	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
HATCH, RONALD	NAVCOM TECHNOLOGY, INC.	TORRANCE, CA
HEATHER, JAN	SPIRENT COMMUNICATIONS (SW) LTD.	UNITED KINGDOM
HEDLING, GUNNAR	LANTMÄTERIET	SWEDEN
HEGARTY, CHRISTOPHER	THE MITRE CORPORATION	BEDFORD, MA
HEINEMANN, PETER	NOVATEL INC.	CANADA
HEINRICHS, GUENTER	IFEN GMBH	GERMANY
HENG, LIANG	STANFORD UNIVERSITY	STANFORD, CA
HENKEL, PATRICK	TECHNISCHE UNIVERSITÄT MÜNCHEN	GERMANY
HERAN, TRACY	ELECTRONIC PROVING GROUND	FORT HUACHUCA, AZ
HERNAEZ, CHRISTIAN	USCG NAVCEN	ALEXANDRIA, VA
HERRING, SCOTT	US COAST GUARD	PORTSMOUTH, VA
HERTZ, ARIK	ACCUBEAT	ISRAEL
HESSIN, ROBERT	USAF	FREDERICKSBURG, MD
HEWITT, BILL	ROCKWELL COLLINS	CEDAR RAPIDS, IA
HEWLETT, JOE	COE-NAWCED	CHINA LAKE, CA
HIDE, CHRISTOPHER	UNIVERSITY OF NOTTINGHAM	UNITED KINGDOM
HIGHSMITH, DOLAN	THE AEROSPACE CORPORATION	CHANTILLY, VA
HIRRLE, ANGELIKA	GERMAN AEROSPACE CENTER	GERMANY
HIRST, ROBERT	SPIRENT COMMUNICATIONS	UNITED KINGDOM
HIXON, SHANNON	LEICA GEOSYSTEMS	NORCROSS, GA
HOCKER, BEN	DAVID EVANS AND ASSOCIATES, INC.	VANCOUVER, WA
HOLDER, RODNEY	ARINC	BELLEVUE, NE
HOLM, RON	SYMMETRICOM	SANTA JOSE , CA
HORNBOSTEL, ACHIM	GERMAN AEROSPACE CENTER (DLR)	GERMANY
HORTNESS, JEANNIE	GPS WORLD	SANTA ANA, CA
HORTON, ROBERT	GPS SOURCE	PUEBLO WEST, CO
HORVATH, OLAF	KAIMSCHLAG GMBH	GERMANY
HUANG, XIAO RUI	BEIJING RESEARCH INSTITUTE OF TELEMETRY	CHINA
HUMPHREYS, TODD	THE UNIVERSITY OF TEXAS AT AUSTIN	AUSTIN, TX
HUNTER, TOM	JAVAD GNSS, INC.	SAN JOSE, CA
HYDOCK, KENNETH	USCG C2CEN	PORTSMOUTH, VA
IBRAHIM, FAROOG	VISTEON CORP.	DEARBORN HEIGHTS, MI
IKEDA, HEISUKE	FURUNO	DENTON, MD

Pre-registered ION GNSS Attendees — As of September 9, 2010

IQBAL, UMAR	QUEEN'S UNIVERSITY	CANADA
IWASE, TATSUYA	TOYOTA CENTRAL R&D LABS., INC.	JAPAN
IZADPANAH, ASHKAN	RX NETWORKS, INC.	CANADA
JACOBS, JARED	USAF/ 2 SOPS	SCHRIEVER AFB, CO
JAIN, MAHAVEER	SIRF TECHNOLOGY INC	INDIA
JALES, PHILIP	SURREY SPACE CENTRE, UNIV OF SURREY	UNITED KINGDOM
JAMESON, JAMES	THE AEROSPACE CORPORATION	LOS ANGELES, CA
JAN, SHAU-SHIUN	NATIONAL CHENG KUNG UNIVERSITY	TAIWAN (ROC)
JAVIER DE BLAS, FRANCISCO	ESSP SAS	SPAIN
JENSEN, ANNA	AJ GEOMATICS	DENMARK
JESSEN, PRECY	NavtechGPS	SPRINGFIELD, VA
JEWELL, DON	GPS WORLD	SANTA ANA, CA
JIMENEZ BAÑOS, DAVID	ESA	NETHERLANDS
JING, JING	ILLINOIS INSTITUTE OF TECHNOLOGY	CHICAGO, IL
JOERGER, MATHIEU	ILLINOIS INSTITUTE OF TECHNOLOGY	CHICAGO, IL, IL
JOHANSEN, DAVID	RINCON RESEARCH CORPORATION	TUCSON, AZ
JOHNS, JC	FEDERAL AVIATION ADMINISTRATION	WASHINGTON, DC
JOHNSON, GEORGE	SAIC	EL SEGUNDO, CA
JOHNSON, JONATHAN	USCG C2CEN	CARROLLTON, VA
JOKITALO, TIMO	FASTRAX, LTD.	FINLAND
JONES, LARRY	JT3, LLC	EDWARDS, CA
JONES, MATTHEW	THE BOEING COMPANY	ARLINGTON, VA
JORGENSEN, KIM	FMT	DENMARK
JOSEPH, ANGELO	ROCKWELL COLLINS INC	MELBOURNE, FL
JUANG, JYH-CHING	NATIONAL CHENG KUNG UNIVERSITY	TAIWAN (ROC)
JUNG, SUNGWOOK	KAIST	SOUTH KOREA
JUNGSTAND, ARNE	STZ NAVIGATION, TRANSPORT + COMM.	GERMANY
KABLER, RONALD	COBRA ELECTRONICS CORPORATION	CHICAGO, IL
KAHLER, RADAR	SYMMETRICOM	BEVERLY , MA
KAHR, ERIN	UNIVERSITY OF CALGARY	CANADA
KAIN, JAMES	GEOVANTAGE	SANTA ROSA BEACH, FL
KAISTI, KIM	FASTRAX LTD	FINLAND
KAMEL, AHMED	UNIVERSITY OF CALGARY	CANADA
KANDZIORA, CHRISTOPH	UNIVERSITY ERLANGEN-NUREMBERG	GERMANY
KANGAS, KIM	NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY	ARNOLD, MO
KAO, WEI-WEN	NAT'L TAIWAN UNIV. OF SCI. AND TECH.	TAIWAN (ROC)
KAPOOR, VINOD	THE AEROSPACE CORPORATION	LOS ANGLES, CA
KAPPEN, GOETZ	RWTH AACHEN UNIVERSITY	GERMANY
KARAMAT, TASHFEEN	QUEEN'S UNIVERSITY, KINGSTON ON, CANADA	CANADA
KARUTIN, SERGEY	RUSSIAN SPACE SYSTEMS	RUSSIA
KAUFFMAN, KYLE	AIR FORCE INSTITUTE OF TECHNOLOGY	OXFORD OH, OH
KEALY, ALLISON	THE UNIVERSITY OF MELBOURNE	AUSTRALIA
KEE, CHANGDON	SEOUL NATIONAL UNIVERSITY	SOUTH KOREA
KENNE, KURTIS	NAVCOM	TORRANCE, CA
KENNEDY, SANDY	NOVATEL INC.	CANADA
KENNEDY, THOMAS	OVERLOOK SYSTEMS TECHNOLOGIES, INC	VIENNA, VA
KERKHOFF, AARON	APPLIED RESEARCH LABORATORIES/UT AUSTIN	AUSTIN, TX
KEYNAN, TSAFRIR	BAE SYSTEMS ROKAR	ISRAEL
KEZYS, VYTAS	RESEARCH IN MOTION	CANADA
KHANAFSEH, SAMER	ILLINOIS INSTITUTE OF TECHNOLOGY	CHICAGO, IL
KILLIAN, JIM	746 TEST SQUADRON	HOLLOMAN AFB, NM
KIM, DON	UNIVERSITY OF NEW BRUNSWICK	CANADA
KIM, HYE-IN	INHA UNIVERSITY	SOUTH KOREA
KING, BRIAN	CAST NAVIGATION	TEWKSBURY, MA
KING, THOMAS	GENERAL DYNAMICS - AIS	SCOTTSDALE, AZ
KIRK, JOHN	BOEING TEST & EVALUATION	PALMDALE, CA
KLEINLEIN, JEFFREY	NSWC CRANE	CRANE, IN
KLEPCZYNSKI, WILLIAM		ARNOLD, MD
KLINE, PAUL	HONEYWELL	MINNEAPOLIS, MN
KLINGSEISEN, ROBERT	JOINT NAVIGATION WARFARE CENTER	ALBUQUERQUE, NM
KLUKAS, RICHARD	UNIVERSITY OF BRITISH COLUMBIA OKANAGAN	CANADA
KNAPP, JEFF	ITT	FORT WAYNE, IN
KOLOSOV, DMITRY	TOPCON POSITIONING SYSTEMS, INC.	LIVERMORE, CA
KONNO, HIROYUKI	TOPCON POSITIONING SYSTEMS	LIVERMORE , CA
KOOREY, FRED	SAIC	CORONADO, CA
KOSENKO, VIKTOR	"ISS-RESHETNEV"	RUSSIA
KOVACH, KARL	AEROSPACE CORPORATION	LOS ANGELES, CA
KPORTUFE, STEPHEN	GALILEO INSTRUMENTS INC	CANADA
KRAUSS, PETER	EADS ASTRIUM	GERMANY
KRESGE, JARED	AIR FORCE INSTITUTE OF TECHNOLOGY	WPAFB, OH
KRISHNAMOORTHY, UMA	SANDIA LABS	ALBUQUERQUE, NM
KRYSIAK, CARLA	BOEING COMPANY	EL SEGUNDO, CA
KUANG, DA	JET PROPULSION LABORATORY	PASADENA, CA
KUBO, NOBUAKI	TOKYO UNIVERSITY OF MARINE SCIENCE AND T	JAPAN
KUN-YAO, PENG	NATIONAL CHENG KUNG UNIVERSITY	TAIWAN (ROC)
KUNCHES, JOSEPH	DOC/NOAA/NWS/NCEP/SPACE WEATHER PRED. CT	BOULDER, CO
KUNZE, HANS-JOERG	IFEN GMBH	GERMANY
KUUSNIEMI, HEIDI	FINNISH GEODETIC INSTITUTE	FINLAND
KYLE, JASON	RAYTHEON MISSILE SYSTEMS	SAHUARITA, AZ
LACARRA ARCOS, ELISABET	ESSP SAS	SPAIN
LACEY, JOHN	LOCKHEED MARTIN	ROCKVILLE, MD
LACHAPELLE, GERARD	UNIVERSITY OF CALGARY	CANADA
LAGIMONIERE, ERNIE	SIERRA NEVADA CORPORTION	SPARKS, NV
LAKE, JAMES	GPSW/EN	TORRANCE, CA
LANDAU, HERBERT	TRIMBLE TERRASAT GMBH	GERMANY
LANGEN, DOUG	NOVATEL, INC	CANADA
LANGENSTEIN, TOM	STANFORD UNIVERSITY	STANFORD, CA
LANGLEY, RICHARD	UNIVERSITY OF NEW BRUNSWICK	CANADA
LAPP, TIFFANY	BOEING	SNOHOMISH, WA
LAPUCHA, DARIUSZ	FUGRO CHANCE, INC.	LAYFAYETTE, LA
LAURICHESSE, DENIS	CNES	FRANCE
LAWRENCE, DEBORAH	FEDERAL AVIATION ADMINISTRATION	WASHINGTON, DC
LE, QUAN	OMNISTAR, INC	HOUSTON, TX
LE THUAUT, LAURENT	TOPOS AQUITAINE	FRANCE
LEANDRO, RODRIGO	TRIMBLE TERRASAT GMBH	GERMANY
LECHTENBERG, JASON	SANDIA NATIONAL LABORATORIES	ALBUQUERQUE, NM
LEDVINA, BRENT	COHERENT NAVIGATION, INC.	SAN MATEO, CA
LEE, ALBERT	PMOSSP SHIPBOARD SYSTEMS	UNIONDALE, NY
LEE, CHANG MOON	INHA UNIVERSITY	SOUTH KOREA
LEE, JIYUN	KAIST	SOUTH KOREA
LEE, JONG-KI	THE OHIO STATE UNIVERSITY	COLUMBUS, OH
LEE, MINSU	SEOUL NATIONAL UNIVERSITY	SOUTH KOREA
LEE, RICH	GREENWOOD TELECOMMUNICATIONS	DENVER, CO
LEPPÄKOSKI, HELENA	TAMPERE UNIVERSITY OF TECHNOLOGY	FINLAND
LESTARQUIT, LAURENT	CNES	FRANCE
LEVOLA, AKU	ATHEROS COMMUNICATIONS	FINLAND
LEW, MIRIN	AGILENT TECHNOLOGIES	SANTA ROSA, CA
LEWALLEN, TIMOTHY	HQ AFSPC/A3P	COLORADO SPRINGS, CO
LEWANDOWSKI, WLODZIMIERZ	BIPM	FRANCE
LEWIS, L KIRK	INSTITUTE FOR DEFENSE ANALYSIS	ALEXANDRIA, VA
LI, PHILIP	THE AEROSPACE CORPORATION	LOS ANGELES, CA
LI, TAO	UNIVERSITY OF CALGARY	CANADA
LI, XIAO DONG	BEIJING RESEARCH INSTITUTE OF TELEMETRY	CHINA
LI, YU-HUA	NATIONAL CHENG KUNG UNIVERSITY	TAIWAN (ROC)
LIAO, CHEN-FU	UNIVERSITY OF MINNESOTA	MINNEAPOLIS, MN
LICHTER, PATRICK	KORONIS BIOMEDICAL TECHNOLOGIES	MAPLE GROVE, MN
LILLEY, ROBERT	NORTHROP GRUMMAN SIMULATION TECHNOLOGIES	SANTA BARBARA, CA
LIMAYE, NISH	ROCKWELL COLLINS, INC.	CEDAR RAPIDS, IA
LINKE, THOMAS	USCG C3CEN	PORTSMOUTH , VA
LITTLE, JON	APPLIED RESEARCH LABORATORIES/UT AUSTIN	AUSTIN, TX
LITTON, JAMES	LITTON CONSULTING GROUP	WOODLAND HILLS, CA
LIU, JEFFREY	SONY ELECTRONICS INC.	SAN DIEGO, CA
LIU, KEVIN	NAVIGATION SYS DIV, NORTHROP GRUMMAN	SIMI VALLEY, CA
LIU, WEI	SHANGHAI JIAO TONG UNIVERSITY	CHINA
LIU, XIAOLI	WUHAN UNIVERSITY	CHINA
LIU, YANG	BEIHANG UNIVERSITY BEIJING P.R.CHINA	CHINA
LLOYD, DOUG	ROCKWELL COLLINS, INC.	CEDAR RAPIDS, IA
LO, SHERMAN	STANFORD UNIVERSITY	STANFORD, CA
LOMBARDI, ANTHONY	DTSA	ALEXANDRIA, VA
LOPEZ, JUAN	AVERNA	CANADA
LOSCHIAVO, PHIL	OVERLOOK SYSTEMS TECHNOLOGY, INC	PALM BAY, FL
LOUGHEAD, DOUG	NOVATEL, INC.	CANADA
LUIJNENBURG, ROB	FUGRO NV	NETHERLANDS
LULICH, TYLER	EMERGENT SPACE TECHNOLOGIES	GREENBELT, MD
LUNDGREN, BRAD	ACCUBEAT	ISRAEL
LUNGSTROM, DANIEL	AEROSPACE CORPORATION	LOS ANGELES, CA
MA, TIANYI	TSINGHUA UNIVERSITY	CHINA
MACDORAN, PETER	LOCTRONIX CORPORATION	WOODINVILLE, WA
MACGOUGAN, GLENN	APPLE, INC.	CUPERTINO, CA
MACIEJEWSKI, JAMES	US COAST GUARD	PORTSMOUTH, VA
MACLEOD, ROD	NOVATEL, INC.	CANADA
MACLEOD, SCOTT	NAUTEL	CANADA
MADER, GERALD	NOAA/NATIONAL GEODETIC SURVEY	SILVER SPRING, MD
MAHMOOD, SULTAN	USAF	EGLIN AFB, FL
MALAVIYA, SANJAY (SAM)Malaviya	COORDINATES MAGAZINE	INDIA
MALKOS, STEVE	BROADCOM	SAN JOSE, CA
MALLETT, IAN	CIVIL AVIATION SAFETY AUTHORITY	AUSTRALIA
MANANDHAR, DINESH	GNSS TECHNOLOGIES INC.	JAPAN
MANDER, AMANDEEP	YORK UNIVERSITY	CANADA
MANLOVE, DON	GPSW/GPU	FULLERTON, CA
MARCEAU, GUY	CANADIAN COAST GUARD	CANADA
MARTIN, JEFF	SPIRENT FEDERAL	YORBA LINDA, CA
MARTIN, SCOTT	AUBURN UNIVERSITY	AUBURN UNIVERSITY, AL
MARTÍN PIEDELOBO, JUAN RAMÓNGMV	AEROSPACE AND DEFENCE, S.A.U.	SPAIN
MARTZEN, PHILIP	THE AEROSPACE CORPORATION	LOS ANGELES, CA
MASSATT, PAUL	THE AEROSPACE CORPORATION	LOS ANGELES, CA
MASSIMINI, VINCE	THE MITRE CORPORATION	MCLEAN, VA
MATHEWS, MICHAEL	LOCTRONIX CORPORATION	WOODINVILLE, WA
MATSAKIS, DEMETRIOS	U.S. NAVAL OBSERVATORY	WASHINGTON, DC
MATSUMOTO, MASATOSHI	FURUNO ELECTRIC CO., LTD	JAPAN
MATTHEISEN, ANDREW	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
MATTHEWS, CHRISTOPHER	UNIVERSITY OF MINNESOTA	MINNEAPOLIS, MN
MAUNEY, NINA	ITT	THOUSAND OAKS, CA
MAYNE, CHRIS	FORSBERG SERVICES LTD.	UNITED KINGDOM
MCCANLESS, JOHN	BOOZ ALLEN HAMILTON, INC.	EL SEGUNDO, CA
MCCARTNEY, LEAH	UNIVERSITY TECHNOLOGIES INTERNATIONAL	CANADA
MCCORMACK, SEAN	KVH INDUSTRIES	MIDDLETOWN, RI
MCCROSKEY, ROBERT	HONEYWELL	GOLDEN VALLEY, MN
MCDONALD, CAROLYN	NavtechGPS	SPRINGFIELD, VA
MCGARRY, DONALD	MITRE	ROME, NY
MCGRAW, GARY	ROCKWELL COLLINS	CEDAR RAPIDS, IA
MCGURN, TERENCE	SAIC	RESTON, VA
MCINTYRE, TIMOTHY	GLOBAL POSITIONING SYSTEMS WING	COLORADO SPRINGS, CO
MCKENNA, SEAN	THE MITRE CORPORATION	BEDFORD, MA
MCLAIN, PATRICIA	TRIMBLE NAVIGATION	CARMICHAEL, CA
MEIXNER, WOLFGANG	IFEN GMBH	GERMANY
MELGARD, TOR	FUGRO SEASTAR	NORWAY
MENDOZA, ARMANDO	SIRF TECHNOLOGY, INC. / CSR PLC	PHOENIX, AZ
MERCADO, LISA	BOEING COMPANY	SEAL BEACH, CA
MERKLE, LUCIE	STATE OF BAVARIA US OFFICE W COAST	SAN FRANCISCO, CA
MEURER, MICHAEL	GERMAN AEROSPACE CENTRE (DLR)	GERMANY
MEYERS, JEFF	FAA	RENTON, WA
MIER, FRANCISCO	GRAFINTA S.A.	SPAIN
MILLER, COLLEEN	TRIMBLE	WESTMINSTER, CO
MILLER, JOSHUA	JT3, LLC	EDWARDS, CA
MILLER, MIKEL	AFRL/RW	FORT WALTON BEACH, FL
MILNER, CARL	IMPERIAL COLLEGE LONDON	UNITED KINGDOM
MINKWITZ, DAVID	GERMAN AEROSPACE CENTER	GERMANY
MIOCINOVIC, SRDJAN	CSR PLC	SAN JOSE, CA
MISRA, PRATAP	THE MITRE CORPORATION	BEDFORD, MA
MITCH, RYAN	CORNELL UNIVERSITY	ITHACA, NY
MITCHELL, DON	SYMMETRICOM	PAYSON, AZ
MITCHELL, THOMAS	BAE SYSTEM	MERRIMACK, NH
MITELMAN, ALEXANDER	CSR	SWEDEN

Pre-registered ION GNSS Attendees — As of September 9, 2010

MITTNACHT, MICHAEL	EADS ASTRIUM SATELLITES	GERMANY
MIYA, MASAKAZU	MITSUBISHI ELECTRIC CORPORATION	JAPAN
MOLE, STEPHEN	ST-ERICSSON UK LTD	UNITED KINGDOM
MOLINA, ALBERTO	TECHNICAL UNIVERSITY OF CARTAGENA	SPAIN
MOLINA, PERE	INSTITUT DE GEOMÀTICA	SPAIN
MONTE, JAY	FUGRO CHANCE, INC.	LAYFAYETTE, LA
MOORE, TERRY	IESSG/UNIVERSITY OF NOTTINGHAM	UNITED KINGDOM
MORIN, CHRISTOPHER	746 TEST SQUADRON	HOLLOMAN AFB, NM
MORLEY, THOMAS	NOVATEL, INC.	CANADA
MORRIS, ROBERT	SANDIA NATIONAL LABORATORIES	ALBUQUERQUE, NM
MORRIS, TOM	TOPCON POSITIONING SYSTEMS, INC.	LIVERMORE, CA
MORRISON, AIDEN	UNIVERSITY OF CALGARY	CANADA
MORRISON, STEPHEN	THE AEROSPACE CORPORATION	LOS ANGELES, CA
MORTON, RUSSELL	C & C TECHNOLOGIES,INC	LAFAYETTE, LA
MORTON, YU (JADE)	MIAMI UNIVERSITY	OXFORD, OH
MOULT, BUSTER	NOVATEL, INC.	CANADA
MOUNTAP, OLIVIER	AVERNA	CANADA
MURFIN, TONY	GNSS AEROSPACE	NOKOMIS, FL
MYRICK, WILBUR	IVYSYS	GAINESVILLE, VA
NAKAMURA, RYO	JAXA	JAPAN
NARINS, MITCHELL	FEDERAL AVIATION ADMINISTRATION	WASHINGTON, DC
NAVARRO, RICK	EDWARDS AFB	EDWARDS AFB, CA
NAVARRO, SERGIO	NORTHROP GRUMMAN	KETTERING, OH
NGUYEN, PHU	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
NICHOLSON, ROY	GPSW SE&I	PLAYA VISTA, CA
NIEDERMEIER, HERBERT	UNIVERSITY FAF MUNICH	GERMANY
NIELSON, JOHN	ROCKWELL COLLINS INC	CEDAR RAPIDS, IA
NIEMANN, BIANCA	FRAUNHOFER IIS	GERMANY
NILES, RICK	THE MITRE CORPORATION	MCLEAN, VA
NISHIGUCHI, HIROSHI	JAPAN GPS COUNCIL	JAPAN
NOGAS, PAWEL	PIKTIME SYSTEMS	POLAND
NOURELDIN, ABOELMAGD	ROYAL MILITARY COLLEGE OF CANADA	CANADA
NOVELLI, MARK	USAF	EDWARDS, CA
NYKOLAISHEN, LISA	NATURAL RESOURCES CANADA	CANADA
O'BRIEN, ANDREW	THE OHIO STATE UNIVERSITY	COLUMBUS, OH
O'DRISCOLL, CILLIAN	UNIVERSITY OF CALGARY	CANADA
O'HALLORAN, EILEEN	GPS NETWORKING, INC.	PUEBLO, CO
O'HANLON, BRADY	CORNELL UNIVERSITY	ITHACA, NY
O'KEEFE, KYLE	UNIVERSITY OF CALGARY	CANADA
OBANA, SARAH JOY	GPS WORLD	SANTA ANA, CA
OCHIENG, WASHINGTON	IMPERIAL COLLEGE LONDON	UNITED KINGDOM
OEBERG, STEFAN	NATIONAL LAND SURVEY OF SWEDEN	SWEDEN
OHATA, RYUSUKE	MITSUBISHI ELECTRIC CORP.	JAPAN
OKERSON, GARY	SRI INTERNATIONAL	MENLO PARK, CA
OLEYNIK, EKATERINA	CENTRAL RESEARCH INSTITUTE OF MACHINE BU	RUSSIA
OLSON, EDWARD	SILICON SKY GPS	RED LODGE, MT
OOSTERLINCK, RENÉ	EUROPEAN SPACE AGENCY (ESA)	FRANCE
OTT, LEE	OMNISTAR, INC	HOUSTON, TX
OTTENI, BENJAMIN	U. S, COAST GUARD	PORTSMOUTH, VA
OUEDRAOGO, MAHAMOUDOU	EADS ASTRIUM	GERMANY
OVERBEEK, COCK	LOGICA	UNITED KINGDOM
OZTURK, ALPER	ASELSAN INC.	TURKEY
PACHE, GENE	ITT CORPORATION	FORT WAYNE, IN
PALOMINO, ANTONIO	WHITE SANDS MISSILE RANGE	EL PASO, TX
PAMIR, ALEKS	RX NETWORKS, INC.	CANADA
PANDE, TARKESH	TEXAS INSTRUMENTS	DALLAS, TX
PARDAL, PAULA C P M	INPE	BRAZIL
PARIKH, NIRAV	NAVCOM TECHNOLOGY INC.	TORRANCE, CA
PARK, KWAN-DONG	INHA UNIVERSITY	SOUTH KOREA
PARK, YOUNG SHIN	STANFORD UNIVERSITY	STANFORD, CA
PARKER, LYNDE	50SW PLANS AND PROGRAMS	SCHRIEVER AFB, CO
PASSWATERS, GIL	FURUNO GPS/OEM TIMING	DENTON, MD
PEETZ, BRUCE	TRIMBLE	LOS GATOS, CA
PELOSI, LOUIS	CAST NAVIGATION LLC	TEWKSBURY, MA
PERDIGAO, AL	THE BOEING COMPANY	EL SEGUNDO, CA
PEREZ, ALFREDO	HOLLOMAN 746 TS	ALAMOGORDO, NM
PEREZ BARTOLOME, JAVIER	EUROPEAN COMMISSION	BELGIUM
PERRY, CAROLYN	US DOT/RITA VOLPE CENTER	CAMBRIDGE, MA
PERSAUD, RUDY	FEDERAL HIGHWAY ADMINISTRATION	MCLEAN, VA
PERVAN, BORIS	ILLINOIS INSITUTE OF TECHNOLOGY	CLARENDON HILLS, IL
PESYNA, KENNETH	UNIVERSITY OF TEXAS AT AUSTIN	AUSTIN, TX
PETERSON, BENJAMIN	STANFORD UNIVERSITY	STANFORD, CA
PETOVELLO, MARK	UNIVERSITY OF CALGARY	CANADA
PETTIJOHN, JIMMY	NGA	RED BUD, IL
PHELTS, R. ERIC	STANFORD UNIVERSITY	STANFORD, CA
PIRIZ, RICARDO	GMV	SPAIN
POINTON, JOHN	OMNISTAR, INC.	HOUSTON, TX
POMIES , AXELLE	GALILEO SERVICES/FDC	FRANCE
POON, SAMANTHA	NOVATEL	CANADA
POPOVIC, ZELJKO	HONDA R&D AMERICAS, INC.	SOUTHFIELD, MI
POTTER, BJ	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
POTTLE, JOHN	SPIRENT COMMUNICATIONS	UNITED KINGDOM
POWERS, EDWARD	U.S. NAVAL OBSERVATORY	WASHINGTON, DC
PRATT, ANTHONY	QINETIQ LTD	UNITED KINGDOM
PRICE, ALFRED	SPAWAR	SAN DIEGO, CA
PRICE, GREG	TRIMBLE	NEW ZEALAND
PRICE, RANDY	DOD/NSA	EDGEWATER, MD
PRICE, SAMUEL	NASA	BALTIMORE, MD
PRILLAMAN, JEFFREY	U.S. NAVAL OBSERVATORY	WASHINGTON, DC
PROCTOR, ANDY	CHRONOS TECHNOLOGY LIMITED	UNITED KINGDOM
PROSKOW, SHAYNE	HEMISPHERE GPS	CANADA
PSIAKI, MARK	CORNELL UNIVERSITY	ITHACA, NY
PULGARIN, FELIPE	RAKON AMERICA LLC	EGLIN, IL
PULIDO HERRERA, EDITH	VIENNA UNIVERSITY OF TECHNOLOGY	AUSTRIA
PULLEN, SAM	STANFORD UNIVERSITY	STANFORD, CA
PURVES, GRAHAM	NOVATEL INC.	CANADA
QIU, DI	SIGTEM TECHNOLOGY, INC.	WOODSIDE, CA
QUAN, JAMES	NAVATEL, INC	CANADA
RADICIONI, FABIO	UNIVERSITY OF PERUGIA	ITALY
RAGUSE, ANGELA	FRAUNHOFER IIS	GERMANY
RAINEY, ROLAND	USAF/2 SOPS	SCHRIEVER AFB, CO
RAMANANDAN, ARVIND	UNIVERSITY OF CALIFORNIA, RIVERSIDE	RIVERSIDE, CA
RAMM, PETER	UNIVERSITY OF MELBOURNE	AUSTRALIA
RANSOM, DEAN	RAKON AMERICA LLC	EGLIN, IL
RAYKUNOV, GENNADY	CENTRAL RESEARCH INSTITUTE OF MACHINE BU	RUSSIA
REBOUL, SERGE	UNIVERSITY LILLE NORTH OF FRANCE	FRANCE
REICHENBACH, MATTHEW	JOINT NAVIGATION WARFARE CENTER	ALBUQUERQUE, NM
RENAUDIN, VALERIE	PLAN RESEARCH GROUP	CANADA
RENFRO, BRENT	APPLIED RESEARCH LABORATORIES/UT AUSTIN	AUSTIN, TX
REUSSNER, NICO	TU DRESDEN	GERMANY
REVNIVYKH, SERGEY	CENTRAL RESEARCH INSTITUTE OF MACHINE BU	RUSSIA
REYES, OLGA	DATAGRID	GAINESVILLE, FL
RICCIO, MICHAEL	THE AEROSPACE CORPORATION	LOS ANGELES, CA
RICE, JACOB	MINROBOTICS, INC	HAMPTON, VA
RICHTER, BERNHARD	LEICA GEOSYSTEMS	NORCROSS, GA
RIDAY, OSSIAN	DELORME PUBLISHING INC	YARMOUTH, ME
RIEGEL, STEVEN	JOINT NAVIGATION WARFARE CENTER	ALBUQUERQUE, NM
RIFE, JASON	TUFTS UNIVERSITY	MEDFORD, MA
RIGHETTI, PIERLUIGI	EUMETSAT	GERMANY
RIHNER, CHARLES	TOPCON POSITIONING SYSTEMS, INC.	LIVERMORE, CA
RILEY, JACK	NOAA	SILVER SPRING, MD
RILEY, STUART	TRIMBLE	SUNNYVALE, CA
RITTER, MICHAEL	NOVATEL INC.	CANADA
ROBERTS, FREDERICK	SAIC	EL SEGUNDO, CA
ROBINSON, SIERRA	INSIDE GNSS MAGAZINE	VALLEY VILLAGE, CA
ROBISON, DAVE	JET PROPULSION LABORATORY	PASADENA, CA
ROCHAT, PASCAL	SPECTRATIME	AUSTIN, TX
RODRIGUEZ , CARLOS	FEDERAL AVIATION ADMINISTRATION	WASHINGTON, DC, DC
RODRIGUEZ DE ANDRES, PEDRO	LOGICA	NETHERLANDS
ROHMER, GUENTER	FhG-IIS	GERMANY
ROMANS, LARRY	JET PROPULSION LABORATORY	PASADENA, CA
ROMBERG, JIM	BOEING	ST. CHARLES , MO
RORK, MEENAKSHI	LOCKHEED MARTIN	ROCKVILLE, MD
ROSENFELD, DVIR	CELLGUIDE LTD.	ISRAEL
ROSSETTI, JAYNNE	USDOT/VNTSC	CAMBRIDGE, MA
ROUGERIE, SEBASTIAN	CNES	FRANCE
RUDOLPH, STEPHAN	NORTHROP GRUMMAN LITEF GMBH	GERMANY
RUDZIK, LAUREL	RAYTHEON	FULLERTON, CA
RUE, PAUL	THE AEROSPACE CORP	LOS ANGELES, CA
RUSSELL, DAVID	VERIPOS	HOUSTON, TX
RUSSELL, STEVE	746TH TEST SQUADRON	HOLLOMAN AFB, NM
RUSSO, ANTHONY	NATIONAL COORDINATION OFFICE	WASHINGTON, DC
RYBA, MARTIN	BAE SYSTEMS	NASHUA, NH
RYU, BYUNG-HAN	ETRI	SOUTH KOREA
SADI, FAZLE	UNIVERSITY OF BRITISH COLUMBIA	CANADA
SAFIPOUR, EBRAHIM	LOGICA	NETHERLANDS
SAGE, GERALD	CONSULTANT	MOUNTAIN VIEW, CA
SAHMOUDI, MOHAMED	ISAE: INSTITUTE OF AERONAUTICS AND SPACE	FRANCE
SAITO, SUSUMU	ELECTRONIC NAVIGATION RESEARCH INSTITUTE	JAPAN
SAKAI, TAKEYASU	ELECTRONIC NAVIGATION RESEARCH INSTITUTE	JAPAN
SALINAS, JORGE	USAF/ 746TS	LAS CRUCES, NM
SALOS ANDRES, DANIEL	TESA / ENAC	FRANCE
SANTOS, PEDRO PAULO	NAVCON	BRAZIL
SATYANARAYANA, SHASHANK	UNIVERSITY OF CALGARY	CANADA
SAULAY, JEAN-PHILIPPE	NATO HEADQUARTERS BRUSSELS BELGIUM	BELGIUM
SCANNELL, ROBERT	ANALOG DEVICES, INC.	GREENSBORO, NC
SCHAAL, RICARDO	EESC-USP	BRAZIL
SCHAUER, GEORGE	GENERAL DYNAMICS AIS	SCOTTSDALE, AZ
SCHEERER, JOHN	LOCKHEED MARTIN SPACE SYSTEMS CO	SUNNYVALE, CA
SCHILLING, REINHOLD	STATE OF BAVARIA US OFFICE SF	SAN FRANCISCO, CA
SCHMIDKUNZ, ELIZA	INSIDE GNSS MAGAZINE	EUGENE, OR
SCHNEIDER, PETE	USAF/2 SOPS	SCHRIEVER AFB, CO
SCHROEDER, GLENN	BOOZ ALLEN HAMILTON	PALMDALE, CA
SCHUBERT, NICHOLAS	NOVATEL, INC.	CANADA
SCHUE, CHARLES	URSANAV INC.	WATERFORD, VA
SCOCA, ANTHONY	LOCKHEED MARTIN	HICKSVILLE, NY
SCOTT, LOGAN	LS CONSULTING	FORT COLLINS, CO
SEALS, KELLY	US COAST GUARD	NEW LONDON, CT
SECO-GRANADOS, GONZALO	UNIVERSITAT AUTONOMA DE BARCELONA	SPAIN
SELLA, GIOVANNI	NOAA-NGS	SILVER SPRING, MD
SENNOTT, JAMES	TRACKING & IMAGING SYSTEMS, INC.	ST PETERSBURG, FL
SEYMEN, BURAK	ASELSAN INC.	TURKEY
SEYNAT, CEDRIC	EUROPEAN COMMISSION - DG-TREN/G/3	BELGIUM
SHADE, STEVEN	NAVCOM TECHNOLOGY	TORRANCE, CA
SHAN, JESSE	JAVAD GNSS, INC	SAN JOSE, CA
SHAO, YUNFENG	NAVCOM TECHNOLIGY	TORRANCE, CA
SHAW, MICHAEL	LOCKHEED MARTIN SPACE SYSTEMS CO	BURKE, VA
SHEIKH, SUNEEL	ASTER LABS, INC.	SHOREVIEW, MN
SHENG, FANG	RAYTHEON COMPANY	FULLERTON, CA
SHERRARD, BRAD	U-BLOX AMERICA, INC.	RESTON, VA
SHERRELL, CHAD	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
SHEWFELT, JOHN	SiRF TECHNOLOGY, INC.	SAN JOSE, CA
SHI, JUNBO	UNIVERSITY OF CALGARY	CANADA
SHIVELY, CURT	THE MITRE CORPORATION	MCLEAN, VA
SHOCKLEY, JEREMIAH	AIR FORCE INSTITUTE OF TECHNOLOGY	BEAVERCREEK, OH
SHOHARA, NORI	SAIC	EL SEGUNDO, CA
SHOME, PRADIPTA	FEDERAL AVIATION ADMINISTRATION	WASHINGTON, DC
SHUAI, HAN	HARBIN INSTITUTE OF TECHNOLOGY	CHINA
SIGMOND, MARIT	KONGSBERG SEATEX AS	NORWAY
SILVAS, JOHN	BOOZ ALLEN HAMILTON	EL SEGUNDO, CA
SIMEON, RAYMOND	CAST NAVIGATION, LLC	TEWKSBURY, MA
SIMON, DAVID	TOTAL	FRANCE
SIMON, JERAD	SANDIA NATIONAL LABORATORIES	ALBUQUERQUE, NM
SIMPSON, PHILIP	ARMY RESEARCH LABORATORY	WHITE SANDS MISSILE RANGE, NM

Pre-registered ION GNSS Attendees — As of September 9, 2010

SKAGGS, JAY	FAA, FLIGHT STANDARDS DIVISION	ANCHORAGE, AK
SKALOUD, JAN	EPFL TOPO	SWITZERLAND
SKALSKI, HANK	AFSPC/OST	PETERSON AFB, CO
SKONE, SUSAN	UNIVERSITY OF CALGARY	CANADA
SKORSKI, LAWRENCE	USG	STERLING, VA
SLATTERY, RHONDA	THE AEROSPACE CORPORATION	Los Angeles, CA
SMEARCHECK, MARK	AIR FORCE INSTITUTE OF TECHNOLOGY	KETTERING, OH
SMITH, BERNALD	SOARING SOCIETY OF AMERICA-RETIRED	FREMONT, CA
SMITH, CODY	UNIVERSITY OF COLORADO	BOULDER, CO
SMITH, MORGAN	TOPCON POSITIONING SYSTEMS, INC.	LIVERMORE, CA
SNOW, CARLTON	NASA WALLOPS FLIGHT FACILITY	WALLOPS ISLAND, VA
SNOW, KYLE	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
SNYDER, DAVID	CDC/NIOSH	PITTSBURGH, PA
SO, HYOUNGMIN	SEOUL NATIONAL UNIVERSITY	SOUTH KOREA
SOEN, KIYOAKI	AMTECHS CORPORATION	JAPAN
SOMIESKI, ALEXANDER	U-BLOX AG	SWITZERLAND
SON, SEOK BO	HANYANG NAVICOM CO., LTD.	SOUTH KOREA
SONG, JUNESOL	SEOUL NATIONAL UNIVERSITY	SOUTH KOREA
SOUDER, MICHAEL	LOCKHEED MARTIN	SUNNYVALE, CA
SOUHAMI, MARCELO	AVERNA	CANADA
SPARKS, LAWRENCE	JET PROPULSION LABORATORY	PASADENA, CA
SPAULDING, STEPHEN	ITT -APT	BOHEMIA, NY
SPIEGELBERG, MATT	NATIONAL INSTRUMENTS	AUSTIN , TX
STANSELL, THOMAS	STANSELL CONSULTING	RANCHO PALOS VERDES, CA
STANTON, BILL	LINQUEST CORPORATION	COLORADO SPRINGS, CO
STAUFFER, BRANDON	ASRC MANAGEMENT SERVICES	OKLAHOMA CITY, OK
STEINER, STEPHEN	GPSW/EN	EL SEGUNDO, CA
STEPANIAK, MICHAEL	AIR FORCE INSTITUTE OF TECHNOLOGY	ATHENS, OH
STEPHANE, LOUIS-JOSEPH	SAGEM DEFENSE ET SECURITE	FRANCE
STEVENS, MARK	CAST NAVIGATION, LLC	TEWKSBURY, MA
STEVENSON, JOHN	QINETIQ	UNITED KINGDOM
STILES, PAUL	NOVATEL	CANADA
STIMPSON, ADRIAN	RX NETWORKS INC.	CANADA
STOEBER, CARSTEN	UNIVERSITY FAF MUNICH	GERMANY
STOLTMAN, KEVIN	GPS WORLD	SANTA ANA, CA
STOLZ, RALF	TRIMBLE TERRASAT GMBH	GERMANY
STRADA, JOSEPH	THE AEROSPACE CORPORATION	FAIRFAX, VA
STRUTT, MIKE	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
STUDENNY, JOHN	CMC ELECTRONICS, INC.	CANADA
STUEBS, MARK	NAVCOM TECHNOLOGY, INC	TORRANCE, CA
STURM, RAY	HONEYWELL	PLYMOUTH, MN
SU, HUA	THALES ATM GMBH	GERMANY
SU, XIAN-LI	SHANGHAI JIAO TONG UNIVERSITY	CHINA
SUARD, NORBERT	CNES	FRANCE
SUGIMOTO, SUEO	RITSUMEIKAN UNIVERSITY	JAPAN
SUITA, TOM	KVH INDUSTRIES, INC	MIDDLETOWN, RI
SUN, QINFANG	ATHEROS COMMUNICATIONS	SAN JOSE, CA
SUTTON, DAVID	L-3 INTERSTATE ELECTRONICS CORPORATION	ANAHEIM, CA
SUZUKI, KAZUSHI	NEC CORPORATION	JAPAN
SWIDER, RAY	OASD/NII	BURKE, VA
SWIEK, F MICHAEL	UNITED STATES GPS INDUSTRY COUNCIL	WASHINGTON, DC
SWINDEN, RICHARD	SELEX SYSTEMS INTEGRATION	UNITED KINGDOM
SYED, ZAINAB	THE UNIVSERSITY OF CALGARY	CANADA
SYLVA, KRISTEN	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
SYRJÄRINNE, JARI	NOKIA INC.	FINLAND
TA, TUNG	POLITECNICO DI TORINO	ITALY
TACCI, SERGIO	SATEL USA	CUPERTINO , CA
TAGGART, DOUGLAS	OVERLOOK SYSTEMS TECHNOLOGIES, INC.	VIENNA, VA
TAKASU, TOMOJI	TOKYO UNIV OF MARINE SCIENCE AND TECH	JAPAN
TAM, THOMAS	THE AEROSPACE CORP	LOS ANGELES, CA
TAMAZIN, MOHAMED	UNIVERSITY OF CALGARY	CANADA
TAN, YONG KHING	UNIV OF NEW SOUTH WALES	AUSTRALIA
TANG, HUI	UNIVERSITY OF NEW BRUNSWICK	CANADA
TAYLOR, DAVID	ENSCO, INC	GREENSBORO, NC
TAYLOR, JACK (JOHN)	BOEING SERVICE COMPANY	COLORADO SPRINGS, CO
TEICHNER, EVELYN	ITT	GRANADA HILLS, CA
TEN PAS BELL, KIMBERLY	HONEYWELL	HUNTINGTON BEACH , CA
TETEWSKY, AVRAM	THE CHARLES STARK DRAPER LABORATORY	CAMBRIDGE, MA
THIELECKE, JOERN	UNIVERSITY OF ERLANGEN	GERMANY
THOELERT, STEFFEN	GERMAN AEROSPACE CENTER	GERMANY
THORNBERRY, CHARLES	DW INTERNATIONAL	UNITED KINGDOM
TIBERIUS, CHRISTIAN	TU DELFT	NETHERLANDS
TIWARI, RAJESH	GEOMATICS ENGINEERING DEPT	CANADA
TOERMAE, AULIS	SATEL OY	FINLAND
TOLMAN, BRIAN	APPLIED RESEARCH LABORATORIES/UT AUSTIN	AUSTIN, TX
TORIMOTO, HIDEYUKI	GNSS TECHNOLOGIES INC.	JAPAN
TOROK, KENNETH	THE BOEING COMPANY	LOS ANGELES, CA
TOSSAINT, MICHEL	EUROPEAN SPACE AGENCY	NETHERLANDS
TRACH, WALTER	ROCKWELL COLLINS	CEDAR RAPIDS, IA
TRAN, LUAN	JT3, LLC	EDWARDS, CA
TRAUTENBERG, HANS	EADS ASTRIUM	GERMANY
TRINKLE, MATTHEW	THE UNIVERSITY OF ADELAIDE	AUSTRALIA
TROLLER, MARC	SKYGUIDE (SWISS AIR NAVIGATION SERVICES)	SWITZERLAND
TRUFFER, PASCAL	SKYGUIDE (SWISS AIR NAVIGATION SERVICES)	SWITZERLAND
TRUNZO, ANGELO	USAF 746 TEST SQUADRON	HOLLOMAN AFB, NM
TUCCI, ANTJE	MUNICH SATELLITE NAVIGATION SUMMIT	GERMANY
TURETZKY, GREGORY	SiRF TECHNOLOGY, INC. / CSR	SAN JOSE, CA
TURNER, DAVID	U.S. DEPARTMENT OF STATE, OES/SAT	WASHINGTON, DC
UCHIYAMA, MASAYUKI	GEOSURF CORPORATION	JAPAN
UELAND, GARD	GALILEO SERVICES/ KONGSBERG SEATEX	FRANCE
UNWIN, MARTIN	SURREY SATELLITE TECHNOLOGY LIMITED	UNITED KINGDOM
UPTAIN, CHRISTINE	COE-746TH TEST SQUADRON	HOLLOMAN AFB, NM
URBANIAK, ROBERT	PIKTIME SYSTEMS	POLAND
VALDES, STEVE	AEROANTENNA TECHNOLOGY, INC.	CHATSWORTH, CA
VAN DER WENDEN, ERIK	ESA GALILEO PROJECT OFFICE	NETHERLANDS
VAN DIERENDONCK, A.J.	AJ SYSTEMS	LOS ALTOS, CA
VAN DIERENDONCK, KEITH	NOVATEL, INC.	CANADA
VAN DIGGELEN, FRANK	BROADCOM	SAN JOSE, CA
VAN DYKE, KAREN	US DEPARTMENT OF TRANSPORTATION	LORTON, VA
VAN HEES, JAN	SEPTENTRIO SATELLITE NAVIGATION	BELGIUM
VAN MEERBERGEN, GEERT	SEPTENTRIO	BELGIUM
VANCE, BECKY	USSTRATCOM/J844	OFFUTT AFB, NE
VANNICOLA, FRANCINE	NAVAL RESEARCH LABORATORY	WASHINGTON, DC
VAUJIN, MICHAEL	RAYTHEON MISSILE SYSTEMS	ORO VALLEY, AZ
VEGA, GUILLERMO	U.S. COAST GUARD NAVCEN	ALEXANDRIA, VA
VEITSEL, ANDREY	TOPCON POSITIONING SYSTEMS	RUSSIA
VENABLE, DON	AIR FORCE RESEARCH LAB	WPAFB, OH
VENTRUP, MICHAEL	FMT	DENMARK
VERHOEF, PAUL	EUROPEAN COMMISION	BELGIUM
VETH, MICHAEL	ADVANCED NAVIGATION TECH. CENTER	WPAFB, OH
VINANDE, ERIC	USAF AFRL/RYRN	CENTERVILLE, OH
VINCENT, FRANCOIS	ISAE	FRANCE
VIVIANI, TAMI	AEROANTENNA TECHNOLOGY, INVC.	CHATSWORTH, CA
VOLLATH, ULRICH	TRIMBLE TERRASAT GMBH	GERMANY
WAELCHLI, GREGOIRE	EPFL	SWITZERLAND
WAGNER, WALTER	US ARMY ELECTRONIC PROVING GROUND	FT. HUCHUCA, AZ
WAITE, STEVE	GPS NETWORKING INC.	PUEBLO, CO
WALKER, ANDREW	SPIRENT	UNITED KINGDOM
WALSH, MARK	ARTECH HOUSE	NORWOOD, MA
WALTER, TODD	STANFORD UNIVERSITY	STANFORD, CA
WAN, XIAOGUANG	SHANGHAI JIAO TONG UNIVERSITY	CHINA
WANG, JINLING	UNIVERSITY OF NEW SOUTH WALES	AUSTRALIA
WANG, MIN	NAVCOM TECHNOLOGY, INC.	IRVINE, CA
WANG, YONGQUAN	SHANGHAI HUACE NAVIGATION LTD.	CHINA
WARD, PHILLIP	NAVWARD GPS CONSULTING	GARLAND, TX
WARE, MILES	HEMISPHERE GPS	SCOTSDALE , AZ
WEBER, ROBERT	UNIV. OF TECHNOLOGY, VIENNA	AUSTRIA
WEILL, LAWRENCE	L. R. WEILL CONSULTING	SEAL BEACH, CA
WEINGARTH, LEN	NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY	ARNOLD, MO
WEIR, KIMBERLY	EAST MIDLANDS DEVELOPMENT AGENCY	ALEXANDRIA, VA
WEISS, JAN	JET PROPULSION LABORATORY	PASADENA, CA
WELLM, RONNY	SENSONOR TECHNOLOGIES AS	NORWAY
WENG, CHINTANG	MEDIATEK INC.	TAIWAN (ROC)
WESSON, KYLE	UT AUSTIN	AUSTIN, TX
WESTON, NEIL	NOAA	SILVER SPRING, MD
WHARTON, THOMAS	DEPT OF DEFENSE	CHARLOTTESVILLE, VA
WHEATLEY, CHARLES	QUALCOMM	SAN DIEGO, CA
WHELAN, DAVID	BOEING	SEAL BEACH, CA
WHITE, JOSEPH	MARYLAND SHA	BALTIMORE, MD
WHITEHEAD, MIKE	HEMISPHERE GPS	SCOTTSDALE, AZ
WHITEMORE, CHARLEY	WHITE SANDS MISSLE RANGE	LAS CRUCES, NM
WILDE, JOHN	DW INTERNATIONAL LTD	UNITED KINGDOM
WILES, GEORGE	NSWC DAHLGREN	DAHLGREN, VA
WILKIEWICZ, PETER	JAVAD GNSS, INC.	SAN JOSE, CA
WILLIS, HARLAN	GPS NETWORKING, INC	PUEBLO , CO
WILSON, DAVID	U.S. NAVAL RESEARCH LABORATORY	WASHINGTON, DC
WILSON, MARK	SPIRENT FEDERAL SYSTEMS	YORBA LINDA, CA
WINKEL, JON	IFEN GMBH	GERMANY
WINKLER, LORI	NOVATEL INC	CANADA
WINTER, JOSEPH	DFAT	AUSTRALIA
WISEMAN, BRIAN	METROPOLITAN WATER DISTRICT	LA VERNE, CA
WOLF, ROBERT	IFEN GMBH	GERMANY
WOLFE, DAVID	U.S. COAST GUARD C2CEN	PORTSMOUTH, VA
WON, DAE HEE	KONKUK UNIVERSITY	SOUTH KOREA
WON, JIHYE	INHA UNIVERSITY	SOUTH KOREA
WORMELL, DEAN	INTERSENSE INC.	BILLERICA, MA
WRIGHT, PETER	JT3, LLC	EDWARDS, CA
WU, CHENG A.	THE AEROSPACE CORPORATION	LOS ANGELES, CA
XI, RUIFENG	SANDER GEOPHYSICS LTD.	CANADA
XU, ZILI	UNIVERSITY ADELAIDE	AUSTRALIA
YAHAGI, TOSHIHIRO	GEOSPATIAL INFORMATION AUTHORITY OF JAPA	JAPAN
YAJIMA, KIYOSHI	LIGHTHOUSE TECHNOLOGY & CONSULTING CO.,	JAPAN
YAKOS, MIKE	NAVDYNE, LLC	CEDAR RAPIDS, IA
YAMADA, HIDEKI	TOKYO UNIVERSITY OF MARINE SCIENCE AND T	JAPAN
YANG, CHUN	SIGTEM TECHNOLOGY, INC.	SAN MATEO, CA
YATES, DON	746 TS USAF	ALAMOGORDO, NJ
YE, PING	SHANGHAI JIAO TONG UNIVERSITY	CHINA
YI, YUDAN	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
YONG, YANG	OLINKSTAR CO LTD	CHINA
YORK, JOHNATHAN	APPLIED RESEARCH LABORATORIES/UT AUSTIN	AUSTIN, TX
YOSHIHARA, TAKAYUKI	ELECTRONIC NAVIGATION RESEARCH INSTITUTE	JAPAN
YU, WEI	NAVCOM TECHNOLOGY INC	TORRANCE, CA
ZHAN, XINGQUN	SHANGHAI JIAO TONG UNIVERSITY	CHINA
ZHANG, JIEYING	ZESS, UNIVERSITY OF SIEGEN	GERMANY
ZHANG, JOHN	CROSSBOW TECHNOLOGY	MILPITAS, CA
ZHANG, YUJIE	NAVCOM TECHNOLOGY INC.	TORRANCE, CA
ZHAO, KEDAN	ARINC	CALIFORNIA, MD
ZHAO, SIHAO	TSINGHUA UNIVERSITY	BOULDER, CO
ZHAO, XING	UNIVERSITY OF CALGARY	CALGARY, AB
ZHDANOV, ALEXEY	TOPCON POSITIONING SYSTEMS, INC	LIVERMORE, CA
ZHODZISHSKY, MARK	TOPCON POSITIONING SYSTEMS, CIS	RUSSIA
ZHU, LIANG	TSINGHUA UNIVERSITY	CHINA
ZHU, LIZHI	NDT SYSTEMS AND SERVICES	HOUSTON, TX
ZHU, MAO HUA	BEIJING RESEARCH INSTITUTE OF TELEMETRY	CHINA
ZIEDAN, NESREEN	ZAGAZIG UNIVERSITY	EGYPT
ZINOVIEV, ALEXEI	TOPCON POSITIONING SYSTEMS	RUSSIA
ZINTSOV, EUGENE	TOPCON POSITIONING SYSTEMS	LIVERMORE, CA
ZWICKER, KIRK	NAUTEL	BANGOR, ME

ION GNSS 2010 Evaluation Form

We hope you enjoyed the ION GNSS meeting and have benefited professionally from the technical program, social events, and discussions with colleagues. To ensure that future meetings meet your needs, we would appreciate your input. Please assist us by completing this form and handing it in at the Registration Desk before you leave.

IN WHAT CAPACITY DID YOU PARTICIPATE AT ION GNSS?

Attendee ❑ Speaker ❑ Exhibitor ❑

Session Chair ❑ Other : _____

ION® SPONSORED ACTIVITIES	Excellent	Good	Fair	Poor
Wednesday Informal Luncheon	❑	❑	❑	❑
Thursday Informal Luncheon	❑	❑	❑	❑
Friday Awards Luncheon	❑	❑	❑	❑
Exhibitor Hosted Reception	❑	❑	❑	❑

CONFERENCE ORGANIZATION	Excellent	Good	Fair	Poor
Pre-Conference Information	❑	❑	❑	❑
Registration Process	❑	❑	❑	❑
Registration Materials	❑	❑	❑	❑

QUANTITATIVE vs. QUALITATIVE? Each year we receive far more abstracts than can be presented given the number of parallel tracks and days of this conference. To maintain the value of this meeting for participants and to plan for future meetings, we would like your opinion on the following options.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Expand the technical presentation program with more parallel sessions.	❑	❑	❑	❑
Don't change anything. Select only the best papers for presentation and alternates.	❑	❑	❑	❑
There are too many papers being presented. Scale back the technical program.	❑	❑	❑	❑
I was able to visit all the exhibit booths.	❑	❑	❑	❑
I would like more exclusive time in the exhibit hall so I do not have to miss any technical presentations to visit the exhibit booths.	❑	❑	❑	❑
Exhibit hours are about right.	❑	❑	❑	❑

GENERAL COMMENTS

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CONFERENCE SESSIONS	Excellent	Good	Fair	Poor
ION Plenary Session	❑	❑	❑	❑
Panel Discussions:				
Program Updates 1: GPS, GLONASS, Galileo, IRNSS, QZSS	❑	❑	❑	❑
Program Updates 2: High Integrity Systems	❑	❑	❑	❑
Deep Indoor Navigation—Which Technologies Will Prevail?	❑	❑	❑	❑
50th Anniversary of Kalman Filtering	❑	❑	❑	❑
Common Freqs. vs. Freq. Div. in Civil Signals – What is the Right Choice?	❑	❑	❑	❑
The Use of GNSS in Emergency Services	❑	❑	❑	❑
B1: GNSS Algorithms & Methods 1	❑	❑	❑	❑
C1a: Autonomous Vehicles	❑	❑	❑	❑
C1b: RAIM and/or Multi-Constellation RAIM	❑	❑	❑	❑
D1: Atmospheric Sciences	❑	❑	❑	❑
E1: Urban & Indoor Navigation Technology 1	❑	❑	❑	❑
F1: Pedestrian Navigation	❑	❑	❑	❑
A2: GPS IIF: From Inception to Launch	❑	❑	❑	❑
B2: GNSS Simulation and Testing	❑	❑	❑	❑
C2: Enhanced and Developing Systems	❑	❑	❑	❑
D2: Remote Sensing with GNSS & Integrated Sensors	❑	❑	❑	❑
E2a: Consumer Applications	❑	❑	❑	❑
E2B: Regulatory Service Applications	❑	❑	❑	❑
F2: LBS Technology and Applications	❑	❑	❑	❑
A3: Integrating System Capabilities at the GPS Wing	❑	❑	❑	❑
B3: New Product Announcements	❑	❑	❑	❑
C3: Aviation Applications	❑	❑	❑	❑
D3: Surveying & Geodesy	❑	❑	❑	❑
E3: GPS and GLONASS Modernization and Other Emerging GNSS	❑	❑	❑	❑
F3: Land Based Applications	❑	❑	❑	❑
A4a: NATO Military PNT & NAVWAR	❑	❑	❑	❑
B4: Software Receivers	❑	❑	❑	❑
C4: GNSS Space Based Augmentation Systems (SBAS)	❑	❑	❑	❑
D4a: Marine Navigation	❑	❑	❑	❑
D4b: Timing & Scientific Applications	❑	❑	❑	❑
E4: Integrity Monitoring for Next Generation Applications	❑	❑	❑	❑
F4: Urban & Indoor Navigation Technology 2	❑	❑	❑	❑
A5: Military GPS & Host Apps. Integ. for Robust PNT Solutions	❑	❑	❑	❑
B5: Precise Point Positioning & Network RTK	❑	❑	❑	❑
C5: GNSS Ground Based Augmentation Systems (GBAS)	❑	❑	❑	❑
D5: Space Applications	❑	❑	❑	❑
E5: Multi-Constellation User Receivers	❑	❑	❑	❑
F5: Portable Navigation Devices	❑	❑	❑	❑
B6: Statistical Signal Processing	❑	❑	❑	❑
C6: Next Generation GNSS Integrity for Aviation	❑	❑	❑	❑
D6: GNSS Algorithms & Methods 2	❑	❑	❑	❑
E6: Galileo System Design & Services, GPS/Galileo Interoper.	❑	❑	❑	❑
F6: Urban and Indoor Navigation Technology 3	❑	❑	❑	❑

What session topic should have been included that was NOT represented in this year's program? _____

OVERALL SATISFACTION	Excellent	Good	Fair	Poor
Please rate your overall satisfaction with this conference.	❑	❑	❑	❑

CONFERENCE EVALUATION	Significance to Me			Level of Professional Satisfaction		
	Important	Somewhat Important	Not Important	Satisfied	Somewhat Satisfied	Not Satisfied
Technical Information	❑	❑	❑	❑	❑	❑
Networking Opportunities	❑	❑	❑	❑	❑	❑
New Product Information	❑	❑	❑	❑	❑	❑
Ability to Assess Status of GNSS Technology	❑	❑	❑	❑	❑	❑
Assessment of GNSS Markets	❑	❑	❑	❑	❑	❑
Provided Direction for My Company	❑	❑	❑	❑	❑	❑

WHAT OTHER MEETINGS DID YOU ATTEND WHILE AT ION GNSS?

❑ CGSIC ❑ GNSS Solutions Tutorials ❑ NavtechGPS Tutorials ❑ RTCM

❑ Company Training for _____ ❑ Company Sales Meeting for _____

WHAT OTHER PROFESSIONAL MEETINGS DO YOU REGULARLY ATTEND?

❑ IEEE ❑ ENC ❑ AIAA ❑ AGU ❑ IEEE PLANS

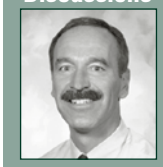
❑ Munich Satellite Navigation Summit ❑ Other _____

Portland, Oregon **ION GNSS 2010** Sept. 21-24, 2010

ION Plenary Session: Tuesday, Sept. 21 • 6:30 - 9:00 p.m. • Oregon Ballroom

The "Big Three" Issues for GPtS: Sustainment, Robustness, Interchangeability

ION Track Chairs

	Panel Discussions	Track A	Track B	Track C	Track D	Track E	Track F
	 Dr. John Betz, *The MITRE Corporation*	Mr. Martin Lopez, *Overlook Systems Technologies*	Dr. Alexander Mitelman, *Cambridge Silicon Radio, Sweden*	Ms. Deborah Lawrence, *Federal Aviation Administration*	Ms. Anthea Coster, *MIT Haystack Observatory*	Dr. Didier Flament, *European Space Agency, France*	Dr. Mark Petovello, *University of Calgary, Canada*
Wednesday, September 22	8:30 a.m.–12:15 p.m. Program Updates: (GPS, GLONASS, Galileo, IRNSS, QZSS) *Room C123-124*		8:30 a.m.–12:15 p.m. B1: GNSS Algorithms & Methods 1 *Room B113-116*	8:30–10:05 a.m. C1a: Autonomous Vehicles *Room A105-106* 10:35 a.m.–12:15 p.m. C1b: RAIM and/or Multi-Constellation RAIM *Room A105-106*	8:30 a.m.–12:15 p.m. D1: Atmospheric Sciences *Room B110-112*	8:30 a.m.–12:15 p.m. E1: Urban & Indoor Navigation Technology 1 *Room A107-109*	8:30 a.m.–12:15 p.m. F1: Pedestrian Navigation *Room B117-119*
	12:15–1:15 p.m., Informal Luncheon, Exhibit Hall • 1:15–1:45 p.m., Free Time in Exhibit Hall						
	1:45–5:30 p.m. Program Updates: High Integrity Systems *Room C123-124* 5:30–6:30 p.m. Galileo IS SIS ICD Exchange of Views with Industry *Room C123-124*	1:45–5:30 p.m. A2: GPS IIF: From Inception to Launch *Room A107-109*	1:45–5:30 p.m. B2: GNSS Simulation and Testing *Room B110-112*	1:45–5:30 p.m. C2: Enhanced and Developing Systems *Room A105-106*	1:45–5:30 p.m. D2: Remote Sensing with GNSS & Integrated Sensors *Room B117-119*	1:45–3:25 p.m. E2a: Consumer Applications *Room A103-104* 3:55–5:30 p.m. E2b: Regulatory Service Applications (Road User Charging, etc.) *Room A103-104*	1:45–5:30 p.m. F2: LBS Technology and Applications *Room B113-116*
	6:30–7:30 p.m., ION Government Fellows Information Booth, Outside Exhibit Hall Entrance						
	7:00–9:00 p.m., Exhibitor Hosted Reception, ION Exhibit Hall						
Thursday, September 23	8:30 a.m.–12:15 p.m. Deep Indoor Navigation–Which Technologies Will Prevail? *Room C123-124*	8:30 a.m.–12:15 p.m. A3: Integrating System Capabilities at the GPS Wing (Invited Papers Only) *Room B117-119*	8:30 a.m.–12:15 p.m. B3: New Product Announcements *Room B110-112*	8:30 a.m.–12:15 p.m. C3: Aviation Applications *Room A107-109*	8:30 a.m.–12:15 p.m. D3: Surveying & Geodesy *Room A103-104*	8:30 a.m.–12:15 p.m. E3: GPS and GLONASS Modernization and Other Emerging GNSS (Galileo, QZSS, IRNSS, COMPASS) *Room A105-106*	8:30 a.m.–12:15 p.m. F3: Land Based Applications *Room B113-116*
	12:15–1:15 p.m., Informal Luncheon, Exhibit Hall • 1:15–1:45 p.m., Free Time in Exhibit Hall						
	1:45–5:30 p.m. 50th Anniversary of Kalman Filtering *Room C123-124*	1:45–4:45 p.m. A4a: NATO Military PNT & NAVWAR (Invited Papers Only) *Room A103-104* 4:50–5:30 p.m. A4b: Results of the ION's 2010 Robotic Lawn Mower Competition *Room A103-104*	1:45-5:30 p.m. B4: Software Receivers *Room A105-106*	1:45–5:30 p.m. C4: GNSS Space Based Augmentation Systems (SBAS) *Room A107-109*	1:45–3:25 p.m. D4a: Marine Navigation *Room B117-119* 3:55–5:30 p.m. D4b: Timing & Scientific Applications *Room B117-119*	1:45–5:30 p.m. E4: Integrity Monitoring for Next Generation Applications *Room B110-112*	1:45–5:30 p.m. F4: Urban & Indoor Navigation Technology 2 *Room B113-116*
Friday, September 24	8:30 a.m.–12:15 p.m. Common Frequencies vs. Frequency Diversity in Civil Signals–What is the Right Choice? *Room C123-124*	8:30 a.m.–12:15 p.m. A5: Military GPS & Host Applications Integrations for Robust PNT Solutions *Room A103-104*	8:30 a.m.–12:15 p.m. B5: Precise Point Positioning & Network RTK *Room B110-112*	8:30 a.m.–12:15 p.m. C5: GNSS Ground Based Augmentation Systems (GBAS) *Room A107-109*	8:30 a.m.–12:15 p.m. D5: Space Applications *Room A105-106*	8:30 a.m.–12:15 p.m. E5: Multi-Constellation User Receivers *Room B113-116*	8:30 a.m.–12:15 p.m. F5: Portable Navigation Devices *Room B117-119*
	12:15–1:45 p.m., ION GNSS Awards Luncheon, Oregon Ballroom						
	1:45-5:00 p.m. The Use of GNSS in Emergency Services *Room C123-124*	1:45–4:50 p.m. B6: Statistical Signal Processing *Room B110-112*	1:45–4:50 p.m. C6: Next Generation GNSS Integrity for Aviation *Room A107-109*	1:45–4:50 p.m. D6: GNSS Algorithms & Methods 2 *Room A103-104*	1:45–4:50 p.m. E6: Galileo System Design & Services, GPS/Galileo Interoperability *Room A105-106*	1:45–3:20 p.m. F6: Urban & Indoor Navigation Technology 3 *Room B117-119*	