

IEEE/ION PLANS 2012

Ilir Progri, Giftet Inc.
Chairman, CEO, and President

The 2012 IEEE/ION Position Location and Navigation Symposium (PLANS) [<http://www.plansconference.org/>] was held at the Myrtle Beach Marriot Resort & Spa at Grande Dunes, Myrtle Beach, SC, April 23-26, 2012. This symposium is currently being cosponsored by the Institute of Electrical and Electronics Engineers (IEEE), the Institute of Navigation (ION), and the Aerospace and Electronic Systems Society (AESS), and it is held once every two years in the United States. The PLANS 2010 conference report is located in [1].

I. PLANS EXECUTIVE COMMITTEE

PLANS 2012 was fabulously put together by the PLANS 2012 Executive Committee which consisted of: (1) General Chair: Wayne Soehren, *Honeywell*; (2) Vice Chair: Phi; Dugandzic, *Northrop Grumman*; (3) Technical Program Co-chairs: Dr. Michael Veth, *USAF 46th Range Group* & Dr. Gary McCraw, *Rockwell Collins*; (4) Tutorials Chair: Chuck Bye, *Honeywell*, (5) Exhibits Chair: Dora Zueck, *SAIC* & Dan Murphy, *Hysitron, Inc.*; (6) Publicity Chairs Dr. Frank van Graas, *Ohio University* & Dr. Jacob Campbell, *AFRL/Sensors Directorate*; (7) IEEE/AESS Liaison John Weyrauch, *Allient Tech Systems* & Dr. Cosimo Stallo, *University of Rome, Italy*. PLANS 2014 might be looking for volunteers should any executive positions opens up. [Online: <http://www.plansconference.org/exec.cfm>].

II. PLANS TUTORIALS

The symposium was preceded by tutorials on April 23rd, 2012. Tutorials are a regular feature at PLANS and are designed to keep attendees up to date on the latest advances in navigation and broad areas of positioning, navigation, and timing (PNT). This year tutorials included: (1) *Sensor Integration for Personal Navigation* by Dr. Dorota Grejner Brezezinska; (2) *Fundamentals of Kalman Filtering for Navigation* by Dr. Mohinder Grewal; (3) *Contemporary and Emerging Inertial Sensor Technologies* by Mr. Ralph E. Hopkins; (4) *An Introduction to the GPS Signals and Receiver Processing* by Dr. Christopher Hegarty; (5) *GPS Error Characterization, Mitigation, and Analysis* by Dr. Chris Bartone; (6) *Kalman Filtering for GPS/INS Integration* by Dr. Mohinder Grewal; (7) *Alternative Navigation Methods Exploiting Integration with Inertial Sensors* by Dr. Maarten Uijt de Haag; and (8) *Nonlinear Estimation Techniques for Aided Navigation Systems* by Dr. Michael Veth. [Online url: <http://www.plansconference.org/tutorial.cfm>]; all the tutorials were well attended and many will be repeated at the next PLANS 2014.



Fig. 1. During the PLANS exhibitor hosted reception.

III. PLANS TECHNICAL PROGRAM

The symposium had four parallel technical sessions in the morning and four parallel sessions in the afternoon between April 24-26, 2012. This symposium includes: (1) international industry leaders such as Analog Devices, Broadcom, Honeywell, iKare, L3 Interstate Electronics Communication, NavCom, Northrop Grumman, NovAtel Inc., Qualcomm, Raytheon, Rockwell Collins, Systron Donner, The Aerospace Corporation, The MITRE Corp., UrsaNav. Inc., etc.; (2) government agencies such as Air Force Research Lab, Army CERDEC, C.S. Draper Laboratory, DARPA, NASA Jet Propulsion Laboratory (JPL), German Aerospace Center (DLR), Germany, Federal Aviation Administration, CNES, France; and academic institutions (3) Auburn University, Georgia Tech, Illinois Institute of Technology, National Cheng Kung University, Taiwan, Stanford University, The Air Force Institute of Technology, The Ohio University, The Ohio State University, Tufts University, University of Florida, University of Minnesota, University of New Brunswick, Canada, University of Texas, and Worcester Polytechnic Institute that contributed to an outstanding international program of twenty four sessions [Online: <http://www.plansconference.org/plans2012program.cfm>].

IV. PLANS EXHIBITS

Exhibits were available for the education of the attendees and the exhibits area was utilized for hosting social activities (see Fig. 1). The PLANS 2012 exhibitors included: (1) L-3 IEC; (2) Xsens Technologies BV; (3) Goodrich; (4) Northrop Grumman Navigation Systems; (5) Ideal Aerosmith; (6) CAST Navigation LLC; (7) KVH Industries; (8) Spirent Federal; (9) Honeywell International; (10) GPS World; (11) NovAtel Inc., Canada; (12) Colibrays; (13) Yole Développement; and (14) OFS-Specialty Photonics Division; [Online: <http://www.plansconference.org/exhibits.cfm>].



Fig. 2. Dr. Richard Greenspan—Dr. Richard Kershner Awards recipient.

V. PLANS AWARDS

A. Richard Kershner Award

Dr. Richard Greenspan is a Fellow and a Past President of ION; an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA), a lifetime member of the IEEE, and a member of the American Geophysical Union (AGU); associate editor of *NAVIGATION: Journal of the ION* since 1992; and consulting editor on navigation for McGraw-Hill's *Encyclopedia of Science and Technology* since 1998. He holds several patents in the area of satellite navigation technology, author of many excellent and often referenced technical papers and invited author of the "GPS and inertial integration" chapter [2]. He received his BS (1960), MS (1962) and Ph.D. (1968) in electrical engineering from Massachusetts Institute of Technology (MIT). At the PLANS 2012, **Dr. Richard Greenspan** was recognized with the **Richard Kershner Award** (see Fig. 2) [Online: <http://www.plansconference.org/kershner.cfm>].

"For his pioneering work in the integration of GPS receivers with inertial navigation systems and the development and perfection of carrier-phase GPS interferometry for the high precision measurement of fixed and moving baselines with applications to relative and differential ranging that cover the alphabet from Agriculture to Zoogeography (NB: the study of the distributions of animals)." [Online: http://www.ion.org/about_ion/pressRelease.cfm?id=47]

B. Walter Fried Award

J.A. Bhatti (see Fig. 3) and T.E. Humphreys, The



Fig. 3. Fried Award being presented by J. Weyrauch, IEEE/ION Liaison (left) to J.A. Bhatti (right).



Fig. 4. Dr. John Betz (left, T-AES Award Recipient), Hugh Griffiths, IEEE AESS President (middle), and Dr. Kevin Kolodziejcki (right, T-AES Award Recipient).

University of Texas at Austin; B.M. Ledvina, Coherent Navigation received the award for "Development and Demonstration of a TDOA-Based GNSS Interference Signal Localization System."

[Online: <http://www.plansconference.org/fried.cfm>].

C. IEEE Transactions on Aerospace and Electronic Systems Award

IEEE T-AES awarded Dr. John Betz and Dr. Kevin Kolodziejcki (see Fig. 4) for their two articles: "Generalized theory of code tracking with early-late discriminator, Part 1: lower bound and coherent processing," *IEEE Trans. AES*, vol. 45, no. 4, pp. 1538-1556, Oct. 2009 [3] and "Generalized theory of code tracking with early-late discriminator, Part 2: noncoherent processing and numerical results," *IEEE Trans. AES*, vol. 45, no. 4, pp. 1557-1564, Oct. 2009 [4] based on number of citations that they received since 2009.

D. Best Paper Awards

BEST PAPER IN TRACK A: "Inertial Sensors- Further Developments in Low Cost Calibration and Testing," Z. Berman, Berman Consulting and Training LTD, Israel



Fig. 5. Best Student Paper Award winner K. Pesyna (left) accepted award from W. Soehren, PLANS General Chair (right).

BEST PAPER IN TRACK C: “Opportunistic Radio SLAM for Indoor Navigation Using Smartphone Sensors,” R. M. Faragher, C. Sarno, and M. Newman, Sensor Systems, Advanced Technology Centre, BAE Systems, UK.

BEST PAPER IN TRACK D: “Collaboration-Enhanced Receiver Integrity Monitoring (CERIM) with Satellite Selection,” J. Rife, Tufts University.

BEST PAPER IN TRACK B: “Time-Frequency Analysis of Ionosphere Scintillations Observed by A GNSS Receiver Array,” J. Wang, Y. Morton, Q. Zhou, Miami University; F. van Graas, W. Pelgrum, Ohio University.

E. Best Student Paper Awards

“Constructing a Continuous Phase Time History from TDMA Signals for Opportunistic Navigation,” K. Pesyna (see Fig. 5), Z. Kassas, T. Humphreys, The University of Texas at Austin.

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REFERENCES

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