Workshops at ION GNSS 2012 on Thursday expanded discussion on China’s Compass/BeiDou-2 and Europe’s Galileo systems.

BeiDou, named after the Big Dipper constellation so well known to anyone navigating by the stars, will ultimately comprise 30 to 35 satellites and provide two levels of service.

The constellation has already been through a demonstration phase in which positioning information from the first three satellites was exchanged among a central control center, which calculated user positions, and mobile user equipment. BeiDou is now in its second phase in which mobile devices are able to calculate positions directly.

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The BeiDou-2 constellation has a total of 15 satellites so far including two launched on Wednesday that are still being tested. Another satellite will be launched before the end of the year.

The third phase, to be completed in 2020, will have at least 50 satellites and as many as 35. The 30-satellite constellation would have 3 GEO satellites, 3 inclined geosynchronous orbits (IGSO) satellites, and 24 in medium Earth orbits (MEO), said Dr. Yuanxi Yang, of the China National Administration of GNSS and Applications. He believes this will be the final configuration.

A 35-satellite constellation, which was mentioned several times during the ION presentations as part of China’s plans, would incorporate 5 GEO satellites, 3 IGSO satellite and 27 MEO spacecraft.

The program will offer a free-of-charge Open Service that, Jun Shen of BNStar Navigation System and Technology told attendees, will use the B1-C signal, an L-band signal centered at 1,575.42 MHz.

The Open Service has a 10- to 20-meter stand-alone accuracy now and is expected to improve to 10 meters, Yang said. The timing accuracy, now at about 20 to 30 nanoseconds, should improve to 15 nanoseconds in the future.

An encrypted Authorized Service will also be available, according to Yang, for key industrial users and the military. That service would be both more accurate and more robust.

A Wide Range Differential Service and a Position Report Service will be available to both sets of users. The differential service will use both on-the-ground augmentation and augmentation from the constellation itself to improve accuracy. The report service sends out a user’s position along with a short message of up to 12 Chinese words (as many as 24 English words.) These two-way messages cannot only be sent to a central system provider but back and forth between users.

Speakers underscored the desire within the BeiDou community to cooperate with other GNSS systems. The presenters suggested development of joint standards for GNSS signals and joint efforts to provide monitoring.

Galileo

Although BeiDou is somewhat farther along in deploying its constellation, the Galileo program has signed most of its contracts with suppliers and set a schedule to have its full constellation of 50 satellites in place by 2020, said Hilar Tork, from the European Commission.

“We have been criticized, of course, in the past for not reaching milestones and targets, for delays,” said Tork.

“One of the things we’ll be careful of now is to ensure that we don’t promise something that we don’t believe we can achieve... So, [with] the full 30-satellite constellation... we’re going to guarantee that’s going to be there by 2020.”

The GNSS community should get a better sense of whether that is achievable in less than a month. The next launch, which will loft two satellites to establish a four-satellite constellation, is scheduled to take place Oct. 10.

Although all the launch contracts and satellite construction deals are in place to achieve a 28-satellite constellation, it is not clear, Tork told the ION Show Daily, when an...
**NEW PRODUCT ANNOUNCEMENTS**

**CAST NAVIGATION OFFERS HANDHELD TOUCH-SCREEN GPS SIMULATOR**

The new CAST-55GX GPS satellite signal simulator from CAST Navigation (Booth 317/319) provides full-featured, dynamic, and repeatable GPS RF signals in a portable, lightweight handheld enclosure. Capable of generating L1 C/A-code signals from up to 16 satellites, the touch-screen–operated CAST-55GX can add optional P-code capability for use in the lab or in the field. Other features include operation with either a lithium-ion or lithium-polymer internal battery or a 110/230VAC 50/60 Hz power supply, external oscillator input, and IIP3 output. Based on CAST’s technology developed for use in larger military products, the simulator is delivered with CAST-XGnSS Basic software and three test scenarios.

**NOVATEL LAUNCHES OEM VERSION OF PINWHEEL GNSS ANTEenna FOR INTEGRATORS**

NovAtel Inc. (Island Booth F) unveiled its new Pinwheel OEM at ION 2012 this week. An antenna module that can be easily integrated into end-user GNSS positioning products, the Pinwheel OEM has a small form factor measuring only 143 x 230 millimeters, the antenna module receives GPS L1/L2, GLONASS L1/L2 and L-band signals and provides increased multi-path rejection and phase center stability.

**TOPCON ADDS QUARTZ LOCK LOOP TO NEW FIRMWARE VERSION OF MINI-G GPS SIMULATOR**

Topcon Positioning Systems (Island Booth G) has announced the release of Firmware v4.0 on all Topcon OEM GNSS platforms. The new firmware version introduces Quartz Lock Loop (QLL) technology designed for “superior GNSS tracking in high-vibration environments,” according to Douglas Lampion, TPS product manager for GNSS systems. QLL technology is an innovative approach to mitigating the effects of shock and vibration through patented algorithms. QLL continuously monitors system behavior — over a full range of vibration frequencies and magnitudes — to detect and remove fluctuations that may cause tracking problems.

**NVS TECHNOLOGIES LAUNCHES MULTI-GNSS MODULE FOR MINI-PCIe**

NVS Technologies AG (Booth 706) introduces the NVBNC-Mini PCIe, a fully integrated GNSS receiver module, optimized for Mini PCI Express (Mini-PCIe)-based applications. According to the company, the module’s key feature is full compatibility with GPS, GLONASS, Galileo, and Compass GNSS systems as well as satellite-based augmentation systems: QZSS, EGNOIS, WAAS, MSAS, and GAGAN. The NVBNC-Mini PCIe’s specifically designed for integration into a wide range of computer–based navigation, positioning, and timing equipment.

**NAVTECHGPS HANDLES CHRONOS HANDHELD JAMMING DETECTOR FOR U.S. MARKET**

The CTL3500 handheld GPS jamming detector from Chronos Technology (Booth 219) currently available in the United Kingdom, will now be available in the United States through NAVTECHGPS (Booth 323). The CTL3500 is designed to detect the presence of too much GPS satellite power or non-GPS signal and interference broadcasting on the GNSS L1 channel, which could indicate inadvertent interference or intentional electronic warfare attacks or the use of commercial jammers intended to jam GPS signals. The battery-operated device uses low-noise signal amplification with precision SAW filters and logarithmic detection to detect interference to GPS sensor signals.

**SEPTENTRIO DUAL-FREQUENCY RECEIVER SUPPORTS DGNS SERVICE**

Septentrio (Booth S17/159) has announced that the TERRASTAR differential GNSS capability has been incorporated into the company’s dual-frequency, 136-channel GPS/GLONASS receiver, the Astrolux R2eL. HDC.

**DEIMOS ENHANCES GRANADA SIMULATOR**

DEIMOS Spaces (Booth 227) introduces the introduction of GRIP (GNSS Receiver Prototype Builder) for its GRANADA simulator. GRIP enables the implementation and analysis of receiver algorithms on real hardware, a friendly real-time user interface in Matlab, allowing access to internal receiver registers, and features GPS and Galileo signals including E5ab/EBOC. The company also announced the new release of the GNSS Blockset for Matlab/Simulink and the Environment and Navigation software simulation tool to design and study new signal processing algorithms and receiver architectures. In the GRANADA, the blockset enables analysis of GPS and Galileo constellation performance and the generation of raw receiver data observables.

**Random Fixes**

**Rohde & Schwarz Shows New GNSS simulation Solutions**

Rohde & Schwarz (Booth 119/121) is demonstrating the latest advances in navigation-based simulation software. The SMBV100A simulation platform includes advanced algorithms in the loop simulation, automatic observation demonstration, and real-time moving receiver simulation using a commercial smartphone mapping application software. The SMBV100A supports GPS L1/L2 (C/A- and F-code), GLONASS L1/L2, and Galileo E1, as well as hybrid constellations and user-defined AGC (assisted GPS) test scenarios, with simulations of up to 24 satellites in real-time. The simulator also supports digital communications standards (GSM, WCDMA, HSPA+, LTE, WiMAX, WLAN, etc.) and radio standards (DVB, Sirius XM Satellite Radio, HD Radio, and FM stereo) in the same instrument.

**GPS Networking Prepares for ISO 9001 Audit**

GPS Networking (Booth 422) has announced that in January of 2013 it will undergo Stage 1 of the ISO 9001:2008 Audit. Stage 2 of the Audit and Certification are scheduled for the end of the first quarter 2013. In preparation for the Stage 1 Audit, GPS Networking underwent an evaluation process that included quality management-system development, a management system document review, pre-audit, and initial assessment. Stage 2 will consist of the Certification Audit. The certification of compliance with ISO-9001-2008 recognizes that the policies, practices, and procedures of our company ensure consistent quality in the product and services we provide our clients. GPS Networking believes that the decision to pursue ISO 9001:2008 certification demonstrates the company’s dedication to its customers’ needs and a commitment to providing quality services.

**Trusted Positioning Names Goodall CEO**

Trusted Positioning (Booth 722) has announced the appointment of Dr. Chris Goodall as CEO. Dr. Goodall has served as the company’s President and previously as a co-founder and previously CEO of Trusted Positioning, will remain as chairman of the board. Trusted Positioning has also appointed Dr. Zainab Syed as vice-president of engineering, and Dr. Jacques Geoffroy as vice-president, R&D.

**Sensonor Takes Part in a Long Journey to Mars**

Sensonor’s remote exploration vehicle, the Curiosity rover, has joined its exciting exploration of the red planet. The Curiosity has a large payload of advanced scientific equipment and includes a high-precision MEMS sensor for atmospheric analysis. These SW380 silicon MEMS sensors are designed and manufactured by Sensonor.

**Inside GNSS Celebrates Lucky 7, Another Webinar Ahead**

Inside GNSS magazine (Booth 715/717) has reached seven years of age — a number associated with perfection, luck, and wonder. At least two of those characteristics describe the feelings of the IGM team exactly. IGM has participated in the transformation of the technology from simply 1–3 GNSS systems to within shouting distance of four operational global systems, numerous regional ones, and a multitude of new signals. In addition to the printed version of the magazine which reaches more than 35,000 readers — including 10,000 outside the United States — Inside GNSS offers the twice-monthly SIGNALS e-newsletter. The next Inside GNSS offering is a free webinar with (participants) on August 20.

**Passing of the Torch**

This past summer the Satellite Division held its election for Satellite Division Officers who will take office at the conclusion of ION GNSS 2012. The following individuals were elected and will serve on the Satellite Division Executive Committee for a two-year term of office.

**Committee**

Chair: James L. Morton, a co-founder and previously the company’s vice-president for applications. These SW380 silicon MEMS sensor chips are designed and manufactured by Sensonor.

**Secretary:** Dr. Anthea Coster, MIT Haystack Observatory

**Treasurer:** Dr. Mark Black, Petullo, University of Carolina

**Immediate Past Chair:** Dr. John Rapuett will continue to serve on the Satellite Division Executive Committee for an additional two years as the Immediate Past Chair. Two International Technical Representatives will also be appointed.

**Coastal Carolina University (Okas)**

**Vice Chair:** Dr. John Betz, MIT/ITRF Corporation

**Executive Committee**

**Director:** Dr. Pratap Misra, who has served on the Satellite Division Executive Committee for the last decade. He obtained his engineering degree from the University of Waterloo and his Ph.D. in geomatics engineering from the University of Calgary. Dr. Naser ESMehrody, co-founder and previously CEO of Trusted Positioning, will remain as chairman of the board. Trusted Positioning has also appointed Dr. Zainab Syed as vice-president of engineering, and Dr. Jacques Geoffroy as vice-president, R&D.

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Presentation Award Winners

Best Presentation Award winners are selected by their respective session co-chairs. Seventy percent of the selection criteria is based on the technical content and innovation, 20 percent is based on the quality of the presentation materials and their applicability to the topic, and 10 percent is based on the quality of the delivery. All winners will be mailed certificates and their papers will be highlighted in the ION GNSS 2013 proceedings CD-ROM. Those winners not yet named will appear on the ION website in the next issue of the ION Newsletter.

Session A1: GNSS NL05 and Multi path Error Mitigation using Advanced Multi-Constellation Consistency Checking by Heigh Allen (Z. Jiang and F.S. Quiney, University College London, UK)

Session B1: SkyView: Real time GNSS Signal Monitoring for Testing GNSS-based Automotive Applications: M. Dundrum, W. Roberts, D. Ives, and J.B. Lauer, Zephyr UK; P. Fernand, S. Werner; and C. Patras, InoTETS, ADIRUX UK

Session C1: Performance Impact: Topography for Cloud Break GNSS Procedures: Mark Thomas, H淖tter, Scymantec, Pascal Hitzel, Wolf/Scymantec, Arnaud Reza, Air Navigation Services, Switzerland; Thomas Hoelschal, Swiss Air Force, Switzerland

Session A2: Analytical simulation model of POCKET technique for Company B1 and B2 Signals: K. Zhang/_HEADER/ National University of Defense Technology China; Hongjie Zhou; Beijing Institute of Tracking and Telecommunication Technology, China; Fei Wang, National University of Defense Technology, China

What is Achievable with Current COM- PASS Constellations? Planning for GNSS Research Center in Graz, Austria; Geoffrey King, Austrian Research Center for Geo-Information; Hans Obrecht, German Research Center for Geoinformation; and Jochen Weidert, German Aerospace Center (DLR), Germany.

Session E1: Low Power ASRC, GPS Tracking and Localizing the Trade-Off Between Accuracy: B.Z. Tang, S. Longfield, Jr., S.A. Bhave, and R. M. Mathias, Cornell University, USA

Session F1: Hybrid Positioning with 30ppm-LTE and GPS: Employing the Frequency Discrimination: M. Kheder, E. Staudinger, and M. Carrera, Germany; and A. D. Dray, German Aerospace Center (DLR), Germany.

Session A2 Against Feature Matching via Mechanical Properties: K.A. Rich, J. Rapaport, J. Krings, and P. R. Greiner, Research Laboratory


Session E2: Blind Adaptive Beamformer on Orthogonal Projections for GNSS: Yunqian Ma, Wayne Soehner, and David Pasquini, Stanford University; and Yunqian Ma, Wayne Soehner, and David Pasquini, Stanford University.

Session F2: Physical-Statistical Channel Model for Joint GNSS and Mobile Radio Band Positioning: J. L. Jesus, A. Luengo, and U. Ruckel, German Aerospace Center (DLR), Germany

Session A3: Proposed Industry Solution to Realize Universal GNSS Observations: Interoperability for Precision Positioning: F. Taky, A. Cala, M. Carucci, E. Vales, and S. Pissos, National Technical University of Athens, Greece; S. Pissos, National Technical University of Athens, Greece; and A. Cala, National Technical University of Athens, Greece

Session F3: Three Axis Magnetometer Navigation in Suburban Areas: Jesenšek; A. Scholz; and J. Koch, Ra.One, Air Force Institute of Technology

WHATSOEVER, continued from page 1

A resolution agreement will be reached to build the last four satellites.

The ability to let that contract and a secure a launch deal will depend largely on the European Parliament. They must approve a recently submitted Galileo budget that requests roughly €7 billion for the years 2014 through and including 2020. Also awaiting approval, said Tork, is a new GNSS regulation — the law that will enable them to carry out all of their activities.

“The new regulation is on the table right now, it is not totally authorized or approved but it is stable. It is supported by the member states.”

While not “a done deal,” Tork said, they expect that the final solution will be close to what is now proposed.

Part of what is awaiting approval is a delineation of new roles. The European GNSS Agency or GSA is expected to take the lead in promoting and implementing the services that Galileo will provide. The Commission will then ease out of its lead role, said Tork.

The GSA officially took up residence at its new headquarters location in Prague, Czech Republic, on September 1.

ION GNSS 2012 Program Committee: Dr. Thomas Paris, JEN GmbH, Germany; Bernard Richter, Leica Geosystems, Switzerland; Prof. Manel Zait, University College London, UK; Dr. Germana Geppert-Braunstein, The Ohio State University; Dr. John Raque, Air Force Institute of Technology; Dr. Todd Walter, Stanford University; Dr. John marble, Pierre Arduino, Paris University, Distrance Xavier College; Dr. Frank von Diggelen, Associate: John Nelson, Rockwell Collins.

Previous Kepler Award Winners at ION GNSS 2011 (from left to right): Dr. Penina Axelrad (99); Dr. A. Van Dierendonck (99); Dr. Todd Walker (10); Patrick Fenton (66); Dr. Cary McGraw (11); Dr. Per Enges (80); Thomas Stansell (83); Dr. Richard Langley (87); Dr. Robert Hath (94)

ION GNSS 2012 Program Committee: Dr. Todd Walter, Stanford University; Dr. Prasad Misra, Tufts University; Dr. John Raque, Air Force Institute of Technology; Dr. Jude Marmos, More University; Dr. Allan Kardy, University of Wisconsin; Dr. Daniel Stoh, California State University; Not pictured: Tim Murphy-Bunting, Paul Kline, Aser Lake, Dr. Jose Angel Avila, Rodriguez, DIA, The Netherlands.

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Raquet Is Recognized for Leadership

Dr. John Raque will be recognized during Friday’s Awards Luncheon for his visionary leadership of the Satellite Division. During the four years that he has served on the Satellite Division Executive Committee (two years each as Chair and Vice Chair) he has been an avid supporter of the Satellite Division’s outreach, supporting the development of technical events such as the ION’s Robotic Lawn Mower and Autonomous Snowplow Competitions, ION GNSS Student Awards, and initiatives for the sustainable development of navigation, science, and technology in Africa. Further, he has participated in the further development of the ION GNSS conference’s organization and leadership which has included ION led pre-conference tutorials and recent updates to the ION’s bylaws and awards policy. The Institute extends its thanks.

WROKSHOPS, continued from page 1

THANK YOU!

The ION wishes to express its sincere appreciation for the support of its Show Daily advertisers: JAVAD GNSS and NovAtel, and to Inside GNSS magazine for its editorial contribution to the Show Daily.

Also, our thanks to the sponsors of the Internet magazine Inside GNSS, Lockheed Martin and NovAtel, Inc., to RX Networks for sponsorship of the Business Center and to Trimester for sponsorship of the ION GNSS Mobile Application.

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FRIDAY AT-A-GLANCE

REGISTRATION OPEN
8:00 a.m. – 12:00 p.m.

MORNING SESSIONS BEGIN
8:30 a.m. – 12:15 p.m.

PANEL DISCUSSION — QZSS WORKSHOP: DESIGN, IMPLEMENTATIONS, CURRENT STATUS & FUTURE OUTLOOK
Grand Ballroom East
Renaissance Nashville Hotel

EXHIBIT HALL OPEN
9:00 a.m. – 1:30 p.m.

THE JOHANNES KEPLER & BRADFORD W. PARKINSON AWARDS LUNCHEON
Grand Ballroom
Renaissance Nashville Hotel
12:15 PM – 1:45 PM
The winner of the coveted Kepler Award will be announced along with the Parkinson award winner. This event is included in a full conference registration. Tickets for partial registrants and guests may be purchased at the ION registration desk.

AFTERNOON SESSIONS BEGIN
1:45 p.m.

PANEL DISCUSSION — GLONAS WORKSHOP: DESIGN, IMPLEMENTATIONS, CURRENT STATUS & FUTURE OUTLOOK
Grand Ballroom East
Renaissance Nashville Hotel
J-Shield not only protects all GNSS bands, it also improves performance. It also allows precious bands near GNSS to be used for applications like broadband wireless that we desperately need.

Click the “Spectrum” icon and view interference in five different ways: A) AGC degradation, B) AGC variations, C) Spectrum shape, D) Deviations of C/No of satellites from standard values.

E) Real-time cycle slip monitoring. Middle screen above shows complete signal jam by a $400 jammer. Summary of all four analyses is shown in the “Spectrum Analysis” screen (below left).

Real-time Cycle Slip monitoring (Labeled “E” above) is the ultimate way to show the effect of interferences.

Lift & Tilt, Six parallel RTK engines and Visual Stakeout are our three other innovations.

Most items presented are patented or pending.