BUSINESS

Industry news and developments | GPS | Galileo | GLONASS

INTERGEO's Massive Marketplace

Every fall thousands of geospatial professionals travel to Germany for the largest geospatial exhibition on Earth. This year in Stuttgart, more than 17,000 attendees from 92 countries flooded the massive halls to examine a vast array of geospatial technology treats from 500+ exhibitors representing 30 countries.

GPS World staff reported live from INTERGEO, September 15–17, and filmed many interviews with exhibitors, highlighting new product releases in survey, mapping, and geoinformation: sensors, software, data processing, and hardware.

Tight deadlines and space constraints mean we can only show you brief highlights here. See the November issue for more complete stories, or, for further details immediately, see the article list at **www.gpsworld.com/live-from-intergeo-2015/**.

Here are only a few of the stories from INTERGEO that you will find there:
- Using the JAVAD TRIUMPH-LS Camera Offset Survey Feature
- Trimble Launches R2 GNSS Receiver.
- Applanix Offers Entry-Level Georeferencing Solution for Airborne Mapping.
- Topcon Releases Three New GLS Laser Scanners
- Septentrio Launches AsteRx-U and AsteRx-U Marine
- Hemisphere GNSS' Atlas Makes Trade Show Debut at INTERGEO
- Tallysman Introduces VeraPhase 6000 High-Precision GNSS Antenna.

Some early impressions from the floor:

Unmanned Aerial Vehicles. A few years ago, there were only a handful of UAV vendors here. Now, there is hardly an aisle that does not contain a quad-copter, fixed-wing aircraft or a UAV-related accessory. UAVs constitute most explosive and possibly gamechanging geospatial technology introduced in the past 25 years. But — one begins to feel that there might be more sellers than buyers, and that a down-select will come soon.

Inexpensive RTK. A growing audience is using high-precision tools based on GNSS and other technologies. These tools were traditionally reserved for land surveyors, but since they've become cheaper and easier to use, a much broader audience is adopting them.

L1 RTK is nothing new. Introduced almost 10 years ago, it wasn't accepted very well. Now, the UAV phenomena is breathing new life into L1 RTK receiver technology because it's driving the requirement for low-cost, high-precision GNSS receivers. L1 RTK GNSS are finally getting the love they were looking for nearly 10 years ago.

Antenova GNSS Antenna Integration

Antenova Ltd. has built a model design for on-board devices (OBD) and vehicle telematics. The OBD design uses three new antennas inside an OBD housing to link to GNSS satellite, Bluetooth and a terrestrial network, while obtaining optimum performance from all three antennas simultaneously, the company said. The design also features a small GNSS RF module to fix location.

Antenova uses its latest antennas in the OBD design:
- the Armata 3G FPC antenna for penta-band frequencies, which operates at 824–960 MHz and 1710–2170 MHz
- a new GNSS antenna named Bentoni operating at 1559–1609 MHZ
- the tiny Weii PCB-mounted antenna that provides a Bluetooth connection at 2.4 GHZ.

Antenova's new GPS/GNSS module M10578 is a complete receiver that provides accurate location tracking for OBDs. It uses the latest MediaTek chipset with an additional low-noise amplifier to give added performance when mounted under dashboards and out of line of sight with the sky.

CTIA Super Mobility 2015

What Mattered Most at Super Mobility Week

By Janice Partyka

In the past, the network operators (we once called them carriers) and device manufacturers owned the Cellular Telephone Industry Association (CTIA) show, where they made their biggest product reveals. This year, the energy focused on machine-to-machine (M2M) and Internet of Things (IoT). Those looking for the big product introductions of the past were disappointed.

One of the most pressing industry issues is spectrum. With wireless data forecast to grow ten-fold by the end of 2020, the industry is concerned that the 2016 spectrum auction will not be sufficient. Keynotes appealed for more spectrum to enable the U.S. to lead in 5G, just as it led in 4G. U.S. company-run operating systems are currently on nine out of 10 smartphones, worldwide. **FCC** Chief Tom Wheeler was at CTIA to give assurances that the spectrum auction slated for March 2016 will be successful and occur as scheduled.

AT&T had a flurry of announcements, including a partnership with car manufacturer **Jaguar Land Rover** North America, to supply car connectivity for features such as Wi-Fi hotspots, connected navigation and a suite of apps. Customers will be able to share wireless data between phones, tablets and vehicles. AT&T previously signed agreements with **Audi**, **BMW**, **GM**, **Ford**,

Tesla, **Nissan**, **Volvo** and **Subaru**.

Read Janice Partyka's full Wireless/LBS Insider column online at *www. gpsworld.com/opinions.* Free subscription at *gpsworld.com/ subscribe.*

GNSS + Inertial
Precise Positioning and Orientation

60mm x 67mm

THE TRIMBLE BD935-INS — A PRECISION GNSS + INERTIAL MODULE DELIVERING RTK AND ORIENTATION IN REAL TIME

The BD935-INS is a compact module that integrates triple frequency GNSS and MEMS Inertial sensors to provide precise real-time position and attitude.

FOR HIGH-PERFORMANCE, PRECISE POSITIONING IN A COMPACT, MOBILE-READY DESIGN
- 336 Channels
- GPS, GLONASS, Galileo and BeiDou
- Integrated 3-D MEMS Sensors
- 100Hz RTK Position and Orientation
- Also available in IP67 enclosure

The BD935-INS module features a high accuracy GNSS receiver for precise position and an integrated MEMS inertial sensor package for 3-D orientation to serve applications requiring position and attitude. The GNSS + Inertial combination delivers more stability and robustness than GNSS alone.

Trimble.

Trimble GNSS OEM

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UAV, Survey Markets Key for Maxtena Growth

At CTIA Super Mobility 2015, Vanja Maric, director of sales and marketing for Maxtena, pointed out the challenge that exists for antenna makers in an uncertain drone market: forecasting what's and planning for it.

"The problem with the drone space its so volatile and so fragmented, and it's very, very hard to predict," Maric said. "Speaking to industry leaders in the UAV market, they don't even know what it's going to be in three years."

That fragmentation is largely a dichotomy between the needs of the professional-grade market and recreational drone pilots, Maric said. Maxtena provides antennas for several large UAV manufacturers.

"It all comes down to the necessity of precision, and different industries have different needs. UAVs, for example: some use very simple GPS patch antennas, simple receivers, and precise

▲ **MAXTENA** GPS antennas on display at CTIA Super Mobility 2015.

location is not as important. Then, in the professional space, it is a necessity."

That necessity right now is in the survey market, particularly RTK solutions for construction and mining operations in emerging countries. Maxtena has seen an uptick in customers from Asia looking for antennas for BeiDou. More specifically, handhelds for lone-worker tracking

in open-pit mining in China has had "fantastic" growth. The M1227 antenna released earlier this year accomplishes this goal, Maric said.

"The antenna is the link between you and the satellite. That antenna has to be right; that's what most companies forget," Maric said. "You can have the best receivers and software in the world, but if you can't make the link you can't do it."

Broadcom's New Chip for Internet of Things

Broadcom Corporation has announced a new GNSS chip for Internet of Things (IoT) and wearable devices that simplifies integration of GNSS into low-cost products. The advanced chip enables devices such as fitness bands to deliver pinpoint location while consuming minimal power and in some cases can eliminate the need for a separate microcontroller (MCU).

The Broadcom BCM47748 removes a bulk of the signal processing from the device MCU by calculating position, velocity and time (PVT) on-chip, delivering significant system power savings. The chip uses intelligent firmware to extend battery life while also maintaining accuracy in speed, distance and position for an enhanced user experience.

By absorbing location computations on-chip, Broadcom not only reduces power consumption but can also dramatically lower costs for original equipment manufacturers (OEMs) by replacing the device MCU and reducing board space. Additionally, firmware inside the BCM47748 automatically adapts to user activity and context, whether biking, walking or running, to provide precise location results to the user, enabling performance that is not sacrificed for power savings.

Key features:
- PVT computed on-chip
- Integrated GNSS receiver with concurrent support for GPS and GLONASS, combined with accelerometer inputs to produce stable, accurate and low power speed and distance
- Context engine and adaptive firmware to enable low power consumption for every activity and context without compromising accuracy
- Ability to produce GNSS fixes with only 5mA current consumption in certain scenarios
- MCU host interfaces include SPI, UART or I2C
- Sensor interfaces include I2C master, SPI master, I2S, ADC and GPIO
- Large on-chip memory for enhanced PVT accuracy and customer applications
- Embedded processor with self-boot capability
- Geofencing and lifelogging capabilities
- 70 ball WLBGA package with 0.4mm ball pitch

The Broadcom BCM47748 is currently sampling with customers. Evaluation kits and reference designs are also available.

CTIA Super Mobility 2015

Autonomous Vehicles, Drones Next Big Thing for u-blox

Q&A at CTIA 2015 with Nick Papadopoulos, President of u-blox America

What is giving your automotive innovations longevity?

One of the things we have been working on is the development of our own LTE chipset, and that has advantages — for one, cost advantages — because LTE-only technology does not compete with our partners. So far, that actually allows us to develop new products, new modules based on our own LTE chipset, and expands our portfolio especially in North America, where we hope in the next few years LTE will be so prevalent you won't need any 2G or 3G.

We have also announced we are working very closely on the positioning side with several carmakers toward technology for autonomous vehicles. We've revolutionized positioning technology to the point you can identify which altitude you're at in a parking garage. That is expanding to allow additional accuracy in very adverse environments for preparation of so-called ADAS systems toward autonomous vehicles.

What can we expect from this technology in the next few years?

You have already today cars that park themselves. You have already today cars that are autonomous, but there are still passengers there just to monitor. A lot of the technology already there is actually based on our dead-reckoning technology. We are expanding around that in order to eventually truly allow autonomous vehicles to the point where those vehicles can actually park themselves in a valet scenario. Imagine driving up to a hotel and telling your car to go park yourself and it does it.

I do see in the next three-to-four years several carmakers launching vehicles that can drive autonomously on the highway. And they will need our technology for it.

What about usage in UAVs?

We're developing the technology to further improve position accuracy for delivery drones.

I see consolidation [in the UAV industry] eventually, but at the same time, I see proliferation of companies developing new types of drones.

PCTEST Expands Antenna Testing Capabilities with Rohde & Schwarz

PCTEST Engineering Laboratory, an accredited testing laboratory for wireless testing and certification, has expanded its over-the-air (OTA) conformance testing capabilities with the purchase of a CTIA-compliant R&S TS8991 Wireless Performance Test Chamber (WPTC) from Rohde & Schwarz.

The R&S TS8991 OTA Test System is configured with hardware and software extensions for legacy and LTE A-GPS, a R&S ZND vector network analyzer for passive antenna measurements and faster system calibrations, and a second antenna boom with additional R&S NRP power sensors for faster total radiated power (TRP) measurements. The entire system is controlled via R&S AMS32 wireless performance software.

As the number of technologies and the variety of mobile devices continue to increase, the ability to verify a device's radiated performance is becoming more important to ensure end-user quality of experience. For 4G/LTE, there are major developments involving the Internet of Things, machine-to-machine communication, LTE at 5GHz (LTE-U), assisted global navigation satellite system (A-GNSS), and carrier aggregation, which are driving the need for improved as well as additional OTA tests required for both carrier acceptance and industry conformance test plans.

"Every day we see the acceptance bar being raised and more test cases defined from operators and standard bodies such as CTIA and 3GPP," said PCTEST Lab president Randy Ortanez. "Rohde & Schwarz delivers and supports a complete turn-key solution for our OTA testing needs."
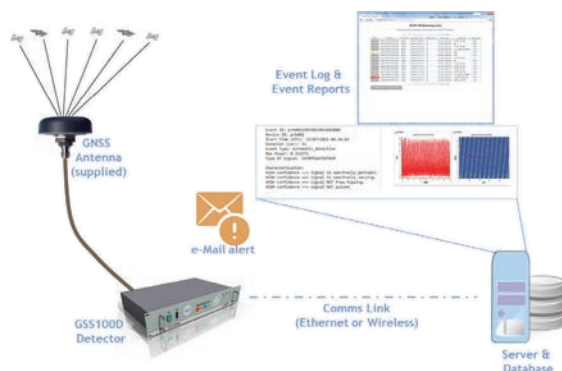
Spirent Robust Framework Evaluates Threats to GNSS

Spirent Communications has announced a Robust PNT Test Framework that evaluates GPS and GNSS security vulnerabilities for positioning, navigation and timing (PNT) systems.

Threats to GNSS and related PNT applications are more orchestrated and coordinated, with the motivation to disrupt or cause financial loss, Spirent said. The technology to disrupt GPS has also become much more accessible, resulting in GPS vulnerability gaining attention at hacker conventions.

The Robust PNT Test Framework will be used by technology, system and application developers where PNT is critical. Spirent's framework enables threats to be detected in the field, taken into the lab, and re-synthesized along with GPS and other GNSS signals. In addition, Spirent's threat intelligence library of actual and typical threats provides a wide range of GNSS segment errors and spoofing attacks, as well as space weather and other vulnerabilities for preventive troubleshooting.

"Spirent wants to move beyond talking about the increase of GNSS vulnerabilities and offer a pragmatic approach to enable informed decision making when it comes to

evaluating the impact of vulnerabilities," said John Pottle, marketing director of Spirent's Positioning Technology Division. "Through our Robust PNT Test Framework Spirent is pulling everything together to enable users to readily audit systems and take practical steps to improve resilience."

Developed in collaboration with Nottingham Scientific Ltd., GSS100D Detector enables detection, characterization and analysis of real GNSS threats.