» **OEM** / SIMULATION

Spirent, Qascom Improve Spoofing Resilience

Spirent Communications has teamed up with Qascom, an expert in GNSS signal security and authentication, to develop a test tool that reproduces spoofing attacks in a controlled laboratory environment. The test bed will concurrently simulate legitimate GNSS constellations and spoofed or hoax signals. It will enable positioning systems manufacturers to improve their products' resilience to hoax signals.

As GNSS becomes increasingly embedded in modern infrastructure for application timing and device positioning, the impact of spoofing attacks becomes greater. From mobile telephony to Internet banking, GNSS timing signals are used in many key systems, and yet there is no requirement on GNSS equipment to demonstrate any degree of robustness to block or even detect malicious attacks that disrupt performance.

Hoax or spoofing attacks work by mimicking genuine GNSS signals, which mislead GNSS receivers. Often affected receivers do not recognize when they are receiving fake signals and continue to operate normally, but provide false time or position information. This new test tool helps to develop systems that will detect and counter spoofing attacks by providing a fully controllable laboratory based, non-radiated test solution to evaluate a receiver's response to a range of spoofing attacks. The test tool controls the emulation of signals representing both the genuine GNSS signals and the false signals. This allows users to simulate a wide range of sophisticated attacks and monitor the response of the receiver under attack to then improve the resilience of the design against such attacks.

» **SIMULATION**

Loctronix Offers Software-Defined Radio Module

Loctronix Corporation, a provider of unified positioning solutions for GNSS-challenged environments, is making available its new software-defined radio (SDR) module, the ASR-2300, for developing high-performance positioning, navigation and timing, and communication applications.

The ASR-2300 delivers advanced SDR capabilities in a small, mobile form-factor enabling developers to readily create and field complex SDR-based solutions, Loctronix said.

The ASR-2300 has multiple, fully-integrated RF paths supporting reception of GNSS, cellular, ISM band, and UHF signals of opportunity. It will benefit SDR developers working on demanding scientific, military, aerospace and commercial/industrial applications, the company said

The ASR-2300 is a multiple-input and multiple-output (MIMO) transceiver module incorporating two wideband Field Programmable RF (FPRF) transceivers (300 MHz to 3.8 GHz) from Lime Microsystems, 10-axis accelerometer/gyro/compass/barometer sensors, and a large

programmable FPGA capable of over 300 MiB/sec sustained communications with a host processor via USB 3.0 interface.

The module's nine integrated RF path options and low size, weight, and power characteristics contribute to ease of integration and portability. Multiple ASR-2300s can be interconnected via an expansion port and/or UART interface, supporting real-time reception / transmission of 4, 6, 8 or more signals without additional hardware.

» **CONSUMER OEM** / TRACKING

Dedicated GPS Devices to Reach $7 Billion in 2018

Despite the continued decline of Personal Navigation Devices (PNDs), and the threat of smartphones, smart watches and eyewear, the portable GPS-enabled device market is forecast to continue to hold its own thanks to dedicated HUD/eyewear, cycling and health/tracking devices.

ABI Research's quarterly GNSS Database forecasts the new and emerging markets for GPS-enabled devices, and where the opportunities lie in terms of device formats and vertical markets. The report also considers the impact of competitive formats such as smartphone applications, wearable sensors, smart watches, and smart eyewear, providing a complete picture of drivers and inhibitors in this market.

Senior analyst Patrick Connolly comments, "The overall market is forecast to grow from 33.3 million units in 2012 to 36.79 million in 2018, following a brief dip in 2013 as PND declines outweigh growth in other areas. Total revenues will undergo a brief period of fluctuation from 2013 to 2015, before rising to $7.14 billion in 2018."

Dominique Bonte adds, "The markets for cycling computers, health/elderly, and fitness are starting to get interesting. As ASPs decline and smart watches become a more established part of our lives, the addressable market will be eaten up, limiting the growth potential for dedicated fitness devices. Looking longer term, ABI Research has forecast very strong growth for HUD/eyewear devices, particularly in the fitness, golf, and cycling categories. It would not be surprising to see an acquisition in this space over the next 12 months."

» **GOVERNMENT** / SPACE

UNB Tech Heads to Space

A GPS instrument designed by University of New Brunswick scientists is scheduled to be launched into space aboard the SpaceX Falcon 9 rocket on or after September 29. The rocket will depart Vandenberg Air Force base in California as part of the CASSIOPE (Cascade Smallsat and Ionospheric Polar Explorer) mission.

Richard Langley, *GPS World* Innovation editor and professor in geodesy and geomatics engineering at the University of New Brunswick, is a principal investigator behind the scientific portion of the CASSIOPE mission. Langley and his colleagues will monitor data from the GPS instrument, which is part of the Enhanced Polar Outflow Probe (e-POP) payload aboard the spacecraft.

E-POP will continue the sequence of Canada's orbiting space environment sensors, which began with Canada's first satellite, Alouette 1, launched in 1962 to study the ionosphere. e-POP is, perhaps, the most extensive suite of sensors for studying the ionosphere/magnetosphere/thermosphere yet to be launched, and will provide Canadian and other scientists with the opportunity to better understand the impact and variability the sun has on the space environment.

» **OEM** / DEFENSE

AFIT, Locata Partner on GPS Tech

The Air Force Institute of Technology (AFIT) and Locata Corporation have signed a Co-operative Research & Development Agreement (CRADA) to build and demonstrate new Locata multipath mitigation technology for use in GPS receivers. This cooperation is expected to leverage many years of proprietary Locata ground-based technology development to bring completely new capabilities to satellite-based GPS receivers, AFIT said.

▲ **LOCATA'S** VRay Orb 80 switching antenna.

The Air Force Institute of Technology, or AFIT, is the Air Force's graduate school of engineering and management as well as its institution for technical professional continuing education.

The CRADA is specifically directed to evaluate Locata's patented correlator and switching antenna technologies for use in positioning receivers running at GPS frequencies. Locata's engineers will transfer knowledge and experience they have gained with existing Locata commercial systems to help AFIT design and build an initial multi-element GPS-based switching antenna prototype, which is based on Locata's patents. This will ensure AFIT researchers and engineers can familiarize themselves with the new antenna's characteristics, and provide AFIT with an essential platform to develop GPS-specific versions of Locata's correlator and switching algorithms. When built, AFIT intends to use its GPS receiver and the prototype switching antenna to physically demonstrate the feasibility of using Locata technology to improve GPS receiver performance.

After initial prototypes are built, AFIT plans to design and test several other GPS-based versions of Locata's switching antenna array to assess how Locata's commercial antennas can be adapted to use cases which are of particular interest to the military. Designs already discussed with Locata include stand-alone antennas, arrays conformal to a vehicle's frame (such as a Humvee's roof or aircraft fuselage), and a version built into helmets.

AFIT personnel visited Locata's head office the week of April 29 for an introduction to the design fundamentals for this new type of antenna,and an introduction to a production version (see photo).

» SURVEY / PHOTOGRAMMETRY

TRIUMPH-LS Receiver Features 864 Channels

JAVAD GNSS has launched a new version of the TRIUMPH GNSS receiver, which features 864 channels — more than any receiver it has yet offered. The TRIUMPH-LS land survey receiver offers, in addition to the 864 GNSS channels, three powerful processors, 256 I/O, 24 digital filters, 24 anti-jam filters and 14-MB program memory all in a single chip, which uses less power and makes the total system less expensive, according to the company.

Javad Ashjaee, CEO and founder, explained the decision to incorporate 864 channels. "Some questioned the need for the 216 channels. They now realize the need for 440 channels. We assign multiple channels to each satellite for redundancy and reliability. We use more than 100 channels to scan GNSS bands for interference — 864 channels

is the key to reliable performance."

The TRIUMPH-LS provides visual stake-out, six parallel RTK engines, more than 3,000 coordinate conversions, advanced coordinate geometry features, and rich attribute tagging on a high-resolution 800 x 480 pixel display. When used in photogrammetry, offsets can be calculated using the internal camera for 10-centimeter accuracy, or an external camera for 5-centimenter accuracy. TRIUMPH-LS is the first JAVAD GNSS receiver to offer photogrammetry for land survey.

Other features include versatile attribute tagging, feature coding, automatic photo and voice documentation, and an interference monitoring and reporting feature.

The TRIUMPH-LS has a battery life of 25 hours in RTK rover mode with full screen brightness and UHF/GSM. The total weight of the system — including radio, controller, pole and 25 hours of internal battery — is 2.5 kilograms.

Built on a tough magnesium alloy chassis, all connectors, SIM cards, and micro-SD cards are protected against harsh environmental conditions. It automatically updates all firmware via Wi-Fi, and has a built-in GNSS full tracking antenna.

» **OEM** / SIMULATION

Racelogic Launches LabSat3

LabSat, the GPS record, replay, and simulation brand produced by Racelogic in the UK, is being augmented with the introduction of LabSat3.

The key feature of the new product is its simplicity, according to Racelogic. The single-box device incorporates a GPS record-and-replay system without the need for a laptop or PC. Racelogic has designed the LabSat3 with convenience at its core: it is small and light, allowing users to record GPS signals in any situation, the company said. It will also come with a pre-recorded library of worldwide scenarios to allow engineers to perform immediate bench testing.

The new LabSat is able to record signals from GPS, GLONASS, Galileo, BeiDou, QZSS, and SBAS, with the top of the range models able to output two channels simultaneously. Both the recording and replay procedures are simple one-touch operations, with data being logged to an SD card.

▲ LABSAT3

LabSat3 is compatible with scenarios generated with SatGen software for those that wish to create full simulations. Ethernet connectivity extends its potential to end-of-line testing where multiple units can be remotely controlled, with potentially large savings in production line testing times.

» **DEFENSE** / SECURITY

Rockwell Awarded SDR Contract

Rockwell Collins has received a 2 million contract from the Air Force Research Laboratory (AFRL) to develop and demonstrate a secure software-defined radio (SDR) GNSS receiver capability.

GNSS typically refers to equipment that can receive signals from multiple navigation satellite systems including GPS, GLONASS, Galileo, and the Chinese BeiDou system. By utilizing multiple available satellite signals, a GNSS receiver can provide improved navigation performance and signal availability.

Hosted in a software-defined radio, this AFRL program will develop the security architecture required for the receiver equipment certifications.

» DEFENSE / SECURITY

Raytheon UK Receives Anti-Jam Order

Raytheon UK has taken its first order for a pre-production MiniGAS, the latest in GPS Anti-Jam technology, designed and manufactured by the company in the U.K. This contract, awarded by an undisclosed customer, requires Raytheon UK to produce demonstrator units for customer evaluation.

MiniGAS is the latest in Raytheon's GPS anti-jam family of products, and it aims to be the lightest and smallest GPS anti-jamming system produced by Raytheon UK. It will have flexible form factors, suited to land, unmanned aerial vehicles and missile platforms. Raytheon is also producing demonstration units of its Landshield high performance digital anti-jam product for customer evaluation.

Raytheon has also received an order for a further 100 of its Advanced Digital Antenna Production (ADAP) systems with the U.S. government. To date, more than 500 ADAP systems and more than 6,600 GAS-1 systems have been delivered to the U.S. government and other international customers. Raytheon continues to deliver GPS anti-jam systems to Northrop Grumman Italia for the Eurofighter Typhoon aircraft.

» OEM / SURVEY

Trimble Module Has Triple Frequency GNSS Support

Trimble has introduced the Trimble BD930 module as part of its GNSS OEM portfolio. The module features triple-frequency support for GPS and GLONASS plus dual-frequency support for BeiDou and Galileo constellations. Capable of receiving a wide range of commercially available GNSS signals, the 220-channel BD930 takes advantage of all available signals to provide optimal and reliable RTK centimeter positioning, the company said.

The BD930 is an easy-to-integrate form factor, 41 x 51 millmeters, for demanding conditions and applications such as high-precision navigation and control, robotics and lightweight unmanned vehicles, Trimble said. Compatible with the Trimble BD920 receiver, the module tracks all available GNSS constellations including GPS, GLONASS, Galileo and BeiDou. The advanced engine provides GNSS, DGNSS and RTK positioning in challenging environments. Flexible connectivity options — Ethernet, RS232 or USB — provide fast data transfer and easy configuration via standard Web browsers.

» SECURITY / JAMMING DETECTION

Exelis Signal Sentry Test Locates Jamming Threats

Signal Sentry 1000, an Exelis product that detects and locates GPS interference sources in 3-D by using longitude, latitude and altitude has demonstrated successful results during a planned field testing event held in September at the Vidsel Test Range in Sweden.

The test employed eight sensors positioned in an array pattern and showed that Signal Sentry was able to successfully detect and locate the jamming source. Having demonstrating interference detection and location capability, Signal Sentry 1000 can be deployed to collect actionable intelligence for law enforcement and protect GPS signal-dependent critical infrastructures.

» EVENTS

ION Precise Time and Time Interval Meeting

December 2 –5, Bellevue, Washington
www.ion.org/ptti/

PTTI is an annual conference sponsored by the Institute of Navigtion with a technical program designed to disseminate and coordinate PTTI information at the user level, review present and future PTTI requirements, inform government and industry engineers, technicians, and managers of precise time and frequency technology and its problems, and provide an opportunity for an active exchange of new technology.

Fourth ESA Colloquium on Galileo

December 4–6, Prague, Czech Republic
www.congrexprojects.com/2013-events/13c15/

The fourth International Colloquium on Scientific and Fundamental Aspects of the Galileo Programme will contribute to ESA's implementation and definition of the evolution of the European GNSS. The gathering of major academic players provides a scientific reference for institutional executives and industry, as well as offering a platform for promoting innovative GNSS initiatives at large.

Sixth European Workshop on GNSS Signals and Signals Processing

December 5–6, Munich, Germany
http://ifen.bauv.unibw.de/gnss-signals-workshop/index.html

This workshop provides an overview of GNSS signals and related processing techniques.

ENC-GNSS 2014

April 14–17, 2014, Rotterdam, Netherlands
www.enc-gnss2014.com

ENC-GNSS 2014 will cover all aspects of positioning, navigation and timing developments and applications. Special sessions will be organized for innovations and their commercialization.

■ **SURVEY** / CONSTRUCTION

Entry-Level Handheld

The LT400HS is a rugged 120-channel GPS+GLONASS handheld receiver designed to achieve sub-meter to RTK centimeter accuracy in adverse mapping conditions. It is designed for companies that have not yet invested in GNSS technology due to cost or occasional equipment use, such as for earth moving, landscaping, real estate development, construction, irrigation, and utilities mapping.

Features include a professional 120-channel GNSS engine (L1/L2 GPS + GLONASS supporting RTCM network RTK corrections and industry-standard NMEA output), 3.7-inch daylight readable transflective VGA touchscreen, built-in GSM/GPRS phone with data transmission, Bluetooth and Wi-Fi connectivity, and built-in 5-megapixel autofocus camera to capture asset information. It comes bundled with Carlson's SurvCE software for survey and construction professionals, or DigiTerra Explorer Mobile GIS software for accurate GIS field data collection and maintenance.

CHC, *www.chcnav.com*

■ **CONSTRUCTION** / MAPPING

Mobile GIS Tablet Attachment

The AsteRx-m GeoPod upgrades professional tablet PCs with a high-accuracy GNSS receiver, giving the user access to sub-meter, or centimeter positions without specialized equipment, through a standard USB connection.

The GPS+GLONASS receiver offers tracking and positioning algorithms designed for professional applications such as construction, field service, utility mapping, highway maintenance, government mapping, and emergency services. Included RxAssistant software configures the receiver and connection to NTRIP-capable RTK or DGNSS networks, allowing seamless integration with existing software applications like Esri ArcGIS for mobile.

Septentrio, *www.septentrio.com*; **Esri BeLux**, *www.esribelux.com*

■ **SURVEY** / NETWORK

Reference Station Software Update

Reference station network software TopNET+ v10 brings new features and functionality to the TopNET+ reference station software suite. Topcon's TopNET+ software is a scalable solution supporting everything from a single CORS station to multiple CORS sites covering a large geographical area. Users of a TopNET+ reference network get GNSS RTK correction data generated using information from all reference stations in a network. Features include custom sub-networks based on a rover's position within a larger regional network, which better supports the network RTK rover to local field conditions, and RINEX (Receiver Independent Exchange Format) shop with expanded data management functionality for conversion of data from Topcon and third-party reference stations connected to the network.

Topcon Positioning Group, *www.topconpositioning.com*

■ **SURVEY**

PC Tablet for Surveying

The Trimble Tablet PC for surveying is a lightweight, rugged, and highly mobile field computer that can operate with Trimble's suite of receivers and total stations to provide a complete surveying solution. With Trimble Access field software, the Trimble Tablet streamlines the flow of information between the field and office while also allowing surveyors to run the applications they need to perform office work directly from the field. The tablet offers a seven-inch capacitive multi-touch screen in a form factor that measures 6.3 x 9.6 inches and weighs three pounds. An extended battery set provides up to 16 hours of operation.

With the Microsoft Windows 7 Professional operating system, a 1.6 GHz Intel Atom dual-core processor, 4 GB RAM, and 128 GB of flash-based storage, the Trimble Tablet allows surveyors to run a variety of applications. Connectivity is available via Bluetooth, Wi-Fi, and a built-in 3.75G GSM modem. Using the multi-touch capacitive touchscreen, surveyors can type, pan, and zoom with their fingers, a stylus, or capacitive gloves. The large display features new technology created specifically to enhance sunlight readability. Jobsite documentation is possible using the Trimble Tablet's built-in 5MP camera with autofocus and built-in flash capabilities, while simultaneously providing geotag functionality using integrated GPS.

Trimble, *www.trimble.com*

■ **DEFENSE** / AVIATION

Tactical-Grade MEMS IMU

NovAtel has added Sensonor's commercially exportable OEM-IMU-STIM300 to its SPAN GNSS + INS line of positioning products. The OEM-IMU-STIM300 is a micro electromechanical system (MEMS) inertial measurement unit (IMU) that integrates with NovAtel's OEM6 receiver technology to provide a powerful 3D continuous position, velocity, and attitude solution. The OEM-IMU-STIM300 comes in a small form factor and offers tactical-grade performance capabilities. NovAtel's proprietary MEMS Interface Card (MIC) integrates the OEM-IMU-STIM300 with NovAtel's OEM6 receiver products for full SPAN navigation capabilities. The STIM300 IMU is designed for stabilization, guidance, and navigation applications in industrial, aerospace, and defense markets, such as inertial navigation systems in UAVs, AUVs, AGVs, UGVs, and ROVs.

NovAtel, *www.novatel.com*

■ **WIRELESS** / TIMING

Temperature Sensing MEMS Resonator

Sand 9 Temperature Sensing MEMS Resonators (TSMR) have high Q, low Rm, an integrated temperature sensor and an integrated calibration heater for demanding wireless applications, including GPS/GNSS. The TSMR architecture consists of a piezoelectric MEMS resonator hermetically sealed in a WLCSP with a resistive temperature detector and calibration heater integrated monolithically into the MEMS die. The WLCSP die is 50 percent smaller than the smallest quartz device, and can be co-packaged with wireless integrated circuits for integration in smartphones and tablets.

Sand 9 TSMR products offer ten times better thermal coupling than quartz by physically integrating the temperature detector and calibration heater with the MEMS resonator, resulting in high-precision temperature compensation at <10 ppb/s. TSMR products feature fast start-up time as well as superior activity dip performance, resulting in an extremely reliable timing source. TSMR products are high-quality, rugged devices, for use in harsh environments.

Sand 9, www.sand9.com

■ **TRANSPORTATION** / MARINE

GNSS Mobile for Offshore Positioning

The Veripos LD7 integrated mobile receiver unit is a multi-frequency system featuring GNSS heading, L-band positioning, and wireless communication capabilities. Typical use is for the provision of high-accuracy heading output combined with high-accuracy positioning data for vessel systems.

Compatible with both GPS and GLONASS networks, the fully ruggedized 272-channel system includes an additional processor for on-board configuration and customized applications separate from its GNSS engine. Integral wireless options include Bluetooth and an optional full-band UHF radio modem for RTCM or RTK corrections. It features an extended range of interface facilities for data output, timing and event marks in addition to a second antenna port for GNSS heading.

Veripos, *www.veripos.com*

■ **TRANSPORTATION** / AVIATION

Light Craft Flight Unit

The AvMap Ultra EFIS is a stand-alone unit providing air data, attitude, heading and altitude reference for flights. It has a 3.5-inch ultra bright, Sunlight Readable LCD display. The unit is compact (49.5 miilimeters deep) and weighs 145 grams.

The unit can be installed in a standard panel and connected to the included GPS receiver and to the aircraft Pitot-static system to provide reliable and advanced ADAHRS. Designed for light-sport, ultra-light, and experimental aircraft, the AvMap Ultra EFIS contains solid-state gyros, accelerometers, magnetic field sensors, air data sensors and UAV Navigation motion processor.

AvMap, *www.avmap.us*

■ **TRANSPORTATION** / FLEET TRACKING

Commercial Fleet Tracking Integration

iTRAK Corporation has integrted iTRAK Fleet Executive (iFE) cloud-based software, the iTRAK WebApp software for tablets and smartphones, and iTRAK's wireless GPS tracking equipment with the Magellan RoadMate Commercial 5190T-LM fleet navigation unit. The combined product allows remote tracking of vehicles and handsets in the field, while integrating with the Magellan commercial product to provide in-cab navigation voice prompts and terminal text messaging.

The new product, combined with a heavy-duty engine interface, will meet EOBR/ELD standards while providing customers with the flexibility, efficiency and reduced liability required by today's professional carriers and heavy-duty equipment operators. Features include a 5-inch WVGA touch screen, customizable truck routes, ability to turn off truck road attributes for use in passenger vehicles, free lifetime traffic alerts, multiple stop routing, and hours of service tracking. Truck-specific points of interest are included. The combined product will provide affordable and safe fleet tracking, communication and navigation functions for commercial trucking, service vehicles, government, and sales fleets.

iTRAK, *www.itrak.com*

■ **OEM** / CONSUMER

Consumer-Grade Receiver

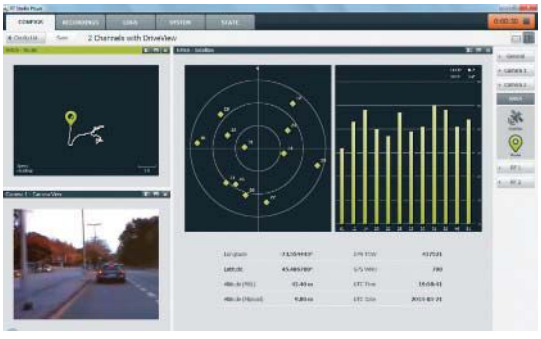
The S1216F8 GPS receiver module has a fast consumer-grade 50-Hz update rate and supports GPS, QZSS, WAAS, EGNOS, MSAS, and GAGAN satellite signal reception. It is based on SkyTraq's newest 55-nm Venus 8 GPS/GNSS chipset.

The Venus 8 incorporates an IEEE-754 compliant floating-point unit (FPU). With RISC/FPU running at 100 MHz, the S1216F8 GPS receiver module has fast and accurate position/speed response, suitable for UAV, RC plane flight logging, and high-performance race car or speed boat datalogging applications. When running at lower 1-Hz, 5-Hz, or 10-Hz update rate, the S1216F8 receiver can be used as a typical GPS receiver module currently available on the market. The module measures 12 x 16 millimeters and consumes 26mA @ 3.3V during continuous navigation at the 50-Hz update rate.

SkyTraq Technology, *www.skytraq.com.tw*

■ **OEM** / SIMULATION

Record and Playback



RF Studio software offers advanced RF record-and-playback tools for field capture and lab playback of real-world RF spectrum, including GNSS, radio, video, and location data. Noise figure, spectrum, power, histogram views, and more are available to speed up signal work. Users can quickly and easily record RF, audio, and video signals, as well as NMEA data, and then play back the recordings anywhere, visualizing the signals and impairments for in-depth, repeatable analysis and product testing.

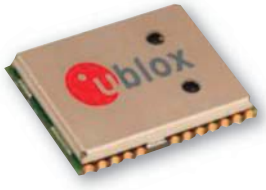
The software is available for multiple Averna platforms and National Instruments' Software Defined Radio Platform (USRP), converting the USRP into a portable and cost-effective RF system for the recording and playback of real-world GNSS signals.

The software includes user-friendly tools for logging, manipulating, and archiving real-world signals. Plug-in architecture supports additional hardware, channels, user inputs, remote triggering, and a distributed control interface.

Averna, *www.averna.com*

■ **OEM** / SIMULATION

Sub-Meter Positioning Module



The NEO-7P is a low-power, compact, high-precision GPS module that is backwards compatible with the NEO-6P. It achieves standalone sub-meter precision based on single-frequency precise point positioning (PPP) technology. Fully autonomous sub-meter performance can be realized for most outdoor applications within coverage of SBAS (WAAS, EGNOS, and MSAS). In areas where SBAS is unavailable, the NEO-7P achieves high accuracy based on Differential GPS (DGPS) positioning as an alternative to PPP. The NEO-7P addresses many requirements for precise positioning in surveying, mapping, marine, and clear-sky recreational applications. The module is suitable for vehicle, industrial, and consumer applications.

u-blox, *www.u-blox.com*

■ **OEM** / SIMULATION

Simulator with BeiDou Support

The NavX-NCS GNSS multi-frequency simulator now supports China's BeiDou-2 navigation satellite system. BeiDou support is a key enhancement in software update V.1.9 for the NavX-NCS GNSS multi-frequency simulator product line. Users now have the flexibility to support a wide range of constellations, frequencies, and channels for research and development of GNSS safety and professional applications, as well as system integration and production testing of mass-market applications, such as automotive satellite navigation, mobile-phone applications, chipsets, and handheld personal navigation devices.

By enabling real-time simulation of second-generation BeiDou satellite signals, also referred to as BeiDou-2, NavX-NCS expands a user's GNSS signal capability beyond GPS, Galileo, GLONASS, and SBAS constellations.

IFEN, www.ifen.com; **WORK Microwave**, www.work-microwave.de

■ **WIRELESS** / TIMING

Oven-Controlled Crystal Oscillators

The rugged Poseidon Series of OCXOs features high phase noise performance in a modular-type sealed package. It is a customizable frequency range product specifically designed for vibration-prone environments where dynamic phase noise performance is paramount.

Applications include ground mobile, airborne, and shipboard environments. Features include typical acceleration sensitivity of <2e-11/g, excellent FvT performance, frequency range of 5 MHz to 130 MHz, ultra-low static and dynamic phase noise, and excellent long-term aging.

Bliley, *www.bliley.com*

■ **SURVEY** / MAPPING

Field Mapping Software

Juniper Aspect version 1.2 builds upon and adds to the field mapping software's previous strengths as an easy-to-use, versatile mapping tool. The mobile software for the Mesa Rugged Notepad or Archer Field PC, with GlobalSAT BC-337 or Hemisphere XF101, helps users navigate to and collect the GPS location (as well as many other attributes) of individual parts or items in irrigation or other mapping projects synchronized to and from desktop software. Juniper Aspect is designed to boost efficiency and productivity, while being simple enough that anyone can quickly learn how to use it. It places the capabilities of GPS and GIS in the hands of field workers, resulting in more streamlined processes, for any job that requires locating, documenting, and inspecting assets.

A new feature extensively filters and organizes data, and large amounts of data can be imported into Excel. The software will now operate on most devices running Windows Mobile 6.0 or higher.

Juniper Systems, *www.junipersys.com*

■ **CONSUMER** / RECREATION

Sporting Dog Collar

The DC 50 dog tracking collar is more robust and reliable than previous models. Its main housing sits below the dog's neck while a low-profile, high-sensitivity GPS antenna is now positioned atop the dog's neck, providing a clearer view of satellites, including GLONASS. When using both GPS and GLONASS, the receiver can lock on to 24 more satellites than when using GPS alone, so that sporting dog owners will spend less time waiting for the collar to acquire satellites before the hunt, and the collar will better maintain its location even in heavy cover and deep canyons during the hunt. The Garmin Astro 320 GPS tracking device works with the collar.

At a 5-second update rate, the DC 50 will get approximately 26 hours of battery life when fully charged. The DC 50 also has a selectable dog rescue mode, which automatically switches the DC 50 to a two-minute update rate when the battery is less than 25 percent charged, making it easier to recover a lost dog.

Garmin, *www.garmin.com*