» AUTONOMOUS NAVIGATION

Trimble UX5 Unmanned Craft Captures Images, Maps

Trimble's UX5 unmanned aircraft system (UAS) is an aerial imaging and mapping tool with particular application in precision agriculture, open-pit mining, and construction. The UX5 enables users to capture aerial images for a wide range of purposes: surveying, crop and livestock management, and generating topographic maps and models for land leveling and drainage applications. It combines a GPS receiver, radio, photogrammetry, remote sensors, a lithium ion battery, plus an electric motor to propel itself. A hand-torqued cable launcher deploys it on a pre-programmed flight plan.

The UX5 flies at 80 kilometers/hour (50 mph) and is stable in significant crosswinds and even light rain. In a single 50-minute flight, the UX5 can cover a two-square-kilometer area at five-centimeter image resolution. It comes with a camera modified to capture the near-infrared spectrum, which helps in deducing vegetation indexes for crop health assessment.

The UX5 can capture a variety of images to be processed post flight, through the Trimble Business Center. The output of a single flight provides geo-referenced precision images, a digital surface model showing elevations as a color image, and a dense 3D point cloud that includes elevations.

KVH Inertial Aboard UAVs via Geodetics, NovAtel

KVH Industries, Inc., has entered into a strategic partnership with Geodetics, Inc., to provide high-performance positioning and navigation products for commercial applications requiring high levels of precision, from unmanned platforms to terrestrial navigation.

Geodetics is integrating the KVH1750 inertial measurement unit (IMU) into two solutions: Geo-iNAV Advanced, a GPS-aided inertial navigation system; and Geo-RelNAV, a high-accuracy relative navigation, positioning, and orientation system.

Also, NovAtel, Inc., has added the-KVH1750 as an IMU option in its SPAN GNSS/INS line of positioning products.

The IMU-KVH1750 is a high-performance commercial off-the-shelf (COTS) sensor that offers bias stability and repeatability, KVH said. The Geo-iNAV Advanced system is available for commercial applications such as manned and unmanned aircraft and

▲ **GEODETICS** Geo-iNAV provides precise relative position and orientation for UAVs and other platforms.

control, security platforms on land, air and sea, surface or subsea unmanned vehicles, mobile mapping systems, and photogrammetry and terrestrial navigation.

The KVH 1750 IMU incorporates KVH's DSP-1750 fiber-optic gyro with very low-noise MEMS accelerometers, providing six-degrees-of-freedom angular rate and acceleration data.

For collision avoidance and vehicle-to-vehicle navigation and communication (V2V), the Geodetics Geo-RelNAV system offers a real-time relative positioning and orientation solution that uses single- or dual-frequency GPS receivers and the KVH 1750 IMU. The Geo-RelNAV provides precise relative position and orientation between moving platforms such as manned or unmanned air, marine, and ground vehicles. Relative position data is used for autonomous aerial refueling, autonomous landing, and collision avoidance.

For NovAtel, the IMU-KVH1750 integrates with its OEM6 series of receivers to provide a tightly coupled 3D navigation solution, the company said. Offering customers continuous position, velocity and attitude (roll, pitch and azimuth) measurements, a SPAN system is stable and available even through periods when satellite signals are blocked or unavailable; it is designed for mobile and airborne mapping applications as well as hydrographic survey.

» CONSUMER OEM

Spirent Enables Multi-GNSS Integration in Consumer Devices

Spirent Communications has introduced the GSS6300M range of multi-channel GPS and multi-GNSS simulators for receiver integrators, application developers, aftercare, and production testing environments.

The GSS6300M is designed to for the huge and growing range of applications and technologies that incorporate location features — from vehicles and mobile devices to wearable technology, security tracking, and other new market segments. In addition to GPS, the GSS6300M fully supports GLONASS, BeiDou and Galileo, the Russian, Chinese and European navigation systems.

The entry-level test system enables laboratory evaluation of GPS performance across different locations and routes, Spirent said. While easy to use even for non-GPS experts, the GSS6300M range features competitive pricing for engineering teams looking to integrate positioning functionality to new classes of consumer electronic devices, the company said.

The GSS6300M is a one-box solution with everything required to start testing immediately and can be controlled from a tablet or smartphone, or via remote commands across multiple interfaces. It enables a variety of fundamental test and compliance to industry standard. Users can create custom trajectories using a Google Maps interface to help evaluate receiver performance.

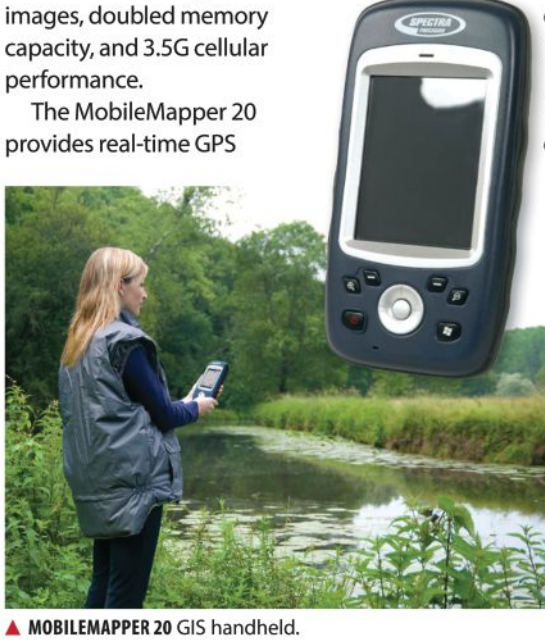
» SURVEY/GIS

MobileMapper 20 Extends GIS in the Field

Spectra Precision has introduced the MobileMapper 20 GIS handheld. In has the same form factor as the MobileMapper 10, but enhanced capabilities that include a new bright VGA color touch screen display, a 5-MP camera for higher resolution images, doubled memory capacity, and 3.5G cellular performance.

The MobileMapper 20 provides real-time GPS accuracy of better than 2 meters and post-processed accuracy of a half-meter using MobileMapper Office software. Mapping professionals can also take advantage of Spectra Precision's optional MobileMapper Field software for data collection, maintenance, and inspection.

MobileMapper 20 incorporates a variety of communication technologies, including Bluetooth, Wi-Fi, and a 3.5G cellular modem, to keep mobile workers connected in the field. With a compact design, large display, and long battery life (typically more than 20 hours), the handheld is designed for intensive data collection. It runs Windows Embedded Handheld 6.5 and supports a range of third-party software applications.



▲ **MOBILEMAPPER 20** GIS handheld.

» INDOOR POSITIONING

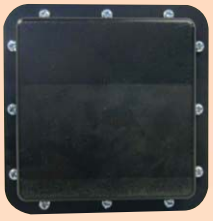
Indoor Research Employs Spectra Precision Equipment

Researchers at Telecom SudParis are working on a solution to provide indoor continuity for GNSS positioning. The idea is to deploy a minimal transmission infrastructure to allow a standard receiver to measure pseudo-ranges and carrier phases, leading to indoor accurate positioning. The infrastructure consists of a few antennas fed through optical fibers with a GNSS-like signal.

To achieve positions accurate to a few decimeters, the locations of the antennas had to be accurately known. This was achieved with the Spectra Precision FOCUS 8 total station in a local reference frame. To calculate indoor positioning in WGS84 format to achieve full compatibility with outdoor GPS, a Spectra Precision ProMark 800 GNSS receiver linked the local reference frame and the GPS. The researchers propose a repealite system to provide continuity of positioning through the use of GNSS-like signals, leading to a single technological means: a GNSS receiver, for both outdoors and indoors.

BUSINESS BRIEFS

Applied EM Offers Anti-Jam Antenna



Applied EM's anti-jam GPS antenna, AJGPS045, has achieved a four-channel Controlled Radiation Pattern Antenna (CRPA) in a very small size, weight and power (SWAP) suitable for airborne platforms. Its footprint is the same as a standard GPS Fixed Radiation Pattern Antenna (FRPA), the FRPA-3. This is a key enabler to bringing greatly improved anti-jam performance to smaller platforms and to GPS-equipped platforms that have inadequate anti-jam capability. When integrated with appropriate four-channel antenna electronics and a military GPS receiver, the AJGPS045 enables L1 and L2 anti-jam performance of typically >80 dB. This is achieved with a passive compact antenna (0.7 x 4.6 x 4.6 inches) that weighs 9 ounces.

Report Focuses on Global Military GNSS Market

A new defense market report from Strategic Defence Intelligence has been released. "GPS/GNSS Market 2013-2023 – SWOT Analysis: Market Profile" provides an analysis of industry characteristics, determining strengths, weaknesses, opportunities, and threats faced by the military GPS/GNSS market.

The SWOT analysis is designed for industry executives and anyone looking to gain a better understanding of the market.

Topcon Launches Field Controller for Advanced Data Collection

Topcon Positioning Group announces a new data controller — the FC-500 — with numerous features and benefits, including a large 4.3-inch touchscreen display and 5MP camera with built-in LED flash.

The FC-500 is designed for professionals operating Topcon MAGNET Field, Site, and Layout software and Topcon's Pocket 3D. The FC-500 GEO has Bluetooth, Wi-Fi, and GPS. Another model comes with a 3.5G cellular modem that allows access to the MAGNET Enterprise Solutions suite. It has a geotagging feature that allows imprinting file information, including GPS location, on photos.

» SURVEY

NovAtel CORRECT with TerraStar PPP Service Now Available

With the release of its 6.400 firmware, NovAtel CORRECT positioning technology is now available with TerraStar's precise point positioning (PPP) corrections. Delivered via L-band, TerraStar corrections provide decimeter-level accuracy worldwide on all NovAtel OEM6 high-precision receivers without users having to add base-station infrastructure.

NovAtel CORRECT combines data from multiple GNSS satellite constellations with corrections from a variety of sources, to deliver the best position solution possible. The strategic importance of TerraStar's decimeter-level correction service to NovAtel's product offering is reflected in the recent purchase of TerraStar parent company Veripos by Hexagon. Veripos operates a network of more than 80 GNSS reference stations.

NovAtel CORRECT is available for land, air and sea applications, providing customers with one-stop shopping for receivers, antennas and correction services. It provides integrators with the opportunity to choose pricing and subscription options that best match their OEM business objectives.

» TRANSPORTATION

SatNav Can Make European Rail More Affordable

Cost-effective synergies between the European Rail Traffic Management System (ERTMS) and satellite technologies such as Galileo can make rail transport more efficient and reliable, agreed European authorities in February at a Rail Forum Europe dinner in Brussels. But while the technology is now available, its implementation is still too slow due to the long term return on investment.

Francesco Rispoli, manager of satellite technologies at Ansaldo STS, an Italian provider of rail-traffic management, stressed that satellite technology can improve the penetration of ERTMS in the worldwide market as well as on European local and low-traffic lines. He predicted that further synergies will be developed on the SHIFT^{2}RAIL initiative: "EGNOS and Galileo are key enabling technologies for a market-driven step change in the rail sector" he concluded. In that light, Ansaldo STS is developing an open platform to allow the ERTMS to fully exploit EGNOS and Galileo.

Olivier Onidi of the EC's Directorate General for Mobility and Transport, highlighted the role of ERTMS in achieving an interoperable Single European Railway Area. "2014 is a key year in terms of innovation for the rail sector. Major progress is expected on ERTMS, Galileo, and SHIFT^{2}RAIL." SHIFT^{2}RAIL is a European initiative to double the capacity of the European rail system, increase its reliability, and half lifecycle costs.

Ratikova/shutterstock.com

Carlo des Dorides, executive director of the European GNSS Agency, applauded the ERTMS Memorandum of Understanding envisaging the future use of EGNOS and Galileo to improve the competitiveness of train control systems. "There are signs that GNSS will be adopted globally as in the aviation sector. In this scenario, Europe now has the opportunity to exploit the synergy between ERTMS and GNSS."

More Airports Across Europe Add EGNOS Approaches

Flight operators can now use EGNOS approach procedures at airports in the Czech Republic, Austria, Finland, and Tunisia, all part of a growing list of airports across Europe that have implemented localizer performance with vertical guidance (LPV) procedures.

The announcement was made by European Satellite Services Provider (ESSP), a Toulouse-based company which has the contract for EGNOS system operation and service provision.

▲ London Southend Airport.

In all, 18 EGNOS Working Agreements (EWA) with airports have been signed — a key step for the implementation of LPV procedures to be used. Also, 171 EGNOS-based approach procedures have been authorized for specific runways.

Most recently, ESSP signed EWAs with both London Southend Airport and Cambridge International Airport in the United Kingdom.

The European GNSS Agency (GSA) is launching the implementation of the first LPV procedures in seven countries this year, as an exercise to gain the necessary competencies at national level, leading to a further plan for EGNOS adoption in the Perfromance-Based Navigation (PBN) plans.

» GPS MODERNIZATION

General Dynamics Awarded $26M for GPS III Communications

General Dynamics Advanced Information Systems has been awarded a $26 million contract from Lockheed Martin to support the U.S. Air Force GPS III Network Communications Element (NCE).

General Dynamics is already under contract with Lockheed Martin to produce the NCE for the first four GPS III space vehicles (SV01-SV04), as well as for the procurement of long lead material for the second set of four space vehicles (SV05-SV08). This follow-on contract provides General Dynamics with the funding to complete the NCE for SV05 and SV06.

General Dynamics' NCE components provide the communications functions for the GPS III satellites, including the ground-to-space command and control channel, the space-to-space inter-satellite channel, and the command and telemetry communications channels within each satellite. NCE components have been delivered for SV01 and SV02. The NCEs for SV03 and SV04 are scheduled for delivery by June 2014.

Braxton LADO System Supports 10th GPS Satellite Initialization

GPS IIF-5 was launched on February 20 and turned over to the 2nd Space Operations Squadron (2 SOPS) for operations on March 5. This was the 10th successful launch and initialization using Braxton Technologies' Launch, Anomaly Resolution, and Disposal Operations (LADO) system.

LADO has performed all the mission planning, commanding, and telemetry processing necessary to prepare all GPS satellites for operational use since October 2007.

Developed and sustained by Braxton Technologies, LADO was built using Braxton's ACE Premier commercial-off-the-shelf (COTS) product line for spacecraft control, astrodynamics. and simulation.

The GPS IIF-5 replaces the GPS IIA-15 satellite launched in 1994. The 19th Space Operations Squadron (19 SOPS) will control the GPS IIA-15 using LADO, where the spacecraft will be stored as a spare available for reactivation within the x-plane for the remainder of its useful life.

» EVENTS

European Space Solutions 2014

June 11–13, 2014; Prague
www.european-space-solutions.eu

The conference brings together business and the public sector with users and developers of space-based solutions to explore how space can make a difference to the lives and livelihoods of people across Europe and around the globe.

Applanix User Group Meeting

June 17–20, 2014, Toronto
www.regonline.com/register/checkin.aspx?eventid=1463917

The Applanix User Group Meetingwill have two main themes: Advanced Product Training and New Product Announcements. The program will include opportunities for training on Applanix products, addressing business or operational challenges, and learning about industry trends and different customer experiences

GEO Business 2014

May 28–29, 2014 , London
www.GeoBusinessShow.com

GEO Business is a major new geospatial event for everyone involved in the gathering, storing, processing and delivering of geospatial information. The hands-on event includes an international trade exhibition, conference, and live workshops and demonstrations.

2014 NIST Time and Frequency Seminar

June 3–6, 2014, Boulder, Colorado; www.tf.nist.gov/timefreq/seminars/TFSeminar2014/Seminar39.html

The Time and Frequency Division of the National Institute of Standards and Technology is offering a course on understanding clocks, oscillators, atomic frequency standards, RF and optical synchronization, optical oscillators, quantum information, optical cooling and heating; making precise frequency, time, phase-noise, and jitter measurements; and establishing measurement accuracy and traceability.

CERGAL 2014

July 8–9; Dresden, Germany; www.dgon-cergal.org

The International Symposium on Certification of GNSS Systems & Service covers qualification and certification of mission- and safety-critical applications in the successful operational rollout of satellite navigation systems.

Spirent Federal 2014 GNSS Technical Meeting

July 15–16, 2014, Salt Lake City, Utah
www.spirentfederal.com/GPS/Meeting/Default.asp

The meeting features hands-on training led by Spirent engineers on state-of-the-art GNSS simulation equipment. FOUO sessions will be held on July 16 for U.S. citizens only.