L3Harris demonstrates reprogrammable PNT system for US Space Force

L3Harris has demonstrated a positioning, navigation and timing (PNT) solution for the U.S. Space Force's Space Systems Command that is adaptable across platforms, fully reprogrammable on orbit and scalable to support more signals and increased power as PNT threats evolve. According to L3Harris, the solution is designed to provide the Space Force with the flexibility to deploy smaller, multi-launch-capable satellites, thereby strengthening or diversifying its satellite constellation.

During a two-day design concept review, L3Harris presented a resilient-GPS (R-GPS) prototype that exceeded current requirements, highlighting its potential to accelerate the Space Force's roadmap for a stronger, more adaptable PNT infrastructure. Using the Navigation Technology Satellite-3 reprogrammable payload and NSA-certified cryptography, the company simulated the operation of an R-GPS satellite transmitting navigation signals. These signals were successfully acquired and tracked by monitoring stations, military receivers and commercial equipment, demonstrating that R-GPS technology can be seamlessly integrated into the existing GPS framework.

Read more in *GPS World* article. https://www.gpsworld.com/l3harris-demonstrates-reprogrammable-pnt-system-for-us-space-force/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250716002&oly_enc_id=1784A2382467C6V

2025-07-21

Honeywell gets US contracts to develop quantum navigation systems

Honeywell has been selected by the U.S. Department of Defense's (DOD) Defense Innovation Unit (DIU) to participate in the Transition of Quantum Sensing (TQS) program. The program aims to accelerate adoption of quantum sensors to

address near-term alternative position, navigation and timing (PNT) and intelligence, surveillance and reconnaissance (ISR) applications for the U.S. Joint Forces Command.

Honeywell has been chosen to support the TQS program under two DOD contracts: CRUISE (Compact Rubidium Unit for Inertial Sensing and Estimation) and QUEST (Quantum Enabled Sensor Technologies for MagNav).

“With the growing threat of jamming and spoofing, aircraft and naval vessels on critical missions can no longer rely solely on GPS,” said Matt Picchetti, vice president and general manager, Navigation and Sensors, Honeywell Aerospace Technologies. “Quantum sensors have the potential to augment existing navigation solutions, helping pilots operate with greater confidence. Honeywell’s pedigree in fielded sensors and navigation solutions provide us with a unique perspective to ensure the technology is viable beyond the laboratory.”

Read more in *GPS World* article. https://www.gpsworld.com/honeywell-gets-us-contract-to-develop-quantum-navigation-systems/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250716002&oly_enc_id=1784A2382467C6V

2025-07-17

Australian Navy trials validate quantum solution for GPS denial at sea

Q-CTRL has completed a major field trial with Australian Defence on board the Royal Australian Navy’s Multi-role Aviation Training Vessel (MATV), the MV Sycamore. The results of the trial demonstrated advancements in software-ruggedised quantum sensing for navigation.

In the trials, Q-CTRL field deployed a quantum dual gravimeter, which measures tiny variations in Earth’s gravity as part of a next-generation quantum-assured

positioning, navigation, and timing (PNT) system operable when GPS is unavailable or untrusted.

This first trial saw over 144 hours of continuous operation and successful data collection with no human intervention during real maritime operations.

“Quantum sensors provide a near-term opportunity to achieve transformational defence capabilities, but previous deployments in the field have struggled to deliver defence-relevant performance,” said Q-CTRL CEO and founder Michael J. Biercuk.

Read more in *GPS World* article. https://www.gpsworld.com/australian-navy-trials-validate-quantum-solution-for-gps-denial-at-sea/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250716002&oly_enc_id=1784A2382467C6V

2025-07-16

SouthPAN satnav program for Australia passes Critical Design Review milestone

The Southern Positioning Augmentation Network (SouthPAN) has successfully completed its Critical Design Review (CDR), marking a pivotal milestone towards delivering advanced satellite-based augmentation services (SBAS) across Australia and New Zealand.

Led by Lockheed Martin Australia, with GMV as a key strategic partner, SouthPAN is jointly supported by the Australian and New Zealand governments to provide satellite navigation and precise positioning services throughout Australasia.

The Critical Design Review represents a vital checkpoint in the lifecycle of a safety-critical system such as SouthPAN, validating that the design meets stringent performance, safety and security requirements necessary for civil aviation operations. As part of this milestone, the SouthPAN team provided comprehensive certification artifacts aligned with international aviation standards, including ARP

4754A for systems development processes, DO-254 for hardware, and DO-278A for software assurance.

The successful completion of the CDR demonstrates that the system's architecture and implementation will satisfy the rigorous design assurance levels mandated for safety-of-life applications. Achieving this milestone confirms the readiness of the system's design for operational deployment and marks a critical step forward towards its future certification for safety-of-life services in the aviation sector.

Read more in *GPS World* article. https://www.gpsworld.com/southpan-satnav-program-for-australia-passes-critical-design-review-milestone/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250716002&oly_enc_id=1784A2382467C6V

2025-07-17

UK and France Renew Ties, Resilient PNT, eLoran a Key Part

British officials and French President Macron have announced collaborative efforts on a range of advanced technologies that includes resilient positioning, navigation and timing (PNT) such as eLoran.

The announcement on resilient PNT to protect infrastructure was made during the French President's visit to Imperial College, London. The event was part of the first state visit of a European leader since Brexit.

DR Peter Kyle, the UK's Secretary of State for Science, Innovation and Technology, said "…we are building resilient and innovative positioning, navigation and timing systems to contribute toward European collective security."

The partnership between the two nations also includes work on AI super computing infrastructure and AI research.

The UK had previously established a project to expand its eLoran capability from a single site providing a timing signal to six that will provide high power, low frequency PNT for the British Isles and their maritime regions. One or more timing signals from this network will also reach and be usable across much of northern and western Europe. With minimal investment, France and other European nations will be able to take advantage of those signals and, if desired, improve local service to a full PNT service with their own primary and/or differential transmitter sites.

Read more in *Inside GNSS* article. https://insidegnss.com/uk-and-france-renew-ties-resilient-pnt-eloran-a-key-part/

2025-07-10

Nowcasting the ionosphere: Evaluating GloTEC for real-time GNSS corrections

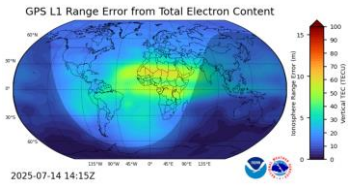
One of the most persistent sources of GNSS error — ionospheric delay — has been challenging to correct in real time, especially for mass-market devices. While dual-frequency receivers and commercial correction services can mostly mitigate this issue, they remain too costly and impractical for the billions of smartphones and IoT devices that rely on single-frequency GNSS. Even for dual-frequency systems, the commonly used ionosphere-free linear combination amplifies multipath and receiver errors and reduces data redundancy — yielding only two usable combinations from four original measurements.

This landscape may be shifting with the introduction of GloTEC, a real-time global Total Electron Content (TEC) map from NOAA's Space Weather Prediction Center (SWPC), released in February 2025. GloTEC assimilates both ground- and space-based observations to provide real-time global ionospheric corrections without relying on error-prone linear combinations.

Unlike coarse models such as the broadcast Klobuchar algorithm or forecast-only products such as the predicted IGS Global Ionosphere Maps, GloTEC updates every 10 minutes using real-time measurements. This high refresh rate establishes a new benchmark for open-access ionospheric nowcasting in GNSS applications.

Read more in *GPS World* article. https://www.gpsworld.com/nowcasting-the-ionosphere-evaluating-glotec-for-real-time-gnss-corrections/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250709002&oly_enc_id=1784A2382467C6V

2025-07-14



OCX nears full operational integration

The U.S. Space Force's Space Operations Command has accepted a modernised operating system for GPS, designed to maintain the resiliency of the constellation and enhance positioning, navigation and timing (PNT) services to meet evolving user demands.

The GPS Next Generation Operational Control System (OCX) upgrade is part of a broader set of Space Systems Command acquisition programs designed to deliver a range of modernised capabilities across the GPS III enterprise. In addition to OCX, these programs include the GPS III/IIIF satellite vehicles and Military GPS User Equipment.

The modernisation effort is expected to improve signal access in electronically contested environments, increase the system's ability to detect failures, enhance position and time transfer accuracy, and strengthen the integrity and uninterrupted availability of the Military Code.

Read more in *GPS World* article. https://www.gpsworld.com/modernized-gps-operating-system-nears-full-operational-integration/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250709002&oly_enc_id=1784A2382467C6V

2025-07-14

GNSS Interference in Ship Collision, Fires, Grounding

Just after midnight on June 17, the 1,100 foot tanker Front Eagle, carrying approximately 2 million barrels of crude oil in the Gulf of Oman, made a quick and sharp right turn that resulted in a collision with Adalynn, a 900 foot tanker. Both vessels caught fire. The fire aboard Front Eagle was quickly extinguished. All 24 Adalynn crew members were rescued by the UAE Coast Guard.

A video of the vessels' Automatic Identification System (AIS) plots on X by @MaritimeTraffic shows both vessels altering course toward each other just before the collision. GPS navigation signals were being actively interfered with in the area at the time.

In May, GPS interference was blamed for the grounding of the 912 foot container ship MSC ANTONIA near the port of Jedda. The ship's grounding on Eliza Shoals was determined to be the result of GPS interference by Captain Steve Bomgardner, vice president of shipping and offshore at Pole Star Global, and maritime AI specialist Windward.

Official reports from both Frontline, Plc, the owner of Front Eagle, and the Joint Maritime Information Center (JMIC) blame the collision on "navigational error." It was described as "not security related."

The degree to which the near constant and widespread GPS and other GNSS interference in the area played a factor has not yet been determined, though it unquestionably played a role.

Read more in *Inside GNSS* article. https://insidegnss.com/gnss-interference-in-ship-collision-fires-grounding/

2025-06-25

When GPS is under attack, we need back-ups

On June 13, following reports of Israeli airstrikes on Iran, interference rates in the Strait of Hormuz spiked. GPSJam.org, a service that tracks satellite signal interference, now reports medium-level disruption (between 2% and 10%) across the Gulf region. This is no isolated blip, but part of a pattern: electronic warfare is increasing in global hotspots. It's also a warning.

Modern warfare is no longer about guns and bombs. Jamming, spoofing and using ever-more sophisticated cybertricks to disrupt GNSS are now regular tactics used to sow disorder. They are cheap, deniable, and often highly effective. But they also expose a dangerous weakness in how we navigate, communicate, and coordinate. If GPS is the backbone of global positioning, we are learning just how brittle it can be.

The Strait of Hormuz is a narrow channel through which around one-fifth of the world's oil passes, and here, ships are now at risk not only from pirates and mines, but from corrupted satellite signals. Spoofers can broadcast false GPS positions to nearby vessels. In recent years, we have seen ships appear to sail across runways, airports, and deserts, thanks to malicious signal interference. In aviation, spoofed or jammed GNSS signals have led to aircraft turning around mid-air or being diverted. These are real and growing threats.

Read more in *GPS World* article. https://www.gpsworld.com/when-gps-is-under-attack-we-need-back-ups/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250702003&oly_enc_id=1784A2382467C6V

2025-07-08

Research exposes Russia as jamming culprit

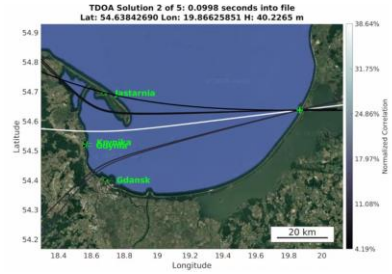
Radio waves emanating from secretive facilities run by Russia's military are the culprit behind GNSS jamming in the Baltic Sea, according to Defense News.

The news outlet reports that Polish researchers collected jamming and spoofing information on incidents covering the Gdansk airport, shipping lanes, and the airspaces of Estonia and Finland. The interference has been recorded almost daily since Russia's full-scale invasion of Ukraine in February 2022, resulting in flight cancellations, airport closures and commercial ships steering off track.

In March, eight European countries, including the Baltic states, Finland, Poland, France, the Netherlands and Ukraine, lodged a complaint with the UN about the practice. Several UN agencies have also taken up the issue, including the International Maritime Organization, the Civil Aviation authority ICAO and the International Telecommunications Union.

Read more in *GPS World* article. https://www.gpsworld.com/research-exposes-russia-as-jamming-culprit/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250702003&oly_enc_id=1784A2382467C6V

2025-07-07



Xona satellite begins tests for commercial LEO navigation

Xona Space Systems' Pulsar-0 satellite, the company's first production-class asset for a commercial navigation constellation, is now operational and undergoing in-orbit testing. Launched in March 2024 on SpaceX's Transporter-10 mission, Pulsar-0 is designed to assess the performance of Xona's Pulsar architecture, which aims to provide high-accuracy, resilient positioning, navigation and timing (PNT) services from low-Earth orbit (LEO).

According to Xona, Pulsar-0 is transmitting LEO-based PNT signals using a payload built to support signal authentication and increased resilience against interference — capabilities that have become more important as concerns about vulnerabilities in traditional GNSS systems grow. The system's encrypted and authenticated signals are intended to mitigate risks from jamming and spoofing, and deliver stronger, more reliable service in environments where legacy GPS may be degraded.

Read more in *GPS World* article. https://www.gpsworld.com/xona-space-systems-pulsar-0-satellite-begins-testing-for-commercial-leo-navigation/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250702003&oly_enc_id=1784A2382467C6V

2025-07-07

Europe launches PNT/GNSS info portal

A new information portal for PNT and GNSS is now active. The European GNSS Center of Excellence (GNSS-COE) is designed to provide expertise to help development of critical PNT and GNSS applications.

"We support the development of applications both in the design definition phase, as well in the validation phase of these applications," according to the site. Among the offerings are masterclasses, resilience assessment, mitigation methods, and a newsfeed.

The portal, a National GNSS Knowledge Center project, was funded under the European Space Agency's NAVISP Element 3, which supports member states' PNT initiatives and national strategies.

Read more in *GPS World* article. https://www.gpsworld.com/europe-launches-pnt-gnss-info-portal/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250702003&oly_enc_id=1784A2382467C6V

2025-07-07

BKZS: Turkey's regional GNSS system takes shape

Turkey is laying the groundwork for its own satellite navigation system, the Bölgesel Konumlama ve Zamanlama Sistemi (BKZS), or Regional Positioning and Timing System. As a key pillar of Turkey's 2030 Industry and Technology Strategy, BKZS reflects the country's ambition to gain strategic autonomy in satellite-based positioning, navigation and timing (PNT), moving away from dependence on foreign systems such as GPS.

BKZS was established as one of the ten flagship goals of Turkey's National Space Program, introduced in 2021. It directly addresses growing national security concerns: in times of geopolitical conflict, GNSS signals can be jammed or disabled — leaving nations vulnerable if reliant on foreign services. President Erdoğan's 2030 roadmap emphasises preparing for "a new era of challenges," where technological independence is seen as vital to national sovereignty. At the core of BKZS development is innovative timing technology.

Read more in *GPS World* article. https://www.gpsworld.com/bkzs-turkeys-regional-gnss-system-takes-shape/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250625002&oly_enc_id=1784A2382467C6V

2025-06-30

Rocket Lab to launch ESA's first LEO-PNT navigation satellites

The European Space Agency (ESA) has selected Rocket Lab Corporation to launch a dedicated Electron mission, marking the first time the company will deploy satellites for ESA's next-generation navigation constellation, low-Earth orbit positioning, navigation and timing (LEO-PNT). Thales Alenia Space and GMV, two European satellite prime contractors, are providing the "Pathfinder A" spacecraft for the mission. Rocket Lab plans to launch the satellites from Launch Complex 1 no earlier than December 2025.

The mission will place the two satellites in a 510 km LEO to test a new method of delivering location, direction and timing services from satellites in low orbit, known as LEO-PNT. ESA will use this demonstration to evaluate how a low Earth orbit satellite fleet can work with the Galileo and EGNOS constellations, which provide Europe's global navigation system from higher orbits.

Read more in *GPS World* article. https://www.gpsworld.com/rocket-lab-to-launch-esas-first-leo-pnt-navigation-satellites/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250625002&oly_enc_id=1784A2382467C6V

2025-06-30

ESA teams up with Leonardo against satnav jamming

The European Space Agency (ESA) and Leonardo are embarking on a joint project to explore smart antennas powered by machine learning to block unwanted signals.

Representatives of ESA and Leonardo signed a contract at the Paris Air Show to research and develop machine learning techniques to steer antenna arrays to block out unwanted signals. The project will be developed under the umbrella of ESA's Navigation Innovation Support Programme (NAVISP).

Conventional antennas catch signals from all directions. A controlled reception pattern antenna (CRPA) can focus on signals coming from specific satellites and ignore signals or interference coming from other directions. These types of antennas are used in satellite navigation receivers to block jamming and counterfeit signals. They rely on electronics that control how they adjust their patterns (beamforming).

Read more in *GPS World* article. https://www.gpsworld.com/esa-teams-up-with-leonardo-against-satnav-jamming/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250625002&oly_enc_id=1784A2382467C6V

2025-06-26

Quantum magnetometer could solve GNSS-denied navigation problems

Fraunhofer IAF presented the latest version of its compact integrated quantum magnetometer at World of Quantum in Munich. The diamond-based system is characterized by its robustness, high integration density, and measurement sensitivity. It offers new measurement possibilities for a wide range of applications, including navigation.

The highly integrated vector magnetometer developed by the Fraunhofer Institute for Applied Solid State Physics IAF is based on nitrogen vacancies (NV) in diamond and provides access to the smallest magnetic fields with a previously unattainable degree of flexibility and precision. The miniaturised measuring system offers new possibilities in applications that require precise measurement with minimal

interference, such as in biochemical measurements of nerve pathways or in microelectronics.

“What makes the diamond-based NV vector magnetometer so special is its native and intuitive functionality, which enables it to precisely measure the vector components of the Earth’s magnetic field under most operating conditions,” explained Michael Stoebe, Business Unit Manager for Quantum Devices at Fraunhofer IAF. “This makes the sensor not only a technical innovation, but also a significant advance in sensor technology”.

Read more in *GPS World* article. https://www.gpsworld.com/quantum-magnetometer-could-solve-gnss-denied-navigation-problems/?utm_source=Omeda&utm_medium=Email&utm_campaign=NCMCD250625002&oly_enc_id=1784A2382467C6V

2025-06-25