Amateurs with Smartphones Help Monitor GNSS Signals in Space

More than 11,000 people around Europe and the world have turned their smartphones into GNSS monitoring tools by downloading the CAMALIOT app, so far delivering more than 53 billion measurements of meteorology and space weather patterns to researchers, according to the European Space Agency (ESA).

ESA asks CAMALIOT volunteers to leave their smartphones by a window each night with GNSS on. The phones record small variations in satellite signals, gathering data for machine-learning analysis. More than 50 smartphone models with dual-frequency receivers can use the app.

CAMALIOT was developed through ESA's Navigation Innovation and Support Programme (NAVISP) with the support of the agency's Navigation Science Office through its GNSS Science Support Centre. The combination of GNSS data, smartphone access and machine learning in support of science is a priority research line of ESA's Navigation Science Office.

GNSS signals undergo scintillation as they pass through irregular plasma patches in the ionosphere. This electrically charged upper atmospheric layer is continuously changing, influenced by solar activity, geomagnetic conditions and the local time of day. Dual-frequency GNSS receivers can compensate for this effect by comparing their two frequencies.

Read more in *GPS World* article. https://www.gpsworld.com/amateurs-with-smartphones-help-monitor-gnss-signals-in-space/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD220518002&oly_enc_id=1784A2382467C6V

2022-05-20

Geoscience Australia Conducts Economic Impact Survey of NPIC Program

Geoscience Australia is undertaking an assessment of the economic impact of the National Positioning Infrastructure Capability (NPIC) program.

The program provides free and open access to multi-GNSS observation streams from Australia's network of continuously operating reference stations (CORS).

Users can connect to these data and product streams directly from Geoscience Australia or via a commercial positioning-service provider. The CORS network has been designed to support a national positioning capability that provides better than 5-cm accurate positioning solutions in areas with access to mobile-phone coverage (delivery via the internet).

Geoscience Australia has engaged ACIL Allen to conduct a web-based survey for stakeholders with interest in this program to assist with data gathering for the economic assessment. The survey takes 15 to 20 minutes to complete. There is an additional optional component for service providers that may take an additional 15 minutes.

Read more in *GPS World* article. https://www.gpsworld.com/geoscience-australia-conducts-economic-impact-survey-of-npic-program/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD220518002&oly_enc_id=1784A2382467C6V

2022-05-23

Nikolina Satellite Enters Service as Part of Galileo

After a challenging Launch and Early Orbit Phase (LEOP) and testing campaign during the COVID-19 pandemic, Galileo satellite "Nikolina" (GSAT0223) entered service on May 5. The satellite will reinforce the performance and robustness of the Galileo satellite.

GSAT0223 was launched Dec. 5, 2021 with Galileo launch L11 after the usual design, acceptance, validation, launch and early orbit preparation and operations phases. This was the first Early Orbit Operations phase conducted directly from the operational centre in Germany, under the responsibility of EUSPA.

GSAT0223 and its launch companion GSAT0224 (Shriya) are the first pair of the third batch of Galileo First Generation satellites to reach space. GSAT0223 will fill the last empty slot in Galileo's orbital plane B.

Read more in *GPS World* article. https://www.gpsworld.com/nikolina-satellite-enters-service-as-part-of-galileo/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD220511002&oly_enc_id=1784A2382467C6V

2022-05-17

EU Space Community Talks Security, Defence and Galileo

At the 14th European Space Conference earlier this year, EU Internal Market Commissioner Thierry Breton said, "Space is a contested domain. We should develop new infrastructures as dual-use by design, integrating the defence needs from the outset."

Among Europe's key space assets are the Galileo satellite-based navigation system and the EGNOS augmentation system, both of which are due for upgrades in the coming years. Galileo second generation (G2G) will feature improvements in the form of increased, designed-in robustness for both civilian and military users.

"Following my decision to accelerate the deployment of the second generation," Breton said, "we have now prepared all the necessary contractual conditions and we are expecting to receive the first second-generation satellite in 2024, for a launch in 2024."

Meanwhile, the next generation of EGNOS will provide dual-frequency, multi-constellation (DFMC) services, augmenting GPS L1/L5 and Galileo E1/E5.

It doesn't require a lot of imagination to appreciate the military value of secure, highly accurate and robust space-based positioning and navigation. A European Commission source told *Inside GNSS:* "Secured navigation and timing is essential for most military operations, as illustrated by the current widespread use of GPS PPS [Precise Positioning Service]."

Read more in *Inside GNSS* article. https://insidegnss.com/brussels-view-eu-space-community-talks-security-defense-and-galileo/
2022-05-16

CACI to Launch Experimental Satellite to Demonstrate Alternative to GPS Navigation

U.S. defence contractor CACI International is funding an experiment to demonstrate space technologies for military use, including an alternative to GPS navigation. As part of the company's plan to grow its space business, CACI is launching two demonstration payloads on a York Space satellite scheduled to fly to low Earth orbit in January aboard the SpaceX Transporter 7 rideshare.

"We're looking at an alternative PNT [positioning, navigation and timing] solution that will work in a contested space domain," CACI's president and CEO John Mengucci said during a third-quarter fiscal year 2022 earnings call.

"It won't completely replace GPS, but it will support systems out there when GPS signals are jammed or when they're attacked," he said.

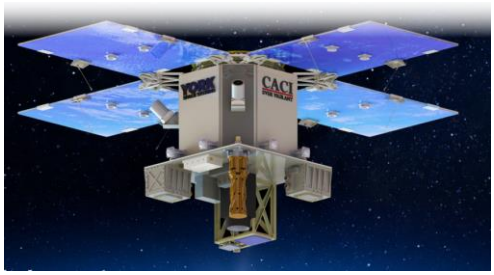
Non-GPS navigation from space is expected to become a significant business opportunity, Mengucci added. The military is looking for alternatives that are “resilient and less vulnerable to jamming.”

The navigation technology that will be tested is called two-way time transfer – a technique that has been used for many years in timing applications on the ground. Two-way time transfer in space means the satellite sends a timing signal and a receiver on the ground or aboard an aircraft sends a signal simultaneously back to the satellite.

Read more in *article*…

https://spacenews.com/caci-to-launch-experimental-satellite-to-demonstrate-alternative-to-gps-navigation/

2022-05-09



Google Maps Gets Immersive View That Combines Street Maps With Satellites

At Google's annual developer conference Google IO 2022, which was held fully in person for the first time in two years in San Francisco, the search engine giant announced a new update for its mapping service Google Maps which is called Immersive View. Fundamentally, Google is merging Street View technology with satellites which makes it a street view in the sky allowing you to look over a location from above. This will give you more real-time context and allow you to drop to the street level to see specific spots.

The Maps overlays with live busyness and traffic information which is kind of a take on augmented reality. This enables one to look at a park or street corner or beach that you're looking at. The interesting bit is that the images behind "Immersive View" are all computer-generated and derived from a combination of Google Satellite captures and street view shots that have been taken manually by its cars. Google is able to fuse this data and set it in a precisely scaled world.

Read more in *article*…

https://www.carandbike.com/news/google-maps-gets-immersive-view-that-combines-street-maps-with-satellites-2967851

2022-05-12

Xona's Private GNSS Satellite Passes Pre-launch Testing

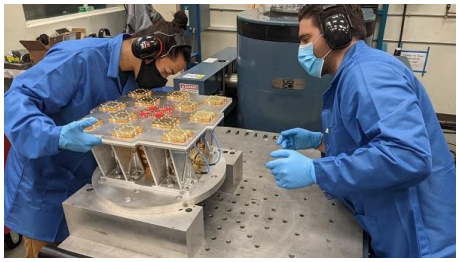
Xona Space Systems announced that their first in-space demonstrator has been delivered to Spaceflight Inc. for final integration after successfully completing testing and is scheduled for launch on SpaceX's Transporter 5 in May.

Xona is an aerospace startup developing a precision navigation and timing system in low Earth orbit. It plans to build an independent high-performance satellite navigation and timing system to meet the needs of intelligent systems.

Satellite navigation systems such as GPS and Galileo are in the domain of major governments (and free to users). Xona said it is part of the new commercialized space movement, using it to bring benefits to satellite navigation and timing.

Read more in *GPS World* article. https://www.gpsworld.com/xonas-private-gnss-satellite-passes-pre-launch-testing/?utm_source=Defense+PNT&utm_medium=Newsletter&utm_campaign=NCMCD220505003&oly_enc_id=1784A2382467C6V

2022-05-10



GNOMES-3 GNSS Radio-occultation Satellite Launched

A new GNSS radio-occultation (RO) satellite is now in orbit. The GNOMES-3 — GNSS Navigation and Occultation Measurement Satellite — flew aboard the SpaceX Falcon 9 Transporter-4 rideshare mission on April 1 and was launched into a 646-km circular sun-synchronous orbit. The payload was powered on and operating nominally within four days of launch.

The GNOMES-3 was manufactured for PlanetiQ by Blue Canyon Technologies LLC, a wholly owned subsidiary of Raytheon Technologies. Using refracted GNSS signals, PlanetiQ can determine the density and moisture content of the atmosphere to improve weather predictions, helping improve NOAA weather models.

The GNOMES-3 joins GNOME-2 on orbit and is expected to achieve highly accurate GNSS-RO measurements using the fourth-generation Pyxis-RO sensor. PlanetiQ plans to launch more Pyxis-RO atmospheric and ionospheric sounding spacecraft in 2023. In all, PlanetiQ plans for a fleet of 20 GNOMES by 2024.

Read more in *GPS World* article. https://www.gpsworld.com/gnomes-3-gnss-radio-occultation-satellite-launched/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD220504003&oly_enc_id=1784A2382467C6V

2022-05-05

Downed Russian Fighter Jets Are Being Found With Basic GPS 'Taped to the Dashboards'

Wrecked Russian fighter jets are being found with rudimentary GPS receivers "taped to the dashboards" in Ukraine because their inbuilt navigation systems are so bad, the UK's defence secretary, Ben Wallace, said.

Speaking at the National Army Museum in London Monday, Wallace commemorated those who died in World War II and called Russia's invasion of Ukraine "senseless and self-defeating."

He added that there was evidence suggesting Russian military hardware was being pushed to breaking point by the invasion of Ukraine.

"'GPS' receivers have been found taped to the dashboards of downed Russian Su-34s so the pilots knew where they were, due to the poor quality of their own systems," he said.

Read more in *article*…

https://www.businessinsider.com/russia-su34-jets-basic-gps-receivers-taped-to-dashboards-uk-2022-5?r=US&IR=T

2022-05-10

US Representatives Call for Greater Investment in GPS Modernisation

Even as GPS has grown to become a fundamental part of our everyday life, the U.S. provides GPS signals for free to users worldwide. And yet, China, Russia, the European Union, India, and Japan have all developed regional or global satellite systems since GPS was launched.

Most recently, China’s completion of its BeiDou system comprised of over 30 satellites — part of its broad Belt and Road Initiative — risks endangering U.S. technological leadership.

Beijing has made it clear that it will leverage BeiDou as part of an overall strategic effort to obtain greater influence internationally, heavily subsidize the adoption of BeiDou-equipped infrastructure for government and military use in countries throughout its region, and advantage BeiDou-compatible domestic products.

As the House co-chairs of the congressional GPS Caucus, we believe it is critical to our international interests that the U.S. reinvest in GPS modernization. We cannot afford to overlook the satellites — the oldest of which were launched in the late 1990s or early 2000s — that underpin civil and social infrastructure, including civil aviation, banking systems, financial markets, power grids, precision agriculture, and communications networks and applications. Even as manufacturers develop multi-constellation devices that can receive signals from both GPS and other global systems, it is more critical than ever that the U.S. accelerate its investment in next-generation GPS satellites.

Read more in *GPS World* article. https://www.gpsworld.com/us-representatives-call-for-greater-investment-in-gps-modernization/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD220427002&oly_enc_id=1784A2382467C6V
2022-04-29

Aussie Tech Acquisition to Advance Spacecraft Navigation

Sydney-based Advanced Navigation, an AI robotics company, announced it has acquired ANU spin-off Vai Photonics to enhance space exploration technology.

The companies will combine their robotics and advanced sensor technology to aid the navigation of spacecraft in orbit, and on-Earth autonomous vehicles in places where GPS is unavailable.

Canberra-based Vai Photonics was born in 2021 from 15 years of research at ANU, and Advanced Navigation penned the roughly $40 million deal as part of its growth strategy to provide solutions for the “autonomy revolution”.

“The synergies, shared vision and collaborative potential we see between Vai Photonics and Advanced Navigation will enable us to be at the absolute forefront of robotic and autonomy driven technologies," said said Xavier Orr, CEO and co-founder of Advanced Navigation.

James Spollard, CTO and co-founder of Vai Photonics, said its navigation technology will fill in the gaps from existing systems, such as GPS, which is unavailable in certain environments, whether on Earth or in space.
Read more in *article*…
https://www.spaceconnectonline.com.au/industry/5427-aussie-tech-acquisition-to-advance-spacecraft-navigation?utm_source=undefined&utm_campaign=06_05_22&utm_medium=email&utm_content=1&utm_emailID=7b4c7db616168fe865f3a2f96500fa1904548b5145c6ae1709d81f43459c19a2
2022-05-05

Why GPS Should Embrace Privatisation To Avoid Obsolescence

Most people think they have GPS in their iPhone, but they do not. What is in our smartphones is a component that’s just a small part of a vast architecture of satellites and ground stations, all of which were built, deployed, and maintained by the US Air Force during the Cold War to assure military navigation during a nuclear Winter. The Space Force continues maintaining this capability for the nations today, at a cost of about $2B annually courtesy of the American taxpayer.

Many argue for a continuation of the status quo because of the commercial economic growth realised by the historic government run GPS system, a sort of “if it’s not broken, don’t fix it” mentality. The problem is, however, that GPS’s initial advantages have become insufficient for the sophisticated and precise requirements modern and future technology requires.

We’ve seen this scenario before with many of our government’s civil and military investments – the policy challenge is knowing when to phase aging systems out and

when to invest in new solutions. Much like the growing obsolescence of the once-venerable, government-designed rockets that won us the space race against the Soviets, the Space Force's vaunted Global Positioning System is becoming increasingly outdated.

Read more in *article*…

https://www.forbes.com/sites/charlesbeames/2022/04/29/why-gps-should-embrace-privatization-to-avoid-obsolescence/?sh=7e2eb8893ef8

2022-04-29

Autonomous 300 Tonne Triple Road Trains Achieve World First

A driverless road train pilot program is continuing to gain momentum, following a successful world first run of a triple road train platoon, with each combination hauling 300 tonnes of iron ore.

"No one has ever run autonomous road trains in a platoon configuration. The team's done a great job – extremely proud," said Mike Grey, chief executive of Mining Services at Mineral Resources.

"It's effectively a train, not far different in cost but certainly far more agile. Today, we had 900 tonne going down the road in one train."

Mineral Resources has been working on the autonomous road train project in partnership with digital reality solutions provider Hexagon, integrating its drive-by-wire technology with an autonomous management system to orchestrate vehicle movement.

Read more in *article*…

https://bigrigs.com.au/index.php/2022/04/28/video-autonomous-300-tonne-triple-road-trains-achieve-world-first/?cspt=1651215673%7Ce16d038554ca63623928c75893c7ec70

2022-04-26