

New Method to Accurately Predict Solar Storms to Protect Earth's Technology

Space storms could soon be forecasted with greater accuracy thanks to significant advancements in predicting when a violent solar eruption may impact Earth. Scientists have developed a method to determine the exact speed of a coronal mass ejection (CME) and predict its impact on Earth before it fully erupts from the Sun.

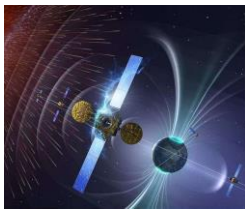
CMEs, which are bursts of gas and magnetic fields from the solar atmosphere, can cause geomagnetic storms that disrupt technology both in Earth's orbit and on its surface. This improvement in forecasting is crucial for protecting vital infrastructure, according to researchers at Aberystwyth University.

The discovery was made by studying 'Active Regions' on the Sun, which have strong magnetic fields where CMEs originate. Researchers monitored these regions before, during, and after eruptions, focusing on the "critical height" at which the magnetic field becomes unstable and can cause a CME.

Read more in *Space Daily* article.

https://www.spacedaily.com/reports/New_Method_to_Accurately_Predict_Solar_Storms_to_Protect_Earths_Technology_999.html

2024-07-21



Could PNT Have Its Own 'CrowdStrike' Moment?

The recent global IT outage caused by a routine but errant software update from cybersecurity firm CrowdStrike, has had people questioning the vulnerability of ICT systems.

One specific technological system that remains a growing source of concern is the global positioning, navigation and timing (PNT) system, which is almost entirely reliant on space-based global navigation satellite systems (GNSS).

The question then is, are space-based PNT systems at risk of having a serious outage caused by a similar errant software update? Could they have their own CrowdStrike moment?

The answer is that, yes, not only could it happen, but it has already happened, and on more than one occasion.

Read more in *Spatial Source* article. https://www.spatialsource.com.au/could-pnt-have-its-own-crowdstrike-moment/?utm_campaign=SS%20-%20Overall%20Publication%20-%20Master&utm_medium=email&hsenc=p2ANqtz-8mwmZHfeHHDVFZhBJiu5-Zqgl_B8YABlr6uyK-xOdhNomyv_X5dVz6rdX6_FTEkNSmFjUlj2UiKeG-8wVxbSmVK3cZqg&hsmi=317044010&utm_content=317044010&utm_source=hs_email
2024-07-24



The ABCs of PNT

A look at how far we've come, where we are today and where we're going in the effort to protect PNT and critical infrastructure when GNSS services aren't available.

Alternative. Backup. Complementary. These words describe the global efforts to find technologies capable of fulfilling critical infrastructure requirements for positioning, navigation and timing (PNT) in the absence, degradation or disruption of GNSS services. This search has been ongoing and continues to evolve. Here, we provide a historical look back at some of the efforts in the U.S. and Europe, a snapshot of the current PNT environment and how it has influenced more recent developments in the search for resilient PNT solutions, and a glimpse into what may lie ahead in that quest.

Read more in *Inside GNSS* article. <https://insidegnss.com/the-abcs-of-pnt/>
2024-07-24



KrattWorks Awarded \$6M for GNSS-free Navigation

The European Defense Fund (EDF) and the Ministries of Defense of Estonia and Finland have awarded a \$6 million investment to Project BadB, a consortium led by KrattWorks, an Estonian defence technology company. The project focuses on developing advanced navigation solutions for land and aerial vehicles that operate independently of GNSS.

Project BadB aims to address the challenges posed by rapidly evolving electronic warfare technologies, such as radio jamming and GNSS spoofing. The project seeks to ensure reliable navigation for unmanned systems operating in contested environments, enhancing their operational effectiveness in active war zones and other critical areas.

Specific objectives of the project include the development of weather-independent up-to-date satellite imagery maps for unmanned aerial and ground vehicles, a machine vision module, an image recognition system and a path planning system, based on sensor data, cross-platform data sharing and swarming.

Read more in *GPS World* article. https://www.gpsworld.com/krattworks-awarded-6m-for-gnss-free-navigation/?utm_source=Navigate%21+Weekly+News&utm_medium=Newsletter&utm_campaign=NCMCD240710002&oly_enc_id=1784A2382467C6V

2024-07-16



A BeiDou-like Satnav System for the Moon? Chinese Scientists Plot a Possible Route

The moon could soon have its own satellite navigation system, according to a proposal by Chinese scientists. The team from the Beijing Institute of Spacecraft System Engineering proposed the construction of 21 satellites around the moon which would provide real-time, high-precision navigation to support China's lunar ambitions.

The satellites will be deployed in four types of orbits over three phases, featuring a sustainable and cost-effective design, according to a paper published last month in the journal, Chinese Space Science and Technology. While the paper did not specify a construction timeline, China aims to put astronauts on the moon by 2030 and to build a research base at the lunar south pole with international partners around 2035.

Read more in *article...*

<https://www.scmp.com/news/china/science/article/3270195/satnav-system-moon-chinese-scientists-plot-possible-route>

2024-07-14



How Melting Icecaps Impacts the Rotation of Earth

Climate change is causing significant melting of ice masses in Greenland and Antarctica, leading to a substantial flow of water into the world's oceans, particularly around the equator. "This means that a shift in mass is taking place, and this is affecting the Earth's rotation," explains Benedikt Soja, Professor of Space Geodesy at the Department of Civil, Environmental and Geomatic Engineering at ETH Zurich.

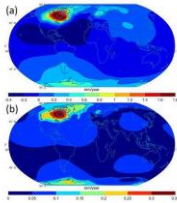
"It's like when a figure skater does a pirouette, first holding her arms close to her body and then stretching them out," Soja says. The initially fast rotation slows down as the masses move away from the axis of rotation, increasing physical inertia. In physics, this is known as the conservation of angular momentum, and it governs the Earth's rotation as well. As the Earth's rotation slows, days become longer, though the change is minimal.

Supported by NASA, researchers from Soja's group at ETH Zurich have published studies in *Nature Geoscience* and *Proceedings of the National Academy of Sciences (PNAS)* on how climate change affects the polar motion and the length of the day.

Read more in *Space Daily* article.

https://www.spacedaily.com/reports/How_melting_icecaps_impacts_the_rotation_of_Earth_99.html

2024-07-16



Lebanon Files Complaint Against Israel Over GPS Jamming

Lebanon filed a complaint with the United Nations and the International Telecommunication Union against Israel on Tuesday 16 July, citing Tel Aviv's deliberate disruption of its global positioning system (GPS), *Anadolu Agency* reports. A statement by the Ministry of Communications said Israel's interference primarily affects GPS systems within Lebanon.

Lebanon accuses Israel of disrupting GPS at Beirut's Rafic Hariri International Airport and several other locations since the outbreak of cross-border clashes with Hezbollah last 8 October. There was no comment from Israel on the Lebanese accusation.

Observers in Lebanon say that the Israeli interference aims to exert control over Lebanese airspace and hinder anti-Israel drones.

Read more in *article...*

<https://www.middleeastmonitor.com/20240716-lebanon-files-complaint-against-israel-over-gps-jamming/>

2024-07-16



EASA Updates Advisory on Navigation Interference

The European Union Aviation Safety Agency (EASA) has updated its Safety Information Bulletin (SIB) to address the growing number of GNSS outages and disruptions.

This updated advisory, SIB No. 2022-02R3, highlights the increasing sophistication and impact of GNSS jamming and spoofing, which have become significant concerns for aviation safety.

The bulletin is directed at competent authorities, Air Traffic Management/Air Navigation Services (ATM/ANS) providers, air operators, aircraft and equipment manufacturers and organizations involved in the design or production of ATM/ANS equipment. It aims to inform these stakeholders about the risks and necessary precautions related to GNSS interference.

Read more in *GPS World* article. https://www.gpsworld.com/easa-updates-advisory-on-navigation-interference/?utm_source=Navigate%21+Weekly+News&utm_medium=Newsletter&utm_campaign=NCMCD240703003&oly_enc_id=1784A2382467C6V

2024-07-09



Israeli Air Base Identified as Alleged Source of GPS Disruptions in Mideast

Researchers from the University of Texas at Austin have identified an Israeli air base as a large source of widespread GPS disruptions affecting civilian airline navigation in the Middle East, reported *The New York Times*.

The spoofing disruptions involve the transmission of manipulated GPS signals, which can cause airplane instruments to misread their location. Lead researchers Todd Humphreys and Zach Clements stated they are “highly confident” that Ein Shemer Airfield in northern Israel is the source of these attacks. The Israeli military declined *The New York Times*’ request for comment.

The research team utilised data emitted by the spoofer and picked up by satellites in low-Earth orbit (LEO) to determine its location. They then confirmed their calculations using ground data collected in Israel.

Spoofing, along with GPS jamming, has significantly increased over the past three years, especially near war zones such as Ukraine and Gaza. In these areas, militaries interfere with navigation signals to redirect aerial attacks.

Read more in *GPS World* article. https://www.gpsworld.com/israeli-air-base-identified-as-alleged-source-of-gps-disruptions-in-mideast/?utm_source=Defense+PNT&utm_medium=Newsletter&utm_campaign=NCMCD240704002&oly_enc_id=1784A2382467C6V

2024-07-10



SandboxAQ Unveils AI and Quantum-powered Navigation System

[SandboxAQ](#) has released AQNav, designed for navigation across air, land and sea when GPS signals are jammed or unavailable.

As of June 2024, AQNav has logged more than 200 flight hours and 40 sorties across multiple regions of the world on four different aircraft types, ranging in size from single-engine planes to large military transport aircraft.

AQNav is a geomagnetic navigation system that uses proprietary artificial intelligence (AI) algorithms, powerful quantum sensors and the Earth's crustal magnetic field. The system seeks to provide an un-jammable, all-weather, terrain-agnostic, real-time navigation solution in situations where GPS signals are unavailable, denied or spoofed.

The system uses extremely sensitive quantum magnetometers to acquire data from Earth's crustal magnetic field, which exhibits geographically unique patterns – similar to a human fingerprint. AQNav uses AI algorithms to compare this data against known magnetic maps, allowing the system to quickly and accurately find its position. Due to the high sensitivity of quantum sensors, AI algorithms are applied to improve the signal-to-noise ratio, removing any mechanical, electrical or other interference that would impact the system's ability to acquire its location.

Read more in *GPS World* article. https://www.gpsworld.com/sandboxaq-unveils-ai-and-quantum-powered-navigation-system/?utm_source=Navigate%21+Weekly+News&utm_medium=Newsletter&utm_campaign=NCMCD240626002&oly_enc_id=1784A2382467C6V

2024-06-27

