Six Companies to Demonstrate Alternative PNT to European Union

The European Union will explore alternative PNT through a pre-feasibility study and technological demonstration of seven different non-GNSS positioning, navigation, or timing solutions from six different companies, including Locata Corporation (Australia), Satelles Inc. (US) and GMV Aerospace (Spain). Some of the demonstrations will consist of precise timing, some of precise positioning, and some of both. The other companies receiving grants to participate are OPNT BV (the Netherlands), Seven Solutions SL (Spain) and SPCTime (France).

The October 11 announcement caps a year of submissions and review since the tender for the project was published in October of last year by the European Commission's Directorate General for Defence, Industry and Space. The goal of the process is "to analyse the technologies, which could deliver positioning, and/or timing information, independently from GNSS, to be effective backup in the event of GNSS disruption, and if possible to be able to provide PNT in the environments where GNSS cannot be delivered."

Read more in *Inside GNSS* article. https://insidegnss.com/six-companies-to-demonstrate-alternative-pnt-to-european-union/
2021-10-19

Japan Launches New Satellite to Improve GPS

Japan successfully launched a rocket carrying a new satellite on Tuesday 26 October, replacing an aging one launched 11 years ago to improve its global positioning system

(GPS) data and telecommunications. The H-2A rocket was launched around 11.20 am local time (02:19 GMT) from the Tanegashima base in the southeast of the country, carried out by the satellite's producer Mitsubishi Heavy Industries, which has participated in this type of operation since it was privatized in 2007.

The rocket, about 53 metres long and weighing around 290 tons, and the satellite separated successfully at an altitude of about 260 kilometres around half an hour after launch. The new satellite will replace Michibiki No. 1, a satellite that was launched in 2010 and has reached the end of its design life.

Read more in *article*…
https://www.laprensalatina.com/japan-launches-new-satellite-to-improve-gps/
2021-10-26

Video Celebrates 10 Years of Galileo

A new video celebrates the first decade of Europe's satellite navigation system Galileo, which celebrates its 10-year anniversary on Oct. 21.

Galileo delivers metre-level accuracy anywhere on Earth. It is also saving lives, by relaying distress calls for search and rescue. Today, 26 Galileo satellites orbit 23,222 km above the Earth. The first was launched on Oct. 21, 2011; nine more launches followed to create the constellation.

Read more in *GPS World* article. https://www.gpsworld.com/video-celebrates-10-years-of-galileo/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD211020003&oly_enc_id=1784A2382467C6V
2021-10-21

GNSS Today: A Four-leaf Clover

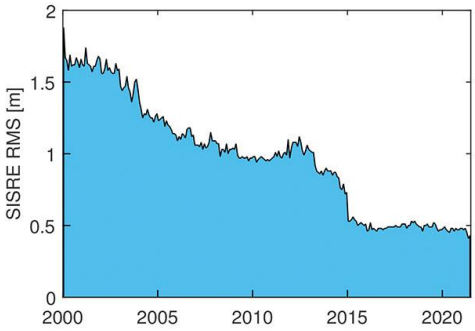
A year ago, the U.S. Global Positioning System celebrated its silver jubilee upon completing 25 years in operation. Also, it was more than 20 years ago that President Clinton agreed to switch off Selective Availability, thus offering seamless positioning to the civil community. The 10-bit GPS week count experienced its second rollover, and people worldwide got addicted to a ubiquitous positioning capability in those decades. Be it for finding the nearest restaurant or to track a Sunday afternoon bike ride, positioning-related services building on GPS have become an integral part of our daily life. In fact, GPS has almost become a synonym for navigation itself.

One cannot underestimate the contribution that GPS has made to society. It is for sure most deserved that the fathers of GPS were ultimately awarded the highly prestigious Queen Elizabeth Prize for Engineering in the year of the above jubilee. As always, success creates followers, and GPS is no longer the sole player. Next to the Russian GLONASS, two new actors — namely the European Galileo and the Chinese BeiDou-3 GNSS — have mounted the stage. So, users are now offered a choice of four independent GNSS.

However, do we really need so many systems? Isn't one enough and all others just a waste of taxpayers' money? The answer to the last question is certainly a clear "no."

Read more in *GPS World* article. https://www.gpsworld.com/gnss-today-a-four-leaf-clover/?utm_source=Autonomous+Arena&utm_medium=Newsletter&utm_campaign=NCMCD211014003&oly_enc_id=1784A2382467C6V

2021-10-18

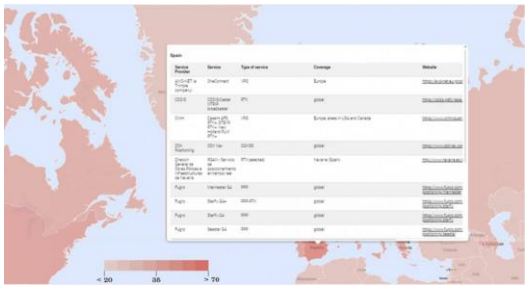


Map of Augmentation Service Providers Supporting Galileo Now Available

The European Union Agency for the Space Programme (EUSPA) has published an online interactive world map providing information about augmentation service providers that support Galileo. Clicking over each country shows the names of the Galileo-ready providers along with the name of the service, type of service and coverage. The online interactive map is accessible here.

Augmentation service providers deliver a range of high-accuracy GNSS positioning services worldwide, tailored both for professional and consumer markets. Service providers monitor signals from GNSS (GPS, GLONASS, Beidou and Galileo) satellites and generate corrections to significantly improve the accuracy of GNSS standalone positioning. Correction messages are transmitted via the internet, SATCOM or GPRS to GNSS receivers. There are different types of services appropriate to all needs and budgets, offering different levels of accuracy from centimetres to decimetres. These solutions can be used in a number of markets including: mapping, surveying, construction, agriculture, automotive or aviation, to name a few.

Read more in *Inside GNSS* article. https://insidegnss.com/map-of-augmentation-service-providers-supporting-galileo-now-available/
2021-10-01

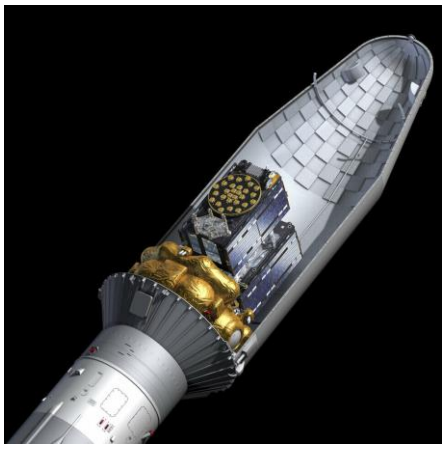


Next Two Galileo Satellites Arrive at Europe’s South American Spaceport

The latest pair of Galileo satellites have touched down at Europe’s Spaceport in French Guiana, ahead of their launch together next month.

Within environmentally controlled containers, the European GNSS satellites crossed the Atlantic from ESA’s ESTEC Test Centre in Noordwijk, the Netherlands to Cayenne in French Guiana and were driven to the cleanroom surroundings of the spaceport in nearby Kourou. These are the first of the last batch of Galileo First Generation satellites, known as ‘Batch 3’, made up of 12 satellites in all. They are built by OHB SE in Bremen, Germany, with their navigation and search and rescue payloads contributed by Surrey Satellite Technology Ltd in Guildford in the UK.

Read more in *Inside GNSS* article. vhttps://insidegnss.com/next-two-galileo-satellites-arrive-at-europes-south-american-spaceport/
2021-10-08



Forecasting Space Weather is Hard. A New Australian Satellite May Help Make It Easier

The Australian-made space weather satellite CUAVA-1 was deployed into orbit from the International Space Station on Wednesday night. Launched to the space station in August aboard a SpaceX rocket, a major focus of this shoebox-sized CubeSat is to study what radiation from the Sun does to Earth's atmosphere and electronic devices.

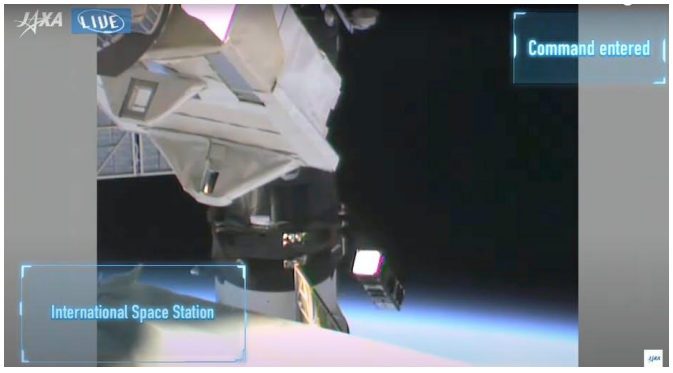
Space weather such as solar flares and changes in the solar wind affects Earth's ionosphere (a layer of charged particles in the upper atmosphere). This in turn has an impact on long-distance radio communications and the orbits of some satellites, as well as creating fluctuations in the electromagnetic field that can wreak havoc with electronics in space and down to the ground.

The new satellite is the first designed and built by the Australian Research Council Training Centre for Cubesats, UAVs, and their Applications (or CUAVA for short). It carries payloads and technology demonstrators built by collaborators from the University of Sydney, Macquarie University, and UNSW-Sydney.

Read more in *article*…

https://theconversation.com/forecasting-space-weather-is-hard-a-new-australian-satellite-may-help-make-it-easier-169027?utm_medium=email&utm_campaign=Latest%20from%20The%20Conversation%20for%20October%208%202021%20-%202081320546&utm_content=Latest%20from%20The%20Conversation%20for%20October%208%202021%20-%202081320546+CID_b7a8933d08353426a442906b1d93ee37&utm_source=campaign_monitor&utm_term=Forecasting%20space%20weather%20is%20hard%20A%20new%20Australian%20satellite%20may%20help%20make%20it%20easier

2021-10-07



EGNOS Contract for Next-Generation, Dual-Frequency European SBAS Signed

The EU Agency for Space Programme (EUSPA) awarded Thales Alenia Space a contract to provide new capabilities to the European Geostationary Navigation Overlay Service (EGNOS) satellite-based augmentation system. Thales Alenia Space will start the development of a new EGNOS version introducing a new generation uplink station (NLES, Navigation Land Earth Station) allowing the introduction of new GEO satellites in the system for improved redundancy. This new generation of station would be also compatible with the future emission of dual-frequency and multi-constellation messages, making possible future introduction of dual-frequency algorithms and usage of the Galileo and GPS constellations.

“We are currently developing and testing with success SBAS next-generation architectures and capabilities. The strong dynamic we experience on our SBAS export markets in Asia, Africa & Indian Ocean demonstrate our solution global attractiveness for our customers,” said Benoit Broudy, Navigation Vice President at Thales Alenia Space in France.

Read more in *Inside GNSS* article. https://insidegnss.com/egnos-contract-for-next-generation-dual-frequency-european-sbas-signed/
2021-09-16

Space Data Used to Detect Sources of GPS Disruptions

One of the challenges is identifying the precise location and source of interference, said Rob Rainhart, chief operating officer of HawkEye 360, a geospatial analytics company

that uses satellites to track ships, vehicles or any devices that emit radio frequency signals.

HawkEye 360 is one of several remote sensing satellite operators demonstrating their technologies at the 2021 GEOINT Symposium this week.

Rainhart said radio-frequency data collected by satellites can help to locate GNSS interference hotspots. GNSS is short for global navigation satellite system, or any satellite constellation that provides positioning, navigation, and timing (PNT) service.

The company's satellites, equipped with software-defined radios, fly in clusters of three: one in front, another behind and a third that oscillates back and forth. Three clusters are currently in orbit.

Rainhart said HawkEye 360 has briefed government and commercial customers concerned about the impact of GPS disruptions on how they could apply RF data analytics to spot interference.

Read more in *article*…
https://spacenews.com/space-data-used-to-detect-sources-of-gps-disruptions/
2021-10-05

Location Tech to Support SA Summer Fire Safety

Automatic Vehicle Location (AVL) equipment will be rolled out across South Australia's fire and emergency services vehicle fleets in time for the summer fire season. AVL enables emergency services organisations to track the location of vehicles, helping to direct them to areas of need or warning personnel of the need to relocate in case of danger.

The South Australian Minister for Emergency Services, Vincent Tarzia, has announced that Netstar Australia has been awarded the $13.5 million tender for the AVL roll out.

“Netstar’s AVL solution has been tested thoroughly and can withstand high demand in some of the state’s most remote locations, like parts of Kangaroo Island, where phone connectivity is non-existent,” Minister Tarzia said.

“This is a significant step forward in terms of safety for our emergency services volunteers and personnel.”

Read more in *Spatial Source* article. https://www.spatialsource.com.au/gis-data/location-tech-to-support-sa-summer-fire-safety?fbclid=IwAR2rhrqOPu3Ml8iQAKUHlmzQfmssYJk7V5sef-x9Z_bGhJqgh01AoVcB5bo
2021-10-01

Xona Space Readies for Launch of Commercial PNT Satellite

Xona Space Systems is preparing for the launch of its first commercial positioning, navigation and timing (PNT) satellite, the first in a planned 300-satellite low-Earth orbit (LEO) constellation designed to cover the globe.

Xona has raised a new funding round co-led by Seraphim Space Investment Trust and MaC Venture Capital, with participation from Toyota Ventures, Daniel Ammann (co-founder of u-blox), and Ryan Johnson (former CEO of BlackBridge, operator of the Rapideye constellation).

Xona’s Pulsar precision LEO positioning, navigation and timing (PNT) service leverages advances in small satellite technology to provide users with a secure and robust alternative to traditional GNSS. The satellites will orbit 25 times closer to Earth than GPS satellites do. Xona’s patent-pending system architecture makes use of the efficiency of small satellites to provide an affordable global service with 10

times better accuracy and 100 times better interference mitigation than the legacy systems, the company claims.

Read more in *GPS World* article. https://www.gpsworld.com/xona-space-readies-for-launch-of-commercial-pnt-satellite/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD210922003&oly_enc_id=1784A2382467C6V

2021-09-22

ION Journal NAVIGATION Goes Open Access on Jan. 1

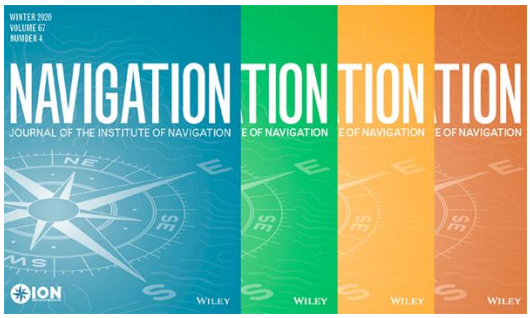
The Institute of Navigation (ION) has announced that its quarterly journal, *NAVIGATION, Journal of The Institute of Navigation*, will move to an open access (OA) model of publishing beginning Jan. 1, 2022.

NAVIGATION is a leading peer-reviewed and indexed scientific journal publishing articles on all areas related to the art and science of positioning, navigation and timing (PNT). Printed paper copies of *NAVIGATION* will be discontinued beginning with the Spring 2022 issue. Instead, ION members will receive an environmentally friendly link to download a compiled electronic copy of each issue.

“Moving *NAVIGATION* to an open access domain is critical to supporting ION’s mission of advancing positioning, navigation and timing,” said Lisa Beaty, managing editor and executive director of ION. “Moving *NAVIGATION* to an OA platform will speed the delivery of timely PNT research, without the restrictions of paywalls or price barriers, to a worldwide audience. We want all scientists and engineers to be able to collaborate, analyze and build upon each other’s work for society’s common good.”

Read more in *GPS World* article. https://www.gpsworld.com/ion-journal-navigation-goes-open-access-on-jan-1/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD210922003&oly_enc_id=1784A2382467C6V

2021-09-24



Russia Will Install GLONASS Monitoring Stations in China; China to Reciprocate

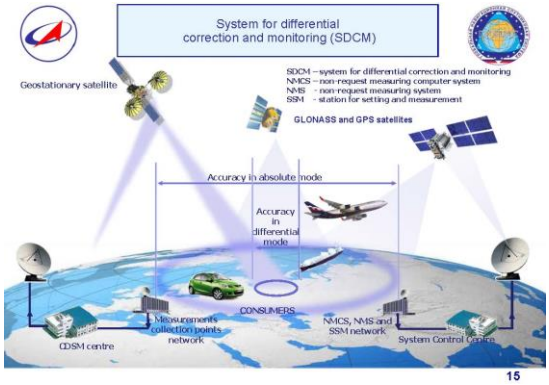
Russia's state space agency Roscosmos will start placing ground stations for its GLONASS navigation satellite system across China, tentatively before the end of the year, announced Roscosmos Deputy Director for International Cooperation General Sergey Saveliev.

"We have a reciprocal process: we need to place GLONASS stations in China, and they are over here (in Russia). Now we have started active work. I hope that the installation will begin this year. We will make every effort for this," Saveliev said.

In 2018, the two countries reached an agreement to cooperate on the use of their respective GNSS for peaceful purposes, with the document ratified the next year. China will install BeiDou ground monitoring stations across Russia.

Read more in *Inside GNSS* article. https://insidegnss.com/russia-will-install-glonass-monitoring-stations-in-china-china-to-reciprocate/

2021-09-24



Australian Cyclist Uses GPS to Recreate Nirvana's Nevermind Cover

The naked Nirvana baby has been recreated yet again – this time on the unsuspecting streets of Adelaide.

Pete Stokes rode about 150km on a single-speed bike to sketch the outline of the famous Nevermind cover. His efforts, tracked by GPS-based site Strava, show the baby's (slightly angry) face over the CBD and the banknote over the leafy eastern suburbs of Burnside and Kensington.

To mark Nevermind's 30th anniversary on 24 September, Nirvana is planning to reissue the album. The official website shows they are still using the image of the naked baby, even though Spencer Elden, who was four months old then when it was shot in 1991, is suing Nirvana for sexual exploitation. (He recreated the swimming scene himself on the 25th anniversary, while fully clothed.)

Stokes, a national parks project manager, imposes pictures over mapping software. The baby took about eight hours, with bakery stops on top.

Read more in *article*…

https://www.theguardian.com/music/2021/sep/26/keen-spirit-australian-cyclist-uses-gps-to-recreate-nirvanas-nevermind-cover

2021-09-26

Smartphone-based GNSS Positioning – Today and Tomorrow

The vast majority of GNSS receivers today are installed in smartphones, with 1.5 billion devices produced every year. Most of these new phones make GNSS raw measurements available to the applications, a feature supported by the Android operating system since 2017. This has led to many new smartphone applications and 1000+ research papers focusing on GNSS positioning with smartphones.

An increasing number of these phones support dual-frequency measurements on the L1 and L5 bands. The use of an additional frequency (L5/E5a) with higher chipping rate (10 times that of L1) produces a narrower correlation peak, making the measurements more precise and eliminating some of the multipath distortions. While these developments pave the way to transfer high-precision positioning technology from expensive professional devices to mass-market smartphones, there remains the major hurdle of successful carrier-phase positioning (i.e. ambiguity fixing) to overcome before reliable decimetre- or centimetre-level positioning can be achieved with phones.

To assess the suitability of the smartphone observations for cm-level positioning, the quality of the measurements must be investigated. Processing tools like RTKLIB, Inertial Explorer or GNSMART can be used for this task. To provide these tools sensor data from the smartphones, a logger is needed. This requirement leads to the development of Android-based logger applications that log GNSS measurements and inertial sensor data that can be processed with wide variety of processing tools available in the market.

Read more in *Inside GNSS* article. https://insidegnss.com/smartphone-based-gnss-positioning-today-and-tomorrow/

2021-09-21