Next Generation GPS III Satellite Propels Itself to Orbit

The fifth Global Positioning System III (GPS III) satellite designed and built by Lockheed Martin is now headed to its orbit 12,550 miles above earth. This marks another step in supporting the U.S. Space Force's GPS satellite constellation modernization efforts.

Launched earlier this week, GPS III Space Vehicle 05 (GPS III SV05) is the latest next-generation GPS III satellite, a warfighting system owned and operated by the Space Force. GPS III SV05 will be the 24th Military Code (M-Code) signal-enabled GPS space vehicle on orbit, completing the constellation's baseline requirement to provide our military forces a more-secure, harder-to-jam and spoof GPS signal.

GPS III satellites provide significant capability advancements over earlier-designed GPS satellites on orbit.

Read more in *GPS Daily* article.
https://www.gpsdaily.com/reports/Lockheed_Martin_Built_Next_Generation_GPS_III_Satellite_Propels_Itself_to_Orbit_999.html
2021-06-18

How Location Technology Helps Real Madrid Improve Team Performance

Spanish football giant Real Madrid is one of the richest and most popular football clubs in the world. The Club boasts a record 13 European Cups and 33 titles in the Spanish Football League, making it the most successful Club in Europe. Since 2016, the Club has transformed itself through the use of data and digital technology to streamline its operations, performance, fitness, and relationships with 500 million global fans.

Every Real Madrid player wears a GPS device, embedded in his training kit, during training sessions. The device records the player's heart rate, speed, running distance, routes, and acceleration. Having such data helps to quantify and control a player's training load better, reducing the chances of injuries.

Ten minutes after a training session ends, data from the GPS devices is uploaded onto a shared information system for the coach to access and analyse. On top of the physical information about all players, the shared system also contains other data, such as, each player's physiotherapy treatments, oral supplements, and podiatrist data.

The entire data is analysed to draw conclusions on a player's form, which then determines the player's role in upcoming matches.

Read more in *article*…
https://www.gwprime.geospatialworld.net/case-study/how-location-technology-helps-real-madrid-improve-team-performance/?utm_source=GW+Subscribers&utm_campaign=9863e91716-gwprime-mailer-24june2021&utm_medium=email&utm_term=0_3b0a203c48-9863e91716-139613109
2021-06-20

Honda Develops "In-Shoe Navigation System" for the Visually Impaired

Honda has made a navigation device for visually impaired people, called the "in-shoe navigation system." As the name suggests, this device is attached to the wearer's

shoes and helps to navigate them to their desired location, which is predetermined by using a smartphone app that sends information to the device.

There are multiple vibrating points situated around the device to indicate to the wearer where they should be heading. For example, if they're to go straight on, the front vibrator will ignite, and the same goes for when you need to go left or right.

Read more in *article*…
https://hypebeast.com/2021/6/honda-navigation-system-in-shoe-gps-visually-impaired-people-wearable-tech
2021-06-16

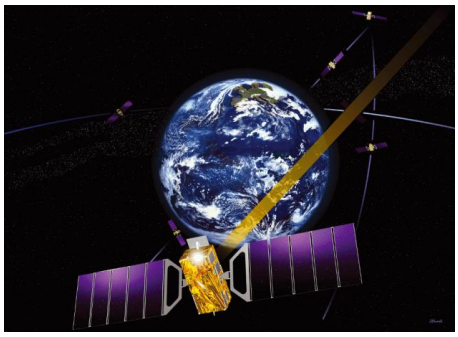
GMV Awarded Contract for Galileo HAS Data Generator

GMV has been awarded a contract for the implementation of the Galileo High Accuracy data generator (HADG), which will be the facility in charge of generating the high-accuracy corrections data to enable the provision of the Galileo High Accuracy Service (HAS). The contract was awarded by the European Union Agency for the Space Programme (EUSPA).

HADG will ensure the continuous provision of HAS data with a proper rate, accuracy, availability, continuity and latency. The data will encompass orbit and clock corrections, biases, quality indicators and service parameters. The HADG contract addresses a key infrastructure development of the Galileo program. The Galileo HAS, together with the Open Service Authentication (OSNMA) and the Commercial Authentication Service (CAS), is one of Galileo's stand-out services, setting it apart from GPS or GLONASS.

Read more in *GPS World* article. https://www.gpsworld.com/gmv-awarded-contract-for-galileo-has-data-generator/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD210609002&oly_enc_id=1784A2382467C6V

2021-06-10



A Book for our 21st Century Times

A new tome — make that two new tomes — join the bookshelf of essential, authoritative references for GNSS users. They widen the information umbrella significantly to cover all PNT technologies, their sensors, integrations and applications. Edited by four leading lights of the community and assistant-edited by two more, its list of authors rounds up another 100+ of the names seen repeatedly in presentations at technical conferences. In every one of 64 subject matters, the author(s) is/are recognised experts, in many cases *the* recognised expert, on the material.

Position, Navigation, and Timing Technologies in the 21st Century: Integrated Satellite Navigation, Sensor Systems, and Civil Applications, Volumes 1 and 2 has appeared from John Wiley & Sons (Wiley-IEEE Press). Its 64 chapters in 2,000 pages neatly fall into 6 divisions:

- Satellite Navigation Systems
- SatNav Technologies
- SatNav for Engineering and Scientific Applications
- Position, Navigation, and Timing Using Radio Signals-of-Opportunity
- PNT Using Non-Radio Signals-of-Opportunity
- PNT for Consumer and Commercial Applications

Read more in *Inside GNSS* article. https://insidegnss.com/a-book-for-our-21st-century-times/
2021-06-03

Foreign Reporters to be Tracked by GPS at Tokyo Olympics

Overseas journalists covering the Tokyo Olympics will have their movements tracked by GPS, the Games president said Tuesday, and could have their passes revoked if they break the rules.

Organisers of the pandemic-postponed 2020 Games, which open in just over six weeks, are trying to reassure a sceptical public that the mega-event can be held safely under strict virus rules.

The about 6,000 reporters visiting Japan for the Olympics must provide a detailed list of areas they will visit for their first two weeks in Japan, such as sports venues and hotels.

And Tokyo 2020 chief Seiko Hashimoto said tracking technology would be used to make sure they only go where they are supposed to.

"To make sure that people don't go to places other than the places where they are registered to go, we will use GPS to strictly manage their behaviour," Hashimoto said before a Tokyo 2020 executive board meeting.

Read more in *article*…

https://www.france24.com/en/live-news/20210608-foreign-reporters-to-be-tracked-by-gps-at-tokyo-olympics

2021-06-08

$17M Proposed for DOT Resilient PNT Initiatives

The U.S. Office of Management and Budget (OMB) seeks to extend Trump policies and repeal timing law counter to its own study and industry input

The Biden administration's budget proposal delivered to Congress last week includes $17 million for the small Department of Transportation (DOT) office responsible for leading civil positioning, navigation and timing (PNT) efforts for the nation. This is a marked increase over the $2 million allocated in 2020 and estimated $5 million being spent this fiscal year.

At the same time, it seeks to repeal the National Timing Resilience and Security Act of 2018 that mandated DOT establish a terrestrial timing backup for GPS. This, despite the findings of a recently published RAND study completed for the Department of Homeland Security (DHS), and other input from a telecommunications industry group.

Read more in *GPS World* article. https://www.gpsworld.com/17m-proposed-for-dot-resilient-pnt-initiatives/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD210602003&oly_enc_id=1784A2382467C6V

2021-06-04

What is the Significance of the NANUs?

Since at least 1997, the Global Positioning System (GPS) Control Segment (CS) has issued what are known as “Notice Advisor(ies) to NAVSTAR Users” or “NANU(s).”

As originally reported in Section 3.5 of the 2001 version of the GPS SPS Performance Standard (GPS SPS PS), these provide “notification of changes in constellation operational status that affect the service being provided to GPS users, or if the U.S. Government anticipates a problem in supporting performance standards established in this document.”

The most recent 5th Edition of the GPS SPS PS [2] explains that a key purpose of NANUs is to alert GPS users of foreseeable future GPS satellite outages so that users are not surprised by them and potentially lose continuity. Specifically, Section 2.3.5 of [2] states the following:

“Scheduled interruptions which are announced at least 48 hours in advance do not contribute to a loss of continuity. Scheduled SPS SIS interruptions are announced by way of the Control Segment issuing a “Notice Advisory to Navstar Users” (NANU). NANUs are similar to the “Notices to Airmen” (NOTAMs) issued regarding scheduled interruptions of ground-based air navigation aids. CS internal procedures are to issue NANUs for scheduled interruptions at least 96 hours in advance.”

Read more in *Inside GNSS* article. https://insidegnss.com/q-what-is-the-significance-of-the-nanus-provided-by-gps-and-the-similar-alerts-provided-by-other-gnss-constellations-are-they-needed-for-the-use-of-these-systems-and-if-not-how-are-they-helpful/
2021-05-27

GNSS-equipped Driverless RaceCar for the Indy Autonomous Challenge Unveiled

On Memorial Day, just prior to the running of the legendary Indy 500 race, a new speedway star came out to shine. A driverless racecar, no less, aiming for track speeds above 120 mph with no human hands on the wheel. The Dallara Lite has been kitted out with sensors and a drive-by-wire system, one identical car for each of the Indy Autonomous Challenge teams. The most advanced autonomous racecar in the world will compete at the historic Indianapolis Motor Speedway on October 23.

Hexagon's Autonomy & Positioning division, in the form of NovAtel and AutonomouStuff, besides donating the GNSS receivers for all the cars, acted as subject matter expert for Clemson University's Deep Orange team of highly skilled graduate students and professors. Clemson is not competing in the race but the Deep Orange team assembled the "over-spec'd" sensor kit for the prototype Dallara reference vehicle. AutonomouStuff is now replicating the process for 20 identical models.

"It's quite simple," says Chris Paredis, professor and BMW Endowed SmartState Chair in Systems Integration at Clemson University, and program director of Deep Orange. The latter is a vehicle prototype Master's degree program offered annually by the Clemson University International Center for Automotive Research.

Read more in *Inside GNSS* article. https://insidegnss.com/gnss-equipped-driverless-racecar-for-the-indy-autonomous-challenge-unveiled/

2021-06-03

Using GNSS for Tide Calculations is a Swell Idea

Advances in GNSS systems mean that tide gauges and tide prediction tables are no longer needed for determining height above a known datum. That's according to the International Marine Contractors Association's (IMCA) new publication, *Guidelines on the use of GNSS for tide calculations*.

The *Guidelines* give an overview of how GNSS can help in providing more accurate, real-time, direct measurement of tidal changes.

"As with horizontal positioning, vertical positioning is referenced to specified datums. Unlike land surveying, where vertical measurements (elevations) are made to and from a known, fixed position, vertical measurements offshore (depths) are taken against a moving dynamic surface," said Nick Hough, IMCA's Technical Adviser – Offshore Survey

"Advances in GNSS technology enable accurate and consistent calculation of height above a known datum, which means reliance on tide gauges or tide prediction tables is no longer necessary," said Hough.

Read more in *Spatial Source* article. https://www.spatialsource.com.au/latest-news/using-gnss-for-tide-calculations-is-a-swell-idea?utm_medium=email&utm_campaign=SS%20Newsletter%2009062021&utm_content=SS%20Newsletter%2009062021+CID_f79f4dc6190cdabcf82804349825ba58&utm_source=Campaign%20Monitor&utm_term=READ%20MORE

2021-06-09

UK Space Sector Targets PNT Sub-systems

6 UK businesses have won a share of over 2 million pounds in government funding to help shape options for the UK's satellite navigation and timing capability, to protect UK Critical National Infrastructure.

Leading UK space companies Airbus, CGI, Sirius Analysis, GMV NSL, Inmarsat, and QinetiQ will each receive a share of the funding to help develop system design and

operation, signals and algorithms, resilience, assurance, and cost modelling for the UK Space Agency's Space Based Positioning, Navigation and Timing Programme (SBPP).

UK Space Agency deputy CEO Ian Annett said:

The UK is critically dependent on position, navigation and timing information from satellite navigation systems in transport, communications, energy distribution, and emergency response.

Read more in *GPS Daily* article.
https://www.gpsdaily.com/reports/UK_space_sector_targets_positioning_navigation_and_timing_sub_systems_999.html
2021-05-31

Space Debris Endangers GPS

GNSS satellites, especially GPS satellites, are critical to the well-being and smooth functioning of economies and national security. This is especially true in Europe and the United States, which do not have complementary terrestrial systems able to provide vital positioning, navigation and timing (PNT) services when signals from space are not available.

While the probability of debris damage to GNSS in medium Earth orbit (MEO) is much less than for satellites in low Earth orbit (LEO), the consequences of such an event would be much, much higher. The loss of one satellite would be a concern; that of multiple satellites, a major problem. The unthinkable chaos, national security damage, and severe economic impacts to the $21 trillion U.S. GDP make the risk unacceptable.

For those who think we need not worry about the low probability of collisions at MEO, the Galileo collision avoidance maneuver in March 2021 should be a wakeup call. The problem is here. We need to act now.

Read more in *GPS World* article. https://www.gpsworld.com/space-debris-endangers-gps/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD210526002&oly_enc_id=1784A2382467C6V

2021-05-25

Go-ahead Given For Next-generation Galileo

ESA has chosen Thales Alenia Space and Airbus Defence & Space to separately build two families of spacecraft that will make up the **second generation of Galileo navigation satellites.**

The contracts for the 12 satellites total €1.47 billion and cover design and construction. The current Galileo fleet comprises 26 first generation satellites, while 12 newer 'Batch 3' satellites are in production and testing. The first launch of Batch 3 satellites is scheduled for late 2021.

It is expected that the first of the new Galileo Second Generation (G2) satellites will be launched by 2025, boosting the accuracy provided to users from metre-scale to decimetre-scale. The G2 satellites will feature:

- Electric propulsion systems
- Fully digital payloads that can be easily reconfigured in orbit
- Inter-satellite links that will enable each satellite to cross-check its performance, reducing dependency on the availability of ground installations.
- More powerful navigation antennae
- Advanced jamming and spoofing protection mechanisms
- More precise atomic clocks

Read more in *Spatial Source* article.

https://www.spatialsource.com.au/gpsnav/go-ahead-given-for-next-generation-galileo?utm_medium=email&utm_campaign=SS%20Newsletter%2002062021&utm_content=SS%20Newsletter%2002062021+CID_f93d3bf0e2fd86ca42199035a414f70e&utm_source=Campaign%20Monitor&utm_term=READ%20MORE

2021-06-02

Telecom Groups Press President, Congress For GPS Alternatives

America urgently needs alternatives to GPS and the government must fund efforts to make that happen. So say separate documents sent to President Biden and senior members of Congress earlier this month.

On May 6, the government's National Security Telecommunications Advisory Committee (NSTAC) issued its "Report to the President on Communications Resiliency." The next day the industry group Alliance for Telecommunications Industry Solutions (ATIS) sent letters to Congress. Both organisations identify the need for alternatives to GPS to support telecommunications and other critical infrastructure. Both also urge government funding for the effort.

NSTAC is a federal advisory committee composed of 18 members from the telecommunications industry. Most are CEOs and very senior leaders in companies such as AT&T, Microsoft, and Iridium.

This month's NSTAC report highlights the critical role that PNT, especially timing, plays in telecommunications. It notes that widespread use of GPS makes the system vulnerable to a host of threats. To address this, the group recommends the administration consider an approach "similar to that reflected in the Resilient Navigation and Timing Foundation's paper entitled "A Resilient National Timing Architecture." Further, to enhance the ability of commercial entities to afford leveraging this architecture, the Administration should appropriate sufficient funds to lay the foundation for creating this timing architecture, with the Federal Government being the first customer for what will ultimately become a resilient, interconnected network for PNT delivery."

Read more in *GPS World* article. https://www.gpsworld.com/telecom-groups-press-president-congress-for-gps-

alternatives/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD210526002&oly_enc_id=1784A2382467C6V

2021-05-25

Why High Definition Maps are Key to Autonomous Trucking

With relatively constrained, predictable drive paths, trucking presents the nearest-term viable opportunity for autonomous-vehicle, or AV, technology. They are an easier challenge than passenger cars, which need the ability to travel widely and through complex road networks in order to reach economic viability.

Despite all the attention, a key component of autonomous truck technology has been somewhat overlooked—one that's both time-tested and cutting-edge: maps. High-Definition maps, to be exact. These critical, informationally rich datasets form the navigational foundation for much of a self-driving vehicle's core driving functions by providing an accurate, detailed representation of the road environment.

Structurally speaking, all HD maps have three primary layers of information: First, the actual 3D representation of the road and its related features and furniture—think stop signs, traffic signals, lane markings, crosswalks, curb heights and so on. All of this is captured with centimetre-level accuracy. Second, an interpretive layer that tells an AV what each such sign, light and marking means. Generally, this is termed the "semantic" layer. And third, a vector layer that outlines the optimal drive paths, essentially providing "virtual rails" for the AV to follow. The quality, format and detail of the data may vary from provider to provider, but this basic architecture remains the same.

Read more in *article*…

https://www.trucks.com/2021/06/01/high-definition-maps-autonomous-trucking/

2021-06-01