

LEO Satellite Payload for DARPA Revolutionises PNT

The Defense Advanced Research Projects Agency (DARPA) Blackjack program has awarded Northrop Grumman Corporation (NYSE: NOC) a contract for Phase 2 development of an advanced, software-defined positioning, navigation and timing (PNT) payload, with options to build units destined for space flight.

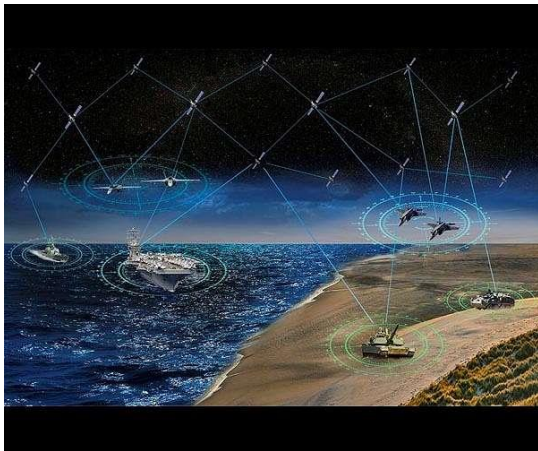
The PNT payload work is led by Northrop Grumman's Future PNT Systems Operating Unit in Woodland Hills. The team supports the DARPA Tactical Technology Office's goal of achieving capable, resilient and affordable national security space capabilities from low Earth orbit (LEO).

"Northrop Grumman's software-defined Positioning, Navigation and Timing technology will offer military users an agile new signal from LEO that is not dependent on existing satellite navigation systems," said Dr. Nicholas Paraskevopoulos, chief technology officer and sector vice president, emerging capabilities development, Northrop Grumman.

Read more in *GPS Daily* article.

https://www.gpsdaily.com/reports/Northrop_Grummans_LEO_satellite_payload_for_DARPA_revolutionizes_positioning_navigation_and_timing_999.html

2021-09-20



SpaceX Satellite Signals Used Like GPS to Pinpoint Location on Earth

Engineering researchers have developed a method to use signals broadcast by Starlink internet service satellites to accurately locate a position here on Earth, much like GPS does. It is the first time the Starlink system has been harnessed by researchers outside SpaceX for navigation.

The Starlink satellites, sent into orbit by Elon Musk's SpaceX, are designed to provide broadband internet connections in remote locations around the world. The researchers used signals from six Starlink satellites to pinpoint a location on Earth within 8 metres of accuracy.

Their findings, shared Sept. 22, 2021, at the Institute of Navigation GNSS annual meeting in St. Louis, may provide a promising alternative to GPS. Their results will be published in the upcoming issue of the journal IEEE Transactions on Aerospace and Electronic Systems.

The researchers did not need assistance from SpaceX to use the satellite signals, and they emphasised that they had no access to the actual data being sent through the satellites – only to information related to the satellite's location and movement.

"We eavesdropped on the signal, and then we designed sophisticated algorithms to pinpoint our location, and we showed that it works with great accuracy," said Zak Kassas, director of the Center for Automated Vehicles Research with Multimodal Assured Navigation (CARMEN), a multi-institution transportation centre housed at The Ohio State University.

Read more in *article...*

<https://news.osu.edu/spacex-satellite-signals-used-like-gps-to-pinpoint-location-on-earth/>
2021-09-22



EGNOS a Safe, Efficient Locator for Europe's Trains

Europe's Certifiable Localisation Unit with GNSS in the railway environment (CLUG) has moved the continent towards a cost-efficient train tracking solution based on satellite technology together with other sensors and data.

The European Railway Traffic Management System (ERTMS) is a major industrial project implemented by the EU to create an interoperable railway system in Europe that is safer and more efficient.

The proposed solution is based on multi-sensor fusion using measurements from a GNSS receiver, an inertial measurement unit (IMU) and a tachometer with the support of a digital map of the rail tracks. The localisation system consists of a data fusion algorithm associated with an integrity algorithm, ensuring the SIL4 level of safety of the main outputs of the Train Localisation On Board Unit (TLOBU). The integrity algorithm uses the European Geostationary Navigation Overlay Service (EGNOS,) a satellite-based augmentation system.

Read more in *Inside GNSS* article. <https://insidegnss.com/eu-space-services-to-back-up-europes-railway-traffic-management-system-ertms/>

2021-09-15



NASA Robots Compete in DARPA's Subterranean Challenge Final

Led by NASA JPL, Team CoSTAR will participate in the SubT final this week to demonstrate multi-robot autonomy in a series of tests in extreme environments.

Eight teams featuring dozens of robots from more than 30 institutions, including NASA's Jet Propulsion Laboratory in Southern California, will converge in a former Kentucky limestone mine from Sept. 21 to 24 to participate in a series of complex underground scenarios. The goal: to demonstrate cutting-edge robotic autonomy capabilities and compete for the chance to win \$2 million.

Sponsored by the Defense Advanced Research Projects Agency (DARPA), the event marks the final contest in the Subterranean, or SubT, Challenge, which began three years ago, attracting engineers from around the world. The challenge is aimed at developing autonomous robotic solutions for first responders in underground environments where GPS and direct communications are unavailable.

Read more in article...

https://www.robodaily.com/reports/NASA_robots_compete_in_DARPA's_Subterranean_Challenge_Final_999.html

2021-09-22



Italy and Qascom to Land First GNSS Receiver on the Moon

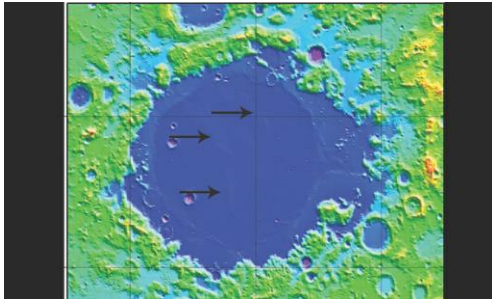
A 2023 lander in the moon's Mare Crisium will carry the first GNSS receiver to that planet's surface: the Navigation Early Investigation on Lunar surface (NEIL) receiver with software-defined radio (SDR) technology. The receiver will spring from agreements between the U.S. National Aeronautics and Space Administration (NASA), the Italian Space Agency (ASI) and the Italian firm Qascom srl.

The Qascom receiver will be part of the on-board payload of the Lunar GNSS Receiver Experiment (LuGRE), defined in the ASI / NASA agreement, which aims to develop an activity in a lunar and cislunar environment. LuGRE will fly on one of NASA's Commercial Lunar Payload Services (CLPS) missions. The mission will also bring 9 other scientific and technological experiments to the Moon. Scheduled for the end of 2023, it will be launched with a Falcon 9 carrier from the Space X company.

Qascom will develop a GNSS reception system for ASI, consisting of a dual-frequency and dual-constellation receiver and the entire signal reception chain (antenna, LNA, filters), capable of supporting the extreme conditions of the moon. The system will be integrated aboard NASA's Blue Ghost lunar lander in early 2022. The weak signals from the side lobes of the GPS and Galileo satellite antennas (not designed to be used outside the Earth) will be processed with specific algorithms, allowing for positioning. space and time, albeit with reduced accuracy, while cruising to the Moon, in lunar orbit and on the surface of the Moon itself.

Read more in *Inside GNSS* article. <https://insidegnss.com/italy-and-gascom-to-land-first-gnss-receiver-on-the-moon/>

2021-09-14



Are Elliptical Galileo Satellites Usable for RTK?

The saga of Galileo satellites 5 and 6 (E18, E14) will be remembered in the history of satellite navigation as a dramatic story of successful recovery from what seemed to be a failed mission. Erroneously launched in 2014 into highly elliptical orbits, quite far from their originally planned destinations, the two satellites were moved to acceptable moderately elliptical (eccentricity 0.162) orbits, where their non-standard orbit parameters would fit the navigation message and could be used in a regular way.

After a few years of steadfast effort by ESA and related organisations, health flags on both satellites were finally cleared on Nov 30, 2020. Thus, two more usable satellites were added to the Galileo constellation. The commissioning of E14 and E18 satellites into service went uneventful; the vast majority of receivers survived the switch. However, repeatable daily problems with RTK, a precise phase differential positioning technology, were reported for some receivers.

Read more in *Inside GNSS* article. <https://insidegnss.com/are-elliptical-galileo-satellites-usable-for-rtk/>

2021-09-14



National Academies Proposes Team to Study FCC Ligado Decision

The National Academies has announced its proposed team to examine the analysis and decision-making process by the Federal Communications Commission (FCC) in the matter of Ligado Networks. Individuals and organizations wishing to comment on the appropriateness of any of the members of that team or on any other aspect of this study have until September 19.

The April 2020 decision by the FCC has generated significant controversy and opposition within the public and Congress. This resulted in, among other things, seven separate petitions for reconsideration being filed, all of which are still pending, and several provisions in the National Defense Authorization Act for 2021. One of those provisions requires the Department of Defense to sponsor a study of the technical assumptions and analyses that went into the FCC's decision to allow Ligado Networks to operate.

Read more in *GPS World* article. https://www.gpsworld.com/national-academies-proposes-team-to-study-fcc-ligado-decision/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD210901002&oly_enc_id=1784A2382467C6V

2021-09-02

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South Korea's GNSS Project to Take-off With \$3.3 Billion Budget

South Korea has set off on a journey to build its own satellite navigation system, in cooperation with the United States, by 2035 to provide more accurate and reliable position, navigation and timing information across the country.

Named “ Korea Positioning System” (KPS), the project cleared the government’s budget feasibility study June 25, taking one step closer to winning the proposed budget of 3.72 trillion won (\$3.3 billion) by the Ministry of Science and ICT, which has pushed forward with the project since 2018. If the budget is approved by the National Assembly, the ministry will begin initial work next year to establish KPS by 2035 by launching eight new satellites — three satellites into geosynchronous orbit and five into inclined geosynchronous orbit. The first satellite for KPS will be launched in 2027, with a trial service scheduled for 2034 and a full-fledged one the following year, according to the ministry.

The KPS, when established, will make South Korea the seventh nation in the world to have its own satellite-based positioning, navigation and timing system, after the U.S., Russia, Europe, China, India and Japan. Its coverage encompasses Southeast Asia, Australia and New Zealand.

Read more in *Space News* article. <https://spacenews.com/south-koreas-gnss-project-to-take-off-with-3-3-billion-budget/>

2021-08-03



World's Most Accurate Clock Can Improve GPS Navigation Accuracy

The world's most accurate clock, invented by Chinese-American scientist Jun Ye, can change a lot of things in the world.

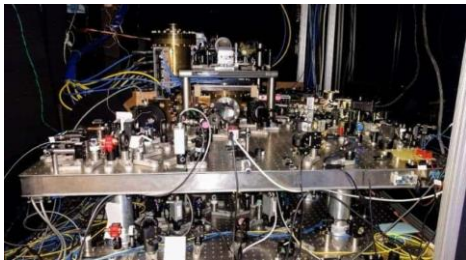
Not only can the clock improve GPS navigation accuracy by a factor of a thousand, but also facilitate a smooth landing of unmanned spaceplanes on Mars.

The clock is so accurate that it would need 15 billion years to lose a second. This is approximately equal to how long the universe has existed.

Read more in *article...*

<https://www.wionews.com/science/worlds-most-accurate-clock-can-improve-gps-navigation-accuracy-412043>

2021-09-10



Space Systems Command Declares Three GPS III Space Vehicles "Available for Launch"

The U.S. Space Force's Space Systems Command recently declared the eighth GPS III satellite as "Available for Launch." This significant accomplishment officially marks the third space vehicle within the GPS III program to be declared available for launch in the past three months. GPS III SV06, SV07, and SV08 are now awaiting official call up for launch in Lockheed Martin's GPS III Processing Facility in Waterton, Colorado.

"SV06, SV07, and SV08 AFL milestones in just three months prove that GPS III production continues to benefit from efficiencies with each satellite delivery," said Col. Edward Byrne, chief of SSC's Space Production Corps' Medium Earth Orbit Space Systems Division. The first of the three recently completed satellites, SV06, is scheduled to launch in 2022 and will join the operational constellation of 31 GPS satellites.

Read more in *GPS Daily* article.

https://www.gpsdaily.com/reports/Space_Systems_Command_declares_three_GPS_III_space_vehicles_Available_for_Launch_999.html

2021-08-27

