Terry Moore Wins International Navigation Award From IAIN

Terry Moore, a positioning and navigation expert at the University of Nottingham and longtime *GPS World* Editorial Advisory Board member and author, has become the first British academic to win a prestigious international award in the field.

Terry Moore is an Emeritus Professor and former director of the Nottingham Geospatial Institute at the University's Faculty of Engineering.

The International Association of Institutes of Navigation (IAIN) awarded Moore with its John Harrison Award for outstanding contributions to navigation. The award ceremony took place during a special session of the Navigation 2021 Conference in Edinburgh, which took place Nov. 16-18.

HRH The Princess Royal (Princess Anne) attended via Zoom to present the award, and had a one-to-one conversation with Professor Moore.

The John Harrison award is a premier global award in the navigation field and Professor Moore is its first British winner.

Read more in *GPS World* article. https://www.gpsworld.com/terry-moore-wins-international-navigation-award-from-iain/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD211117003&oly_enc_id=1784A2382467C6V

2021-11-17

Evaluating LEO Constellations for Global Satellite Navigation Service

We examined the OneWeb LEO constellation and variations of that constellation to determine the minimum size of a LEO constellation needed to provide global satellite navigation service. We used two criteria to assess if the constellation provided global satellite navigation service:

• Did the position dilution of precision (PDOP) values meet the GPS constellation requirements?

• Were the average PDOP values of the LEO constellation less than or equal to current GPS constellation average PDOP values?

From our modelling and simulation, we determined the minimum OneWeb LEO constellation sizes needed to satisfy these two criteria. We did not assess how these LEO satellites would be controlled, how their timing would be synchronised, nor other details of how to make the constellation perform as a stand-alone satellite navigation constellation.

LEO constellations typically consist of more satellites than MEO or geosynchronous orbit (GEO) constellations because LEO satellites have smaller footprints compared to MEO or GEO satellites. LEO satellites also have a significantly shorter orbital period, passing over the earth with a mean motion of 0.06°/s compared to MEO satellites mean motion of 0.008°/s. This faster motion can be an advantage over MEO satellites because it leads to greater multipath rejection of satellite signals. LEO satellites usually transmit stronger signals. In a denied or degraded GNSS signal environment, these stronger signals become an important asset.

Read more in *Inside GNSS* article. https://insidegnss.com/evaluating-leo-constellations-for-global-satellite-navigation-service/
2021-11-22

Unmanned and AI: Indy Challenge Takes Autonomous to Big Track

When I saw that there was a plan for a whole bunch of unmanned, semi-autonomous racecars to compete at the Indianapolis Motor Speedway (Indy, or IMS) racetrack, I initially thought we might be headed to one significant mess of broken-up machines and potentially a lot of damage. I tracked the various announcements of the competition as things progressed, especially when a prize of $1 million dollars was put up by the Lilly Endowment in Indianapolis, and the majority of the field appeared to be potentially staffed by undergrad university teams.

However, this isn't the first time we've had unmanned, autonomous road vehicles in competition — we've seen highly instrumented SUVs in desert settings in Nevada and California, initially with pretty poor results, which began to improve significantly for the second time round, then vehicles in some simulated street settings with some mixed and also some pretty good results.

Read more in *GPS World* article. https://www.gpsworld.com/unmanned-and-ai-indy-challenge-takes-autonomous-to-big-track/?utm_source=Autonomous+Arena&utm_medium=Newsletter&utm_campaign=NCMCD211111003&oly_enc_id=1784A2382467C6V

2021-11-17

China and Russia Cooperate on Rival to GPS

On September 17, Russia's largest, state-owned news agency, TASS, reported that state space corporation Roscosmos will install a satellite ground-monitoring station in Shanghai this year. Additional reports claimed China will place equivalent stations in Russia. This would be the first time either China or Russia allows another country to place monitoring stations on its soil.

The ground stations are the latest development in China and Russia's deepening space cooperation. The two countries have been pursuing integration of their satellite systems since 2014 and collaborating on other projects aimed at countering U.S. influence, including a planned lunar base and missile early warning system. Individually, both countries are developing and testing counterspace weapons capable of imperiling U.S. satellites.

Read more in *article*…
https://thediplomat.com/2021/11/china-and-russia-cooperate-on-rival-to-gps/
2021-11-18

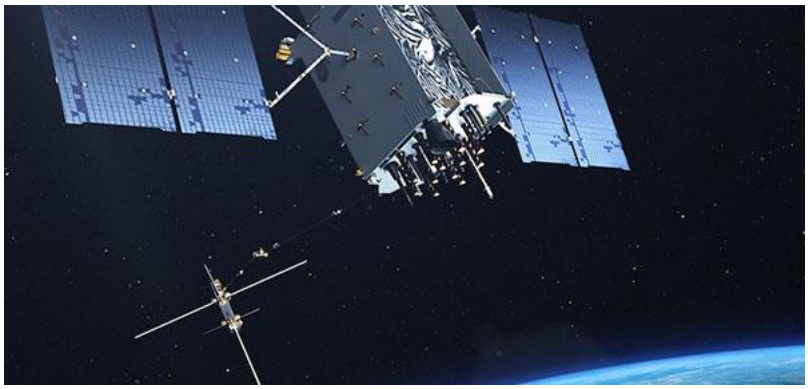
U.S. Space Force Contracts Lockheed Martin for Three More GPS IIIF Satellites

The U.S. Space Force exercised its second contract option valued at approximately $737 million for the procurement of three additional GPS III Follow On (GPS IIIF) space vehicles (SVs) from Lockheed Martin on Oct. 22, 2021. This contract option is for GPS IIIF satellites 15, 16 and 17 (SV15-17).

GPS IIIF satellites build off the innovative design of Lockheed Martin's next generation GPS III satellites (SV 01-10), which provide three times greater accuracy, up to eight times improved anti-jamming capability and increased resiliency, in addition to modernisation, compared to legacy GPS satellites in today's constellation. GPS III also adds a new L1C civil signal that is compatible with other global navigation satellite systems, such as Galileo.

Read more in *GPS World* article. https://www.gpsworld.com/u-s-space-force-contracts-lockheed-martin-for-three-more-gps-iiif-satellites/?utm_source=Autonomous+Arena&utm_medium=Newsletter&utm_campaign=NCMCD211111003&oly_enc_id=1784A2382467C6V

2021-11-16



Tech Expert Warns Russian Missile Strike Underscores

Vulnerability Of GPS Satellites

A near-disaster triggered by a Russian missile blowing up one of its own satellites has gotten a quick response from the U.S. The explosion created a debris field in space that not only could endanger the lives of astronauts, it could pose an even bigger threat. Experts say our satellite systems, including GPS, could potentially be threatened by acts like this.

“Think of bullets and shrapnel faster than bullets that can pierce through all sorts of electronics,” said Bryan Chan, co-founder of Xona Space Systems in San Mateo.

Astronauts aboard the International Space Station received a wakeup call no one expected. Russia’s anti-satellite missile test generated thousands of pieces of debris in lower orbit.

“We watch closely the capabilities Russia seems to want,” said State Department spokesperson Ned Price.

The U.S. economy can’t operate without its GPS technology, a system of 31 satellites that makes the use of phones, credit card transactions, and turn-by-turn navigation in cars possible.

“It’s a fantastic system. But it’s got this big bulls-eye on it because it’s the only system we’ve got,” said GPS expert Marc Weiss.

Read more in *article*…

https://sanfrancisco.cbslocal.com/2021/11/15/bay-area-experts-say-russian-missile-strike-underscores-vulnerability-of-u-s-gps-satellite/

2021-11-15

SoftBank Corp., u-blox to Collaborate on Global GNSS Augmentation Services

SoftBank Corp., ALES Corp. and u-blox AG have signed a memorandum of understanding to cooperate in GNSS augmentation services for global markets.

SoftBank provides the “ichimill” GNSS augmentation service in Japan, its subsidiary ALES operates a business that generates and delivers positioning correction data, and u-blox is a global provider of positioning services for the automotive, industrial and consumer markets.

U-blox also provides electronic components for wireless communications and the PointPerfect GNSS augmentation service in Europe, the United States and other countries and regions.

Through this business collaboration, SoftBank, ALES and u-blox will construct GNSS augmentation infrastructure for Japan, Europe and the United States, develop GNSS receivers and devices, and expand service areas.

Read more in *GPS World* article. https://www.gpsworld.com/softbank-corp-u-blox-to-collaborate-on-global-gnss-augmentation-services/?utm_source=Navigate%21+Weekly+GNSS+News&utm_medium=Newsletter&utm_campaign=NCMCD211103003&oly_enc_id=1784A2382467C6V

2021-11-01