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FIRST UK-GENERATED NATIONAL SATNAV SIGNAL TO BE DELIVERED IN TEST PROJECT BY INMARSAT, GOONHILLY AND GMVNSL



Inmarsat-3 F5 satellite, launched in 1998, continues service, adds new role via re-purposing of transponder for UK Space Based Augmentation System

Inmarsat, the world leader in global, mobile satellite communications is working on a UK Space Agency-funded test project with the [European Space Agency](#), alongside British partners [Goonhilly Earth Station Limited](#) and [GMVNSL Limited](#), to deliver the first UK-generated satellite navigation (satnav) signal. The project provides a potential platform for the UK to enhance its capabilities in the Positioning, Navigation and Timing (PNT) domain post-Brexit.

Repurposing a transponder from the Inmarsat-3 F5 (I-3 F5) satellite, the test project – UK Space Based Augmentation System or UKSBAS – will provide an overlay signal to augment the United States Global Positioning System (US GPS) satellite navigation system. This can refine the precision of the signal from a few metres to a few centimetres in accuracy.

UKSBAS will provide a basis to assess its future development into an operational capability to support safety-critical applications such as aircraft approaching and landing at airports or navigating ships through narrow channels, especially at night and in poor weather conditions. Goonhilly will provide the uplink for the system from Cornwall and software from GMVNSL, based in Nottingham, will generate the ground-based navigation signal. This is a similar system to that already in use in Australia and New Zealand, [supported by Inmarsat](#). UKSBAS will be the first UK-generated national satnav signal.

Transport Minister Trudy Harrison said: "It is very welcome news to hear that UK-based companies have teamed up to deliver this ground-breaking project, with help from government funding. From flying planes to steering ships, reliable and precise navigation support is a crucial part of travel. This development is a significant step forward for our world-leading space sector, as we accelerate towards a net-zero transport future."

This project could be crucial for UK users who need accurate, high-integrity navigation capabilities to enable their operations, initially covering aviation and maritime operations but with potential extension into rail and other land vehicle applications. For example, UKSBAS will be International Civil Aviation Organization (ICAO) standards-compliant.

The UK no longer has access to the [European Geostationary Navigation Overlay Service \(EGNOS\)](#) Safety of Life services since leaving the European Union (EU) and is not involved in the EU's Galileo programme for similar reasons. Therefore, this new



Computer generated impression of an Inmarsat-3 satellite



I-3F5 is in geosynchronous orbit at 54° west, ensuring that its signal covers the UK as part of its Atlantic Ocean region service overlay. This makes it an ideal candidate to participate in this test. The satellite was manufactured by Inmarsat's Athena partner Lockheed Martin and launched in 1998.

"This project demonstrates British innovation at its best," said Nick Shave, Vice President of Strategic Programmes for Inmarsat Global Government. "Working with Goonhilly Earth Station and GMVNSL, supported by UK funding via the ESA Navigation Innovation and Support Programme (NAVISP), enables us to extend the long life of Inmarsat's I-3 F5 satellite with additional new services designed two decades after launch. We look forward to exploring the potential for this project and the benefits it could deliver to the UK with more precise, high-integrity, resilient navigation services, whilst also exploring future capabilities on new satellites through Inmarsat's fully funded technology roadmap. This work also has the potential to be exported to other nations around the world, benefitting the UK economically as well as technologically."

FURTHER INFORMATION

The UK Space Based Augmentation System (UKSBAS) project began on 21 October, 2021. It will generate a signal-in-space by March 2022 and is valued at approximately £1.2 million. More information is available below and at <https://navisp.esa.int/project/details/160/show>.

As the world moves towards greater levels of autonomy and automation, it is expected that wide-area safety systems and services will become the norm including both terrestrial and GNSS-based safety services. Other major developed economies in the United States/Canada (WAAS), Europe (EGNOS), Japan (MSAS), India (GAGAN), South Korea (KASS), and Australasia (SouthPAN) have now or will soon have access to high-integrity GNSS-enabled aviation procedures, largely implemented via Satellite-Based Augmentation Systems (SBAS).

Currently, the UK does not have access to such services, previously provided via EGNOS, for UK airspace flight operations. In this current situation, it is a priority for the UK to evolve national GNSS capabilities, implementing navigation and timing resilience and integrity, for (a) aviation, (b) maritime, and (c) other growing sectors using GNSS safety applications. As an important first step, there is a need to establish a UKSBAS testbed, broadcasting a GNSS Signal-In-Space (SIS) to begin to address the non-availability of EGNOS safety-of-life services.

The primary objective of the proposed UKSBAS testbed project is to establish rapidly and operate a new national capability utilising current in-orbit Inmarsat geostationary (GEO) satellite assets, a navigation signal generator, associated SBAS data processing and monitoring software from GMVNSL, and use a UK ground station for SIS uplink from Goonhilly Earth Station (GES) to the GEO navigation transponder. The Inmarsat, GMVNSL and GES team has at its immediate disposal all the key assets, technologies and skills necessary to activate such a system in a very short timeframe,



results:

- A national SBAS test and development platform available for future use by UK organisations, companies, institutions to test innovative SBAS-delivered PNT services and capabilities.
- The demonstration of service interoperability between UK SBAS and EGNOS across the UK service area.
- The delivery of a UK SIS, which could form the basis for future provision of PNT integrity services for high-end, regulated users (e.g. aviation, maritime, autonomy/robotics).
- An initial, end-to-end infrastructure to support future prototyping of the delivery of innovative services (i.e. high accuracy, encrypted, alerting, and authentication) to next generation applications and user communities.
- Provisional test results for maritime integrity service concepts based on SBAS data products, by developing and experimenting offline with the use of standard data/message types to generate (offline) modified/bespoke SBAS message types.
- The securing of a PRN code in the range 120-158 to enable on-going use of the test platform by UK organisations, companies, and institutions in the development of capabilities, applications and services.
- A defined roadmap for the potential evolution of UK SBAS capabilities, services and applications.

The project kicked off on 21 October 2021 and will undertake its final review by mid-July 2022 with a signal in space broadcast commencing by end-March 2022.

About Inmarsat

Inmarsat is the world leader in global, mobile satellite communications. It owns and operates the world's most diverse global portfolio of mobile telecommunications satellite networks, and holds a multi-layered, global spectrum portfolio, covering L-band, Ka-band and S-band, enabling unparalleled breadth and diversity in the solutions it provides. Inmarsat's long-established global distribution network includes not only the world's leading channel partners but also its own strong direct retail capabilities, enabling end to end customer service assurance.

The company has an unrivalled track record of operating the world's most reliable global mobile satellite telecommunications networks, sustaining business and mission critical safety & operational applications for more than 40 years. It is also a major driving force behind technological innovation in mobile satellite communications, maintaining its leadership through a substantial

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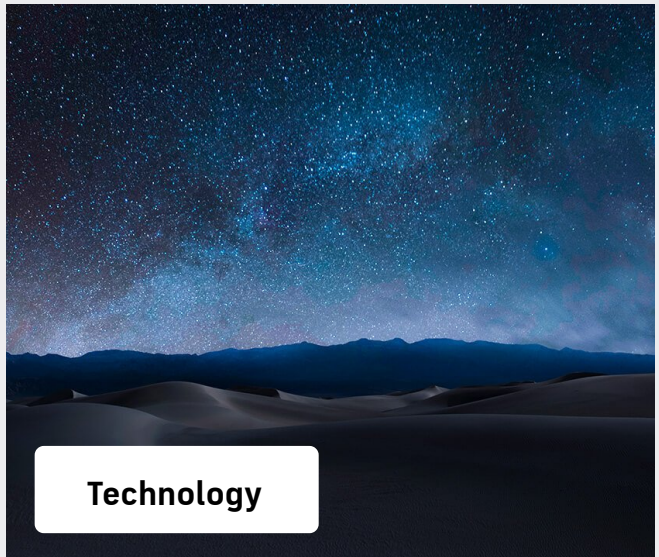
business strategy and holds leading positions in the Maritime, Government, Aviation and Enterprise satcoms markets, operating consistently as a trusted, responsive and high-quality partner to its customers across the globe.

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