

First test signal of the third-generation EGNOS system successfully broadcast

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A team from IEEC and the Universitat Autònoma de Barcelona (UAB) has developed the algorithm to steer the signals sent from ground to the

EGNOS satellites and broadcast back to EGNOS users.

The companies Airbus and Indra, together with the Universitat Autònoma de Barcelona (UAB), the European Union Agency for the Space Program (EUSPA), the European Space Agency (ESA) and Eutelsat, have successfully completed the first test signal broadcast of the third-generation (V3) EGNOS system (acronym which stands for "European Geostationary Navigation Overlay Service').

EGNOS provides corrections and integrity information for Global Positioning System (the well-known GPS) signals received by users and it is the system used, for instance, by aircrafts for GPS-assisted automatic landings. The new EGNOS V3 will augment and improve both GPS and GALILEO performances in some of the signal frequencies for civilian use (more specifically, in the L1/L5 and E1/E5 bands), thus providing satellite-positioning services to the most safety-critical applications, with aircraft navigation in the spotlight.

ESA awarded the development of EGNOS V3 to a consortium led by Airbus together with Indra, with the participation of researchers from the Institute of Space Studies of Catalonia (IEEC—Institut d'Estudis Espacials de Catalunya) at the Center of Space Studies and Research (CERES, IEEC—UAB). The team is formed by Dr. Sergi Locubiche-Serra and Professors Gonzalo Seco-Granados and José A. López-Salcedo, researchers of the UAB's Department of Telecommunications and Systems Engineering and IEEC members.

The researchers have developed the algorithm implemented in the "Navigation Land Earth Station' (NLES) that steers the signals sent from the ground to the EGNOS satellites and from these to the users. This algorithm, an essential part of the EGNOS system, allows seeing the received signal as if it had been generated on the satellite and not on ground as it actually is, and becomes one of the indispensable parts for

the operation of the EGNOS system and, in this case, the forthcoming EGNOS V3 system.

Experimental tests of this algorithm were carried out in November 2021 during the first EGNOS V3 on-site proof-of-concept event where the algorithm was implemented on a real NLES station and transmission with a real satellite was performed. The tests were completed successfully and the algorithm worked flawlessly on the first attempt.

Therefore, this first integration concluded to validate that the [algorithm](#) created by the IEEC team successfully ensures that each signal is correctly steered at the satellite output by adapting in real time the uplink transmitted signal from ground NLES stations.

EGNOS V3

The third generation of EGNOS will operate on a multi-frequency and multi-constellation basis (GPS, GALILEO), embedding security protection against cyber-attacks.

The EGNOS-V3 test-signal campaign involved the new version of the EGNOS V3's NLES, developed by Indra as well as the Eutelsat E5WB's dual-frequency SBAS payload developed by Airbus.

EGNOS and its evolutions are managed by the EU Agency for the Space Program under the governance of the European Commission Directorate-General for Defense, Industry and Space (DG-DEFIS). The systems are designed and developed by ESA.

Provided by Autonomous University of Barcelona

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