

# ACCELERATING EGNOS ADOPTION IN THE AVIATION SECTOR IN EUROPE

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## ABSTRACT

The overall objective for accelerating the adoption of EGNOS in the aviation sector in Europe, is to introduce the EGNOS enabled operations to the end users of the identified niche markets, with a final goal of using integrated avionics on board the aircraft and rotorcraft and perform pre-operational flight demonstrations.

Aiming at supporting the introduction of EGNOS and Galileo services in the aviation market, the GIANT project for the "GNSS Introduction in the Aviation Sector" (Galileo Joint Undertaking Galileo FP6 call 2411) was born in 2005 and successfully ended in October 2008. The Project main objective was to show economic and operational benefits to end users while demonstrating that the required safety levels are maintained or improved to the responsible authorities.

Throughout the project lifetime, the activities performed within GIANT addressed, amongst others, the safety aspects for the implementation of GNSS, the demonstration of the operational benefits to airspace users through real flight trials and the cost-effectiveness of GNSS. Additionally, GIANT promotes GNSS in aviation through the development of innovative applications, analysis of required technological developments (user terminal and local elements) and covers any legal and regulatory aspects necessary for its successful implementation.

The GIANT project ([www.gnss-giant.com](http://www.gnss-giant.com)) paid special attention to how GNSS systems particularly meet the needs of regional airlines, general aviation and helicopter operators and special effort within the

project was devoted to the Flight Demonstrations in two of these domains. The project successfully promoted and trialed the introduction of EGNOS-based LPV applications in the area of Regional Aviation, helicopter HEMS (Medical) operations and North Sea Oil Rigs operations, with special focus and effort devoted to the flight demonstrations with the CRJ200 (with integrated avionics).

Regarding aircraft demonstrations, EGNOS LPV approaches were performed with Dash 8 (Q300) aircraft in Valencia and San Sebastian airport in Spain. A major step for GNSS in Europe was achieved, in summer 2008 with the flight tests that were performed with a CRJ200 aircraft in Valencia (Spain) and Bologna (Italy), as a complete and full integrated avionics configuration was used in the flight, including the installation in the aircraft of two GPS receivers and two Flight Management Computers (FMC).

For the rotorcraft demonstrations, EGNOS LPV approaches and low level IFR flights between two hospitals in Switzerland were performed during 2007. For the North Sea oil rigs in UK and Norway, helicopter approaches procedures and the operational concepts have been developed and full-flight simulations & safety analyses performed.

After the successful completion of the GIANT Project, the European GNSS Supervisory Authority (GSA) awarded a contract (GIANT-2 Project) under the first Call of the Galileo 7th Framework Programme, for the continuation of these activities in other three key identified niche

markets for the EGNOS-based LPV approaches, namely: Corporate Aviation, Helicopters. This project aims at continuing the work previously started and will constitute a step forward by promoting and accelerating the EGNOS aviation applications in the rest of key niche markets interested in the EGNOS use.

It is important to highlight, that the most important and beneficial application of EGNOS in aviation is the possibility to allow the aircraft to perform approaches with vertical guidance (LPV approaches) with no need of ground navigation aids infrastructure. Due to the lower cost of the required on-board avionics equipment to perform these approaches, they are better suited for Regional Aviation, General Aviation and Helicopters.

## General Aviation and SAR

This paper will present the results of GIANT in the different domains covered by the project and the new foreseen activities in the GIANT-2 project that started in January 2009. The tasks included among others, the Action and Transition plans needed for the GNSS Introduction in Aviation, the analysis of the Development of Innovative Applications, the Demonstration of the Operational Benefits of GNSS to Airspace Users, the summary of the Business, Economic & Safety studies performed, the results of the on board user terminal and local elements studies and finally, the assessment of the Legal and Regulatory GNSS enablers.