

## Abstract – ENC 2006

### **Augmentation of GPS and GALILEO with GBAS: Impact study of Category-II/III approaches and ASMGCS on Avionics Receiver Architecture**

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Satellite Navigation has become increasingly important in the optimization of the efficiency and safety within the aviation industry. ANASTASIA (**A**irborne **N**ew and **A**dvanced **S**atellite techniques and **T**echnologies in **A** **S**ystem **I**ntegrated **A**pproach) is a European Commission project within the Sixth Framework Programme, with the basic objectives to define and implement future (beyond 2010) communication and navigation avionics based on satellite services, exploiting the multi-constellation and multi-frequency architectures in combination with multiple onboard sensors, to provide a worldwide gate-to-gate service. Included in the objectives are the preliminary development of advanced airborne systems for flight trial evaluation and the dissemination of results for standardisation activities.

Studies have shown that stand-alone Global Navigation Satellite Systems (GNSS – GPS and GALILEO) or stand-alone GNSS augmented by Space Based Augmentation Systems (SBAS) cannot satisfy the demanding performance requirements of Category-II/III approaches or of surface movement. To satisfy these requirements, Ground Based Augmentation Systems (GBAS) are needed. In this paper, the concept of GPS augmented by GBAS is extended to GALILEO. The paper reports on preliminary developments and initial results of the impacts of the new multi-constellation and multi-frequency configuration upon the avionics architecture, for Category-II/III approaches, and for surface movement (taxiing) using the future Advanced Surface Movement Guidance and Control System (ASMGCS). For Category-II/III approaches, Signal-In-Space (SIS) monitors, to mitigate the integrity risks caused by the ionosphere, are proposed. Integrity and continuity allocation schemes are developed. For ASMGCS, existing Real-Time Kinematic (RTK) methods are reviewed and those suitable for ASMGCS identified. Specific research on error modelling focuses on multipath mitigation as the key limiting factor to ambiguity resolution. Integrity and continuity capabilities are investigated. Simulations are proposed to more clearly define data-link requirements for GBAS to support this type of service.

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