

THE AMBITIONS OF EUROPE IN SPACE

Day 1 of the Conference

- 11:30 - 13:00 Second plenary session -

Galileo/EGNOS and GMES Programmes state of play

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ESSP SAS – The EGNOS System Service Provider

Opening remarks

The year 2009 is a great step forward for EGNOS and ESSP. As of 1st April 2009 the European Commission (EC) is the owner of EGNOS and the European Satellite Services Provider Société par Action Simplifiée (ESSP SAS) is ensuring the operation, maintenance and more generally the EGNOS Service Provision until the end of 2013 through an EC contract (i.e. the current financial period). As of 1st October 2009 EC has declared the EGNOS Open Service and its Signal in Space (SIS) available to all users except for Safety of Life (SoL) applications.

Those events are a great step forward in the EGNOS programme, launched in 1997 by the European Space Agency (ESA). The next important step is scheduled for mid 2010: the certification of ESSP SAS under the Single European Sky (SES) regulations that will allow the EC to declare the SoL service operational. Then it will be possible for airspace users to use the EGNOS signal for their operations. In particular, approaches with vertical guidance (EGNOS APV) will be possible on airports located in the EGNOS coverage area (most of Europe). The major European ANSPs are now preparing EGNOS APV procedures within Europe. They will be published as soon as the ESSP SAS has been certified and the SoL signal declared available by the EC. EGNOS will also allow the development of en-route and terminal applications, in addition to approaches.

General aviation, business aviation, regional aviation and helicopter users have already expressed their strong willingness to use EGNOS applications. As the EC has declared the provision of the EGNOS SoL service free of charge, it is expected that major airlines will equip their aircraft with EGNOS avionics in the medium term. Major aircraft manufacturers like Airbus are now working on the integration of SBAS

solutions (EGNOS in Europe) within their future generation airframes (e.g. A350).

Aviation plays an important role as user of EGNOS. But EGNOS was intended from its conception to serve the multi-modal users. It is the expectation of the EC and of ESSP SAS as the service provider that there will be a high acceptance of the EGNOS service in a wide range of domains.

EGNOS infrastructure

EGNOS is a satellite-based augmentation system. It broadcasts, to users in Europe, a signal that contains corrections and integrity information concerning GPS signals. Therefore, EGNOS strongly enhances the performance of GPS: its accuracy, its availability, its continuity and its integrity (i.e. the information whether the computed location is reliable or not). Accuracy is improved by a factor of 3 to 4 compared to GPS, but the most significant benefit is the integrity (e.g. when a GPS on-board clock failed in June 2006 the GPS users have faced an error of 50 meters on their position, EGNOS mitigated this failure and informed the users that the satellite, called PRN 30, shall be discarded in the location computation).

EGNOS is composed of a large ground segment. It is based on a network of 41 stations that monitor the quality of the GPS signals in Europe. These measurements are processed by 4 Mission Control Centres (operated by Aena, DFS, ENAV, NATS) to determine the correction and integrity parameters. These data are uplinked by 6 Navigation Land Earth Stations (managed by Inmarsat (2), Aena, Vizada, Telespazio and Stratos) and broadcast to European users by one of the three geostationary satellites (2 from Inmarsat and the ESA ARTEMIS). All those entities are connected by a specific network subcontracted to BT.

Centralised functions are performed by 2 additional centres; the Performance Check-out Assessment Facility (PACF) in Toulouse and the Applications Specific Qualification Facility (ASQF) in Madrid. The management of those 2 centres is performed by the ESSP SAS through its System Operations Unit at Toulouse and the Service Provision Unit at Madrid. A Logistic entity is managed by DFS and a Training entity by Aena.

The EGNOS infrastructure was defined and deployed in the framework of the ARTES-9 ESA programme, launched in 1997. Due to the complexity of the programme, it took more than a decade to build, deploy and qualify the system. Similar systems are operational in the USA (WAAS) and in Japan (MSAS) and another will be available soon in India (Gagan).

ESSP SAS the EGNOS service provider

The mission of the EGNOS Service Provider is twofold :

- operate and maintain the system in a reliable technical state.
- act as a focal point for all customer needs around the signal-in-space provision.

ESSP SAS is based in Toulouse. It is composed of a HQ and 2 units: the System Operations Unit in Toulouse and a Service Provision Unit in Madrid.

The System Operations Unit provides support to the system operations (from coordination of the centres to system performance monitoring) while the Service Provision Unit is in charge of the service tasks (including mission analysis and interface with the users).

To achieve its mission ESSP SAS has subcontracted the maintenance of the system to an experienced industry consortium with Thales Alenia Space as Prime contractor, the operations of the telecom network to BT and the Geostationary satellites to Inmarsat. Manned operation sites – the Mission Control Centres – are operated in the facilities of the Air Navigation Service Providers from Germany, Italy, Spain and UK in 24h/365d service to maintain the specified performance of the EGNOS. Unmanned sites are maintained in all parts of Europe and some outside Europe under ESSP SAS subcontracts.

Through the EC contract, ESSP SAS is currently providing the Open Service which is available to users throughout the EGNOS service level area (most of Europe). From mid-2010 onwards this activity will ensure that the EGNOS signal meets the stringent requirements from ICAO to provide a Safety-of-Life service for aviation and other modes of transport. In addition the ESSP SAS supports the European Commission in participating in the definition of the new EGNOS releases and in promoting actions to increase the acceptance of the services within different user domains.

ESSP SAS certification process

The ESSP SAS will be certified according to SES regulations for use in aviation and other safety-critical applications. The target date is mid 2010. Then the EC will be in a position to declare the EGNOS SoL service available. It will provide an essential and valuable warning message informing the users within six seconds in case of a malfunction of the system.

The major European ANSPs are now preparing EGNOS APV procedures within Europe. They will be published as soon as the ESSP SAS has been certified and the SoL signal declared available by the EC

Evolution of EGNOS

Evolutions of the EGNOS infrastructure are mandatory to improve its robustness and its performance.

Until 2013, efforts shall focus on the obsolescence management (EGNOS development started in 1997 following the launch of the programme in 1997). Everything shall be done to provide the EGNOS signal continuously at a high quality standard.

Increase of the performance and of the coverage has to be considered also:

- WAAS is providing a LPV-200ft service and MSAS is currently upgraded for a similar level of performance while ESSP SAS, the EGNOS operator, will be certified initially for LPV-250ft. The LPV-200ft requirement is an important step as this specification will allow the decommissioning of some ground based instrument approach systems, including Cat I ILS in small airports.
- the current EGNOS signal can be received in most parts of Europe. Improvement of the EGNOS coverage is necessary in some areas. As EGNOS operations and maintenance are now funded by EU budgets, all efforts shall be made to allow every EU State to benefit from EGNOS services.

After this phase of EGNOS consolidation, an important evolution of the EGNOS mission can be foreseen for around 2020. By that time the US system will be able to provide integrity information and corrections for the new GPS signals in L5 frequency. This will strongly improve the

robustness of the service, increasing the confidence users can have in the computed location. EGNOS must consider a similar evolution as the new US service will become a standard for Civil Aviation.

In addition, Europe could be innovative and consider the evolution of EGNOS to reinforce the Galileo signals.

Applications

In civil aviation EGNOS APV procedures will be deployed progressively throughout Europe. procedures will be deployed progressively. EGNOS allows also the development of en-route and terminal area applications in addition to approaches. General, business, regional aviation and helicopter users are highly interested. As the EC have declared that OS and SoL services will be available free of charge it is expected that major airlines will be interested in the medium term.

European businesses and citizens in general can obtain great advantages from EGNOS. New applications in such different sectors as agriculture, like high-precision spraying of fertilisers, or transport, like automatic road-tolling or pay-per-use insurance schemes can be developed, based on the EGNOS SIS. Furthermore, EGNOS can support much more precise personal navigation services, both for general and specific uses, e.g. for systems to guide people with visual deficiencies.