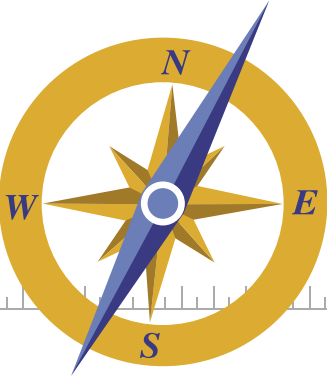


# EGNOS NEWS



Volume 6, Issue 1, 2006

## Editorial

The march toward the EGNOS open service continues apace! In this issue we report on exciting developments for the system, particularly the imminent broadcast of Message Type 0/2 from EGNOS (allowing all SBAS receivers to utilise the signals) and transition from the ESTB. The remaining barriers to the uptake of EGNOS receivers are finally being withdrawn and numerous projects continue to demonstrate the benefits of the system to users. A good example of such a project is GALEWAT, the EGNOS trials on inland waterways, reported in our previous newsletter. The final results from the public demonstrations show that EGNOS can more than meet the safety requirements for a range of maritime applications. This provides a boost to the role of inland waterways, marketing our integrated transport networks.

In this issue we take a quick break from EGNOS and steal a sideward glance to observe the progress being made by Galileo. Here we review

the project's recent successful first step into space – the launch of the GIOVE-A satellite.

In preparation for post-open service growth in the EGNOS user base we review two important initiatives aimed at supporting the uptake of equipment: the launch of an EGNOS operations user support website, and the development of a GNSS receiver testing lab to provide independent accreditation of user equipment.

Looking beyond the present to possible future uses of EGNOS we also take a detailed look at plans to use the system as part of a global disaster alerting system. This could use spare data capacity in the EGNOS navigation message without impacting on the systems primary mission. This has the potential to be a real life saver.

As always, we very much look forward to receiving your comments and any suggestions you have for future issues.

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## EGNOS Progress & Planning Update

As we reported in the previous issue, last summer, after more than 8 years hard work by ESA and European Industry, EGNOS achieved two major milestones; completion of the Operational Readiness Review (ORR) and the start of initial operations in July 2005. We now give details of the next key milestone in the systems life, the migration from the ESTB to EGNOS as well as providing updates on progress toward the EGNOS Open Service and the Operational Qualification Review (OQR).

**ESTB to EGNOS Transition:** When EGNOS became operational in 2005 it was decided to continue the operation of ESTB into 2006 in parallel as a service to equipment and application developers. However, the time has now arrived for the test bed to stand aside and allow EGNOS to take over.

Currently, the ESTB SIS is broadcast from Inmarsat AOR-E (PRN 120). The EGNOS initial operation signal is being broadcast from ARTEMIS (PRN 124) and a signal currently being used to test the next version is being broadcast from Inmarsat IOR-W (PRN 126).

As the figure shows the transition from ESTB will take place as follows:

- Mid June: IOR-W (PRN126) commences broadcast of Message Type 0/2
- ARTEMIS (PRN124) withdrawn from operational service to support testing of the next major system release

Then during Q3 2006:

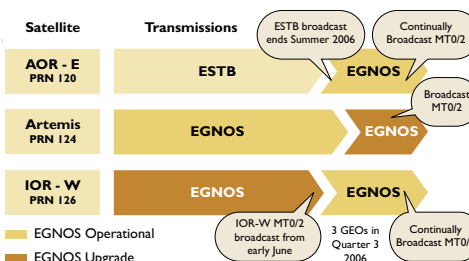
- ESTB services cease on AOR (PRN120)
- EGNOS MT0/2 available on AOR, IOR-W and ARTEMIS (PRN120, 124 & 126)

Hence, the nominal system configuration of two operational transmissions (AOR & IOR both with MT0/2) and one test transmission (ARTEMIS) will be established from Q3 2006 for the rest of the calendar year.

**Significance of MT0/2 Broadcast:** MT0/2 will allow all receiver units to process and use the corrections broadcast by EGNOS for multi-modal non-safety of life applications.

**EGNOS Open Service:** After the MT0/2 upgrade the EGNOS Open Service could be declared at the discretion of the authorising bodies (specifically the GSA and EC), following a positive outcome of the Operations Definition Review (ODR).

**EGNOS OQR:** The Operations Qualification Review will provide the formal technical qualification of the system operations. It is on-schedule for completion during early 2007. Its objectives include the qualification of technical operations necessary to provide a Safety of Life (SoL) service. This will open the door for the various organisations with an interest in certification to take advantage of EGNOS for SoL applications.



EGNOS Progress and Planning Update

## EGNOS over AIS



Constanta Vessel

Previously we reported on encouraging results from trials of EGNOS for inland waterway applications being undertaken within the GALEWAT project. The aim of which is to promote the use of waterways as safe and

efficient thereby allowing competition with road and rail transport. This time we present the results of the project testing for the waterway to open seas environment carried out in Constanta, Romania and the final project outcomes.

At the heart of GALEWAT is the use of the Automatic Identification System (AIS). This demonstration uses AIS as a terrestrial communication link to rebroadcast EGNOS messages and so solve the critical problem of EGNOS signal availability caused by terrain masking.

A public demonstration of GALEWAT was carried out in the black sea port of Constanta on 13 October last year with 29 participants. The results showed that EGNOS via GALEWAT improved availability compared to EGNOS Geo broadcasts whilst maintaining the overall EGNOS accuracy. The net result was a clear demonstration that GALEWAT can provide 100 % availability of a 10 m Horizontal Alarm Limit (HAL). This was a marked improvement over GPS standalone (81.5%) or even GPS / EGNOS (86.1%).

Overall, the results of the project testing have successfully demonstrated the benefits of EGNOS via AIS on the waterways.

## Setting the Standard

When a manufacturer builds a GNSS receiver how do they know it works?

The answer is thorough and complete testing, not only of the functionality of the receiver (what it does) but also of its performance (how well it does it). Moreover, once the manufacturer knows it works, how do they convince the users of the quality of their receiver's performance? A large part of the answer is independent receiver testing that leads to a recognised international certification of compliance.

Identifying this need, ESA have decided to develop a facility called the European Test Centre for GNSS Receiver Performance (EUTERPE) to be hosted as part of the Navigation Laboratory at ESTEC. This facility will support both receiver manufacturers and application developers through an ISO approved test process.

Initially, EUTERPE will evaluate and issue a Statement of Compliance (SoC) for EGNOS

receivers against a standardised set of EGNOS capabilities. It will also characterise the navigation performance based on the EGNOS SIS. The focus, to begin with, will be on non-Safety-of-Life receivers only but this is expected to grow with time to encompass others.

EUTERPE facilities will be state of the art (based on the existing Navigation Lab infrastructure) and will include:

- GPS/GLONASS RF Simulators.
- Galileo RF Simulator
- Sinnet – provides EGNOS messages over the internet from a Novatel millennium receiver.
- Powerful post-processing software – including Teresa, Tango and bespoke development as required.
- An anechoic chamber – including access to

the Compact Payload Test Range (CPTR) for testing receivers with integrated antennae.

ESA is currently consulting with industry about the exact capabilities to be hosted in EUTERPE. For your chance to influence this decision or to find out more about how it can benefit receiver manufacturers visit the ESA Navigation Lab website at <http://www.esa.int/esaNA/EGNOS.html> and select 'development'.



ESTEC Navigation Laboratory

## The First Galileo Signals from Space

On 28 December 2005 the initial Galileo satellite, GIOVE-A, was successfully launched into orbit on top of a Soyuz-Fregat vehicle from Baikonur in Kazakhstan. It is already transmitting the first Galileo SIS from orbit.

navigation signals were transmitted from Earth orbit. As a result the Galileo ITU frequency filing has already been secured, so completing the first major goal of the mission.

The mission of GIOVE-A is to:

Since then, the broadcast Galileo signals have been collected and monitored at a number of sites including the navigation laboratory at ESTEC in the Netherlands, the ESA ground station at Redu, Belgium and the Chilbolton observatory at the Rutherford Appleton Laboratory in the UK. This monitoring will confirm that the broadcast signals conform to the Galileo design specification.

- Secure the use of the Galileo broadcast frequencies allocated by the ITU.
- Demonstrate the use of key Galileo technologies in orbit (including the Rubidium clocks, L-band antenna and signal generators).
- Investigate the radiation environment in the planned Galileo orbits.

GIOVE-A will be followed by GIOVE-B. This will demonstrate other key Galileo technologies, including the Passive Hydrogen Masers which will be the most accurate atomic clocks ever launched into orbit. Subsequently, the first four operational Galileo satellites will be launched for the In Orbit Validation (IOV) phase. They will be used to validate the basic space and ground segments before the remaining operational

satellites are launched and Galileo achieves Full Operational Capability (FOC).

In a closely related development, the contract for the deployment of the space and ground segments for Galileo IOV was recently signed on 19 January 2006 between ESA and Galileo Industries.

The successful and timely launch of GIOVE-A, the planned launch of GIOVE-B and the IOV contract signature are all concrete steps on the way to realising a fully operational Galileo.



GIOVE A launched from Baikonur

## News from Brussels

**International relations:** Discussions with Third Parties over their participation in the Galileo program continue to push ahead.

The Chinese entity - the National Remote Sensing Center of China (NRSCC) and the Israeli entity (MATIMOP) have recently become members of the Galileo Joint Undertaking.

Following the 2004 agreement between the EU and US covering interoperability and cooperation in the Galileo open signal a similar agreement is in negotiation with Russia.

**6th FP Activities:** The third call has been launched in December 2005. Numerous proposals have already been received by GJU – a positive indication that this call will be as successful as its predecessors.

The EU has initialled Cooperation Agreements with both India & South Korea. Exploratory talks are on-going with other third parties that show keen interest in the Galileo Program.

**Concession:** Following the merger of the two former consortia Eurily and Inavsat, the so called Merged Consortium provided a joint

bid in October 2005. Subsequent negotiations have resulted in the signing of an Agreement of Principle on some of the key-drivers of the deal. Concession contract signature is foreseen by the end of 2006 with financial close within the first half of 2007.

**Latin America:** The Galileo Information Centre for Latin America was inaugurated in Sao Paulo, Brazil on 9 December 2005. Its mission is to implement information and training activities and to facilitate interaction between GNSS actors in Latin America and Europe.

## Staying ALIVE

Disaster alert systems save lives by providing rapid dissemination of warning messages. One of the great tragedies of the tsunami on 26th December 2004 was that many thousands of lives would have been saved if the Pacific Tsunami Warning Centre had had the means to rapidly broadcast an alert to the people of the states bordering the Indian Ocean.

has been proposed by ESA. The ALIVE (Alert Interface Via EGNOS) concept uses spare EGNOS message broadcast capacity to transmit geographically targeted warnings. ESA recently commissioned a study, by Helios, to assess the feasibility of ALIVE. Early indications are that it will be an invaluable tool for alerting services and organisations such as the United Nations. SBAS receivers could be configured to receive the alerts, so allowing a cheap and ubiquitous solution independent of physical infrastructure at the site of the disaster.

Such systems are also invaluable in the relief operations following a disaster when most of the public terrestrial networks are destroyed, such as occurred in New Orleans following Hurricane Katrina. More than anything, this demonstrated that even technologically advanced nations can be crippled by natural and man-made disasters.

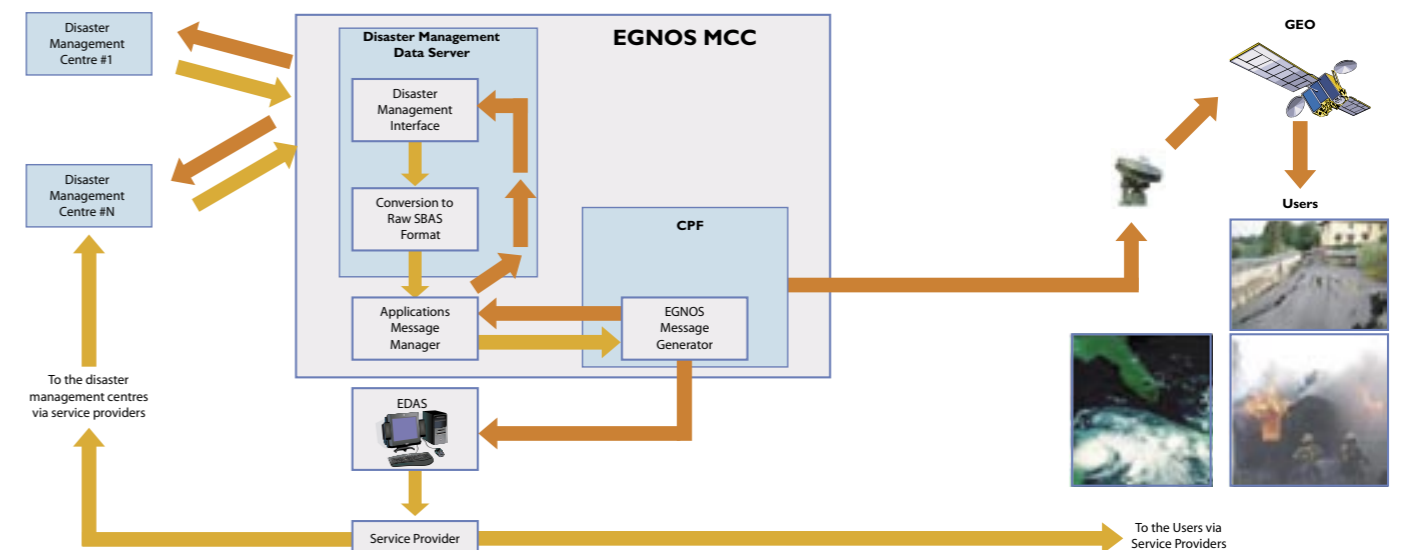
The figure shows the architecture of the ALIVE system. The EGNOS Mission Control Centre (MCC) is interfaced to various national and international disaster management centres that provide the warnings. These are filtered and formatted for re-broadcast as part of the EGNOS SIS. The figure shows the same alerts

A potential solution with the capacity to provide a reliable global disaster alerting service

can be disseminated through the EGNOS Data Server (EDAS) for possible transmission by internet and mobile phone networks.

EGNOS ALIVE broadcasts can cover approximately one-third of the Earth's surface. The other SBAS systems operated by the USA (WAAS – Wide Area Augmentation System) and Japan (MSAS - MTSAT Satellite-based Augmentation System) could easily extend this coverage to become global.

ESA is assessing ALIVE in the context of EGNOS evolution planning with a view to including an implementation in the EGNOS v2.2 (planned for 2008). Discussions are also underway with WAAS and MSAS for a possible global initiative. So watch this space !



ALIVE System Architecture

# Supporting the User

In the frame of the EGNOS Initial Operations Phase, the EGNOS Operations User Support Web Site has been developed under ESA contract by the Application Specific Qualification Facility (ASQF). It aims to provide EGNOS users with up to date information concerning the EGNOS operations.

It is now accessible via a link at the ESSP website: [www.essp.be](http://www.essp.be).

Amongst other information, the website provides:

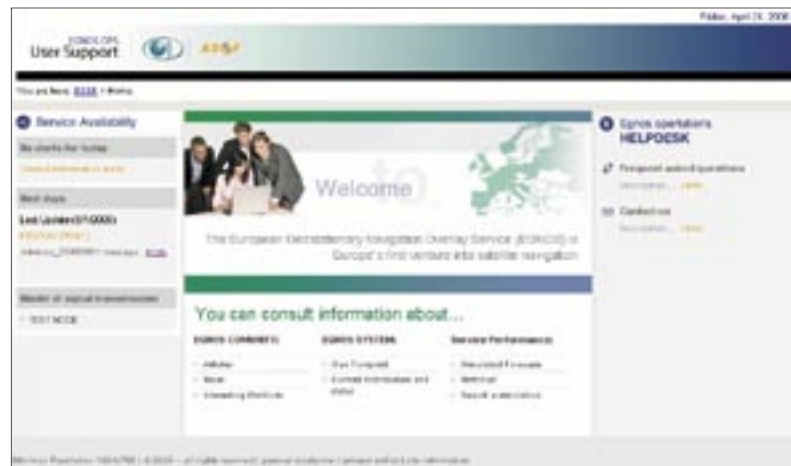
- SIS broadcasting plans updated on a weekly basis
- SIS outages and foreseen recovery times including a notification service to users
- EGNOS navigation performances
- SIS format issues
- EGNOS configuration information
- Answers to general questions about EGNOS system operation

Access to this information will be beneficial to equipment manufacturers and end users

allowing them to know the performance of the system improving the planning of trials and test activities.

In addition to the information provided in the web site, an Operations Helpdesk has also been set up, in order to answer

EGNOS users' requests concerning system operations. You can submit your questions to the Helpdesk via the Operations User web site or directly by e-mail to [egnos-operations-support@essp.be](mailto:egnos-operations-support@essp.be).



EGNOS Operations User Support Home Page <http://www.essp.be>

## Frequently Asked Questions

### Q1 – When will the EGNOS User Interface Document be available and where can I obtain it?

A1 – The UID will be available shortly from [http://esamultimedia.esa.int/docs/egnos/estb/egnos\\_uid.htm](http://esamultimedia.esa.int/docs/egnos/estb/egnos_uid.htm)

### Q2 – When will there be a declaration of the Open Service?

A2 – ESA along with the GJU, GSA and EC are currently



developing plans for the declaration, which requires coordination with the on-going Galileo Concession negotiations. An announcement will be made in 2006.

### Q3 – What are the benefits of broadcasting the Ionospheric Grid Point (IGP) Band 9 message?

A3 – Band – 9 is an additional row of Ionospheric grid points that will improve EGNOS performance for users at Northern latitudes. For these users Ionospheric corrections will be more accurate. EGNOS will soon (June 2006) include this new feature.

## Forthcoming Events

European Navigation Conference and Exhibition 2006, 7-10 May 2006, Manchester, UK  
[www.enc2006.org.uk](http://www.enc2006.org.uk)

3rd International Navigation Conference - Melaha 2006 - Inland Water Transport, 15-16 May 2006, Luxor City, Egypt  
[www.aiononline.org](http://www.aiononline.org)

Mobile Location Services 06 17-18 May 2006, The Hilton Hotel, Amsterdam

13th Saint Petersburg International conference on Integrated Navigation Systems, 29-31 May 2005, St Petersburg, Russia

EURAN 2006 - Integration of GNSS and Loran-C / EUROFIX, 11-12 July 2006, Munich, Germany  
[www.dgon.de](http://www.dgon.de)

## Links and Contacts

ESA Navigation Web Page:  
[www.esa.int/navigation](http://www.esa.int/navigation)

ESA EGNOS Web Page:  
[www.esa.int/EGNOS/](http://www.esa.int/EGNOS/)

ESA EGNOS for Professionals:  
[www.esa.int/navigation/egnos-pro](http://www.esa.int/navigation/egnos-pro)

ESA EGNOS Real Time Performance Web Page:  
[www.esa.int/navigation/egnos-perfo](http://www.esa.int/navigation/egnos-perfo)

ESA ESTB Web Page:  
[www.esa.int/ESTB](http://www.esa.int/ESTB)

ESA EGNOS Help Desk  
[Egnos@esa.int](mailto:Egnos@esa.int)

ESA RIMS Entities Assistance Desk  
[Egnos-read@esa.int](mailto:Egnos-read@esa.int)

EGNOS News:  
[Egnos-News@esa.int](mailto:Egnos-News@esa.int)

ESA Galileo Web Page:  
[www.esa.int/Galileo](http://www.esa.int/Galileo)

ESA Artemis Web Page:  
[www.esa.int/artemislaunch/](http://www.esa.int/artemislaunch/)

EC Galileo Web Page:  
[www.europa.eu.int/comm/energy\\_transport/en/gal\\_en.html](http://www.europa.eu.int/comm/energy_transport/en/gal_en.html)

Galileo Joint Undertaking Web Page:  
[www.galileoju.com](http://www.galileoju.com)

## New

EGNOS Operational Support Web Site:  
[www.essp.be](http://www.essp.be)

EGNOS User Interface Document:  
[http://esamultimedia.esa.int/docs/egnos/estb/egnos\\_uid.htm](http://esamultimedia.esa.int/docs/egnos/estb/egnos_uid.htm)

## Help Us to Help You

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The Editorial Team welcomes your comments, inputs and suggestions for the next issue. Please send emails to [Egnos-News@esa.int](mailto:Egnos-News@esa.int).

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Until further notice, the EGNOS SIS has not been duly certified by the competent authorities and therefore may

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