Title   :   EGNOS/EDAS based services for tracking & tracing of the transport of goods

Source   :   CEN

Date   :   2010-04-22

Status   :   For information

Note   :   The workshop is open to all interested experts.

n2301 Invitation to joint CEN ETSI Workshop on Cooperative Systems standardisation

Draft Business Plan for a CEN Workshop on

EGNOS/EDAS based services for tracking & tracing of the transport of goods

(to be / approved on the Kick-off meeting on 2010-09-14)

1. Background of the CEN Workshop

EGNOS and GALILEO are the two systems implementing the European GNSS (Global Navigation Satellite System) strategy.

EGNOS (European Geostationary Navigation Overlay Service) is Europe's first venture into satellite navigation. EGNOS is a Satellite-Based Augmentation System (SBAS) that improves the accuracy of satellite navigation signals over Europe and the Mediterranean area.

EGNOS improves the accuracy of current GPS signal up to one metre and provides integrity information, making it suitable for applications requiring very accurate and guaranteed positioning.

EGNOS provides three services:
- The Open Service (OS) operational since October 2009, freely available and suitable for most common applications;
- The Safety of Life Service (SoL), that will be available in 2010, certified according to the European regulations in place, in order to provide a service with the safety levels required by Civil Aviation operations;
- The Commercial Service (CS) currently under test until mid-2010, based on the use of EGNOS data disseminated by EDAS (EGNOS Data Access Service), and enables specific applications for professional markets, requiring very accurate and guaranteed positioning such as the regulated applications. EDAS is a server that gets the raw data directly from the EGNOS system and distributes it to Service Providers in real-time, within guaranteed delay, security and performance. EDAS is the basis for the EGNOS CS for professional users needing enhanced performances. Downstream Value Added Services Service Providers (VAS SP) may connect to EDAS to get EGNOS data, and implement solutions to create value added services. They deliver EGNOS data via different telecommunication means and/or process it and deliver products built on it.

Galileo will be operational in 2014 and will be Europe's own global navigation satellite system, under civilian control. With respect to the GPS, currently available for civilian uses but conceived and managed for military purposes, Galileo will provide highly accurate, guaranteed positioning services.

Conceived for Civil Aviation needs, EGNOS has interesting perspectives of commercial utilisation also in other markets, as precursor of the forthcoming Galileo. Any application requiring better positioning accuracy than provided by GPS can benefit from EGNOS. The integrity data provided by EGNOS is particularly suited for applications driven by stringent safety constraints during critical such as the tracking and tracing of dangerous and special goods transport.

Both OS and SoL services are based on a Signal In Space (SiS) broadcasted over Europe. The EGNOS SiS provides OS and SoL service to any user equipped with a SBAS-enabled receivers, available on the market as off-the-shelf products and as SoL certified receiver in civil aviation, for the OS and SoL services respectively.

EU R&D projects proved that opportunities of EGNOS for land applications rely not only on the signal coming from the satellite (i.e. the OS), but also on the distribution of EGNOS data via EDAS (i.e. the CS), thus as combination of OS & CS.

These projects assessed and demonstrated that the introduction of EGNOS OS & CS in the sectors of freight transport and logistics is mainly driven by the benefits of having reliable and accurate tracking & tracing services in comparison to the present GPS-based ones.

EGNOS OS & CS provides enhanced accuracy and availability, higher confidence and guarantee on the position; thus in the above mentioned sectors EGNOS added value with respect to GPS is due to the capability to provide "guaranteed positioning" and EGNOS-assisted functions via a downstream VAS SP.

Main outcomes and results from past EU R&D projects highlighted that there are opportunities for EGNOS OS & CS in the sectors of freight transport and logistics. The most suitable path for a European introduction consists of a "spot" introduction starting from specific types of transports and extending to other freight types, key enablers being standardization and EU harmonization:

- standardization is fundamental for the evolution of technological elements of the service provision from prototype to standardised products.

- in the short-term, the most mature market is the transport of dangerous goods, and extension of nation best cases on a cross-border basis is the first step towards EU harmonization and to support standardization.

- European policy formulation plays a key role as a facilitator for the introduction in other markets (primarily through European Proposal for a Directive for the implementation of the ITS Action Plan and eFreight initiative).

The goal of this Workshop is to develop a standard for the EGNOS/EDAS based services for tracking & tracing of the transport of goods.

This Workshop is developed in the frame of the EU FP7 R&D project named SCUTUM (**SeCU**ring the EU GNSS adop**T**ion in the dangero**U**s **M**aterial transport) focused on the transport of the dangerous goods via road. However the goal is to develop a specification, starting from the specific case of the dangerous goods and the road, that can be extended also to the case of other freight types and modes of transport.

Moreover, it should be noted that in this Workshop, "EGNOS/EDAS based services" means the use of combined EGNOS OS & CS, and details on the service architecture is given in the Annex A of this document.

2. Status of the Business Plan

Draft Business Plan for internal discussion between CCMC and Workshop proposers.

3. Workshop proposers, members and participants

This Workshop has been **proposed by a number of the SCUTUM partners,** and will result in a CEN Workshop Agreement (CWA)

Other interested stakeholders are welcome to register for membership in accordance with the CEN Rules for CEN Workshops. Key stakeholders have been already identified and contacted by the SCUTUM partners, and invited to be involved.

Partners of the SCUTUM project, are in alphabetical order:

- ENI, www.eni.com, contact person: Domenico Pizzorni

- Joint Research Centre of the European Commission (JRC), http://ec.europa.eu/dgs/jrc/index.cfm, contact person: Gianmarco Baldini

- Ministère de l'Ecologie, de l'Energie, du Développement Durable (MEEDDM), http://www.developpement-durable.gouv.fr/, contact person: Jean-Philippe Mechin

- Italian Ministry of Infrastructure and Transport (MIT), http://www.mit.gov.it/mit/site.php, contact person: Massimiliano Zazza

- Telespazio (TPZ), www.telespazio.com, contact person: Antonella Di Fazio

- European Union Road Federation (ERF), www.erf.be, contact person: Irene Fusco.

Targeted stakeholders of the CWA, who most probably use the document, are in particular:

- National or European Associations of Toll Highways

- The European Commission (in particular EC DG ENTR and EC DG MOVE)

- The European GNSS Supervisory Authority (GSA)

- The European Space Agency (ESA), www.esa.int

- National Transport Authorities (such as Rijkswaterstaat (RWS) in the Netherlands)

- The United Nations Economic Commission for Europe (UNECE) Transport Division

- Research and Technical Centres for Transport and Small Medium Enterprises (such as LCPC and M3 System).

4. Workshop scope and objectives

The goal of this Workshop is to develop a standard for the EGNOS/EDAS based services for tracking & tracing of the transport of goods, in terms of specifications of:

1. The **interface/protocol between the mobile terminal and the Service Centre** (i.e. the platform delivering the services, as displayed in next figure) and

2. The implemented **tracking & tracing services**.

In this Workshop, "EGNOS/EDAS based services" means the use of combined EGNOS OS & CS, and details on the service architecture is given in the Annex A of this document.

The Workshop is fed by the work carried out in the frame of the SCUTUM project, that is aimed at the design and development of a system using EGNOS OS & CS for providing tracking & tracing services for the transport of dangerous goods. SCUTUM will validate the system in large scale and live operations in three EU countries (Italy, France and Austria) involving 100 vehicles transporting hydrocarbon by road.

The SCUTUM outcomes of the design phase, refined based on the trials results, will be used for the technical specification subject of this workshop/standardization.

The specifications will serve to develop standardized architectures and products, namely the mobile terminals, Service Centres/platforms and services.

Next figure shows the SCUTUM system architecture, and the main elements related to the subjects of the standardization (detailed in above points 1 and 2):

- The mobile terminal (OBU: On-Board Unit) integrates a low-cost GPS/EGNOS-enabled receiver, capable to receive the EGNOS data (i.e. the corrections) from the SiS (i.e. OS) and send positions & timing and raw data (code range and phase measurements) to the Service Centre, via a telecommunication link (the SCUTUM mobile terminal supports both terrestrial and satellite communications).

- The Service Centre is connected to the EDAS and provides EGNOS-assisted functions through the LCS module. In case the mobile terminal has no SiS visibility (and thus is not capable to receive the EGNOS data via the SiS, i.e. is not capable to receive the EGNOS

OS), the Service Centre/LCS implements and applies the EGNOS corrections using the code range and phase measurements.

Moreover the LCS is also capable to process the EGNOS integrity and provide to the users, the so-called "horizontal protection level" (i.e. the level of confidence on the position, that gives the guarantee of position).
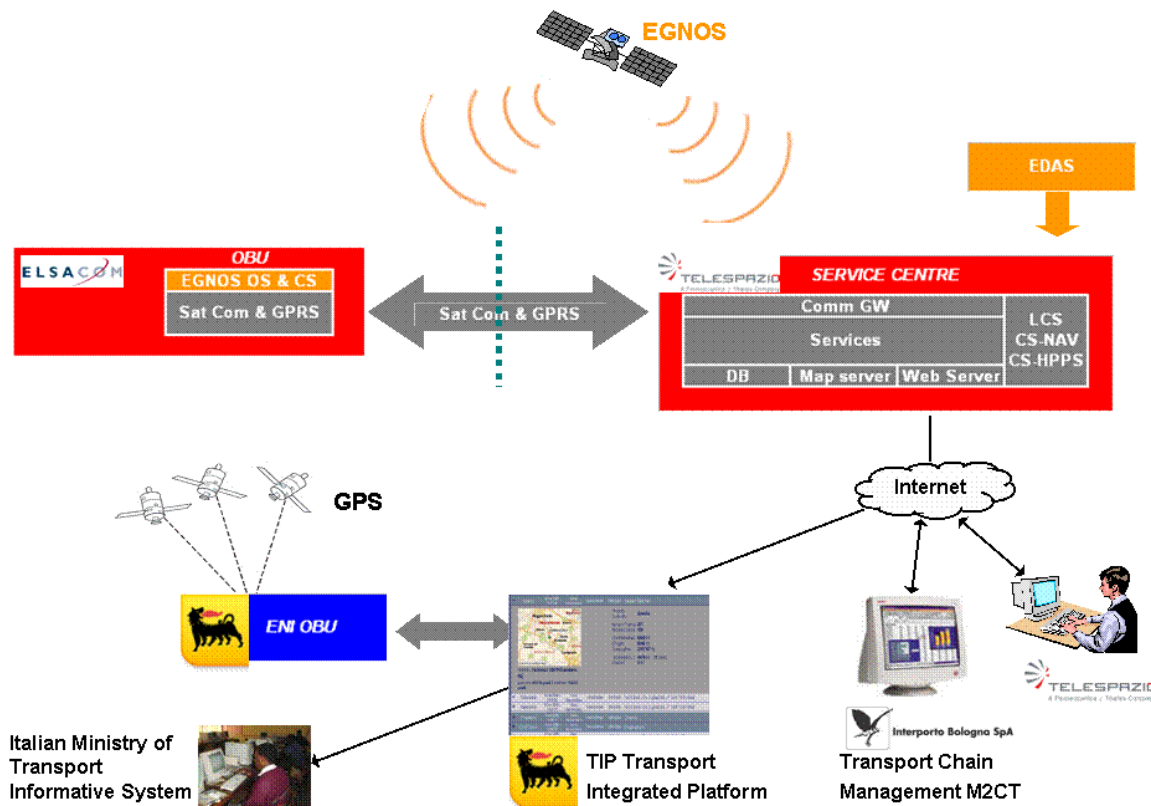

Figure 1 SCUTUM architecture

Position & time and horizontal protection level (indicated as a circle around the position on the digital map, as displayed in the next figure) are the basis of the tracking & tracing services.

Different user types/platforms are supported, and different means/mode of accessing services, as displayed in the SCUTUM architecture figure.

The value of EGNOS OS & CS relies on a better accuracy, higher confidence/guarantee on the position, enhanced EGNOS availability.

Position, velocity & time
Protection level

Figure 2 SCUTUM services

The standardization work is focused on the specification of:

1. The **interface/protocol related to the provision of EGNOS OS & CS (EDAS)** based services, i.e. in the interface between the Service Centre and the OBU (green dotted line in the SCUTUM architecture figure)

2. The **tracking & tracing services** exploiting the position & time and horizontal protection level, in terms of types of services versus application(s)/user(s).

The specifications will be defined in the frame of the SCUTUM project, and thus conceived for the transport of dangerous goods, however they will be extendible to the freight transport in general. The objective is to define an interface/protocol and services, which are applicable for the transport sector, with opportune customisation.

The standardization effort will be in line with EU current strategies in the transportation service like eFreight and ITS Action Plan Directive.

5. Workshop programme

The CWA will be written in English.

Three versions of the CWA will be produced during the CEN Workshop: first draft, intermediate version and final version/ready for approval, according to the following programme/milestones:

Meeting ID	Absolute Date	Place (Host)	Remark
Workshop Kick-Off meeting	14/09/2010	Brussels (CEN)	Approval of the Business Plan
Workshop Plenary Meeting	11/02/2011 (tentative)	Ispra (Italia, JRC)	First draft version of CWA deliverable
Workshop Plenary Meeting	27/07/2011 (tentative)	Brussels (ERF or TPZ)	Intermediate version of CWA deliverables
Workshop Final Meeting	10/11/2011 (tentative)	Brussels (ERF or TPZ or CEN)	Approval of CWA deliverable for the publication

Table 1 Workshop programme

Next table presents the detailed timeplan of the Workshop meetings (a 60 day public comment on the draft is obligatory as it is EU-funded).

Description	Time	Place	Duration
1st Meeting - Kick Off of Workshop	14/09/2010	Brussels (CEN)	1 day (10:30-15:00)
1st Call conference	27/10/2010 (tentative)	N/A	2 hours
2nd Call conference	15/12/2010 (tentative)	N/A	2 hours
First draft of the CWA deliverable	20/01/2011	N/A	N/A
2nd Meeting	11/02/2011 (tentative)	Ispra (JRC)	1 day (10:30-15:00)
3rd Call conference	30/03/2011 (tentative)	N/A	2 hours
Second version of the CWA deliverable	30/05/2011	N/A	N/A
3rd Meeting	27/07/2011 (tentative)	Brussels	1 day (10:30-15:00)
60 days public circulation (draft text of the CWA deliverable made available on CEN Web Site)	27/07/2011 (tentative)	N/A	N/A
Third version of the CWA deliverable	15/09/2001	N/A	N/A
4rd Call conference	1/10/2011 (tentative)	N/A	2 hours
4rd Meeting and final version/approval of deliverable	10/11/2011 (tentative)	Brussels	1 day (10:30-15:00)
Publication of CWA deliverable	After editorials arranged	N/A	N/A

Table 2 Timeplan of the Workshop meetings

6. Workshop structure

The Workshop proposers suggest the following Workshop officers, to be appointed at the Workshop Kick-Off meeting:

Proposed Chair: Gianmarco Baldini (JRC)

Main responsibilities:

- To preside at the Workshop plenary meetings and audioconferences

- To manage the consensus building process

- To organize electronically plenary meetings

- To consolidate the comments received on the draft during the enquiries and send them to the participants for discussion and resolution.

Proposed Vice-Chair: Antonella Di Fazio (Telespazio)

Main responsibilities:

The Vice-Chair will support and assist in all responsibilities outlined for the chair. In the absence of the chair, the Vice-Chair will represent the CEN Workshop at outside meetings in cooperation with CEN Management Centre and will interface with CEN/CMC (CENELEC Management Centre) regarding strategic directions, problems arising, external relationships, etc.].

Proposed Secretariat: UNI

Main responsibilities:

- Registration of WS participants

- Producing WS meeting reports and action lists

- Administrative contact point for WS

- Managing WS membership lists

- Managing WS document registers

- Checking conformity of all of the versions of the draft CEN Workshop Agreement to CEN rules

- Participate to CEN Workshop plenary meetings and audioconferences.

7. Resources

The registration and participation at this CEN Workshop is free of charge for every member of the Workshop, but each participant will bear his/her own costs for travel and subsistence.

The administrative costs of the Workshop Secretariat and other logistical support will be covered by the SCUTUM project through FP7 funds.

8. Related activities, liaisons, etc.

The results of the current project will be of considerable value for standardization in intelligent transport, and as a model for work on GNSS applications in other areas. Liaisons will be established as appropriate with the CEN and ETSI Technical Committees concerning intelligent transport:

- CEN/TC278 "Road Transport and traffic Telematics"
- ETSI TC/ ITS "Intelligent Transport Systems.

Contact will also be established as appropriate with CEN/TC296 "Tanks for the Transport of Dangerous Goods", and ETSI TC/SES "Satellite Earth Stations and Systems".

The work will also take due account of a number of related programmes:

- Activities of UN-ECE's Unit for the Transportation of Dangerous Goods.

- The European Commission Action Plans on GNSS and ITS

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- National projects such as ENI case study for transport of dangerous goods (ex. PICOGE MP, others from Ministries).

9. Contact points

Workshop Chairman:

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Annex A EGNOS/EDAS service architecture

EGNOS Data Access Service (EDAS) - EGNOS data (real-time):
RIMS raw observations
SBAS messages

EGNOS MCC — RAW DATA — EGNOS Data Server

Value-added service provider

End users
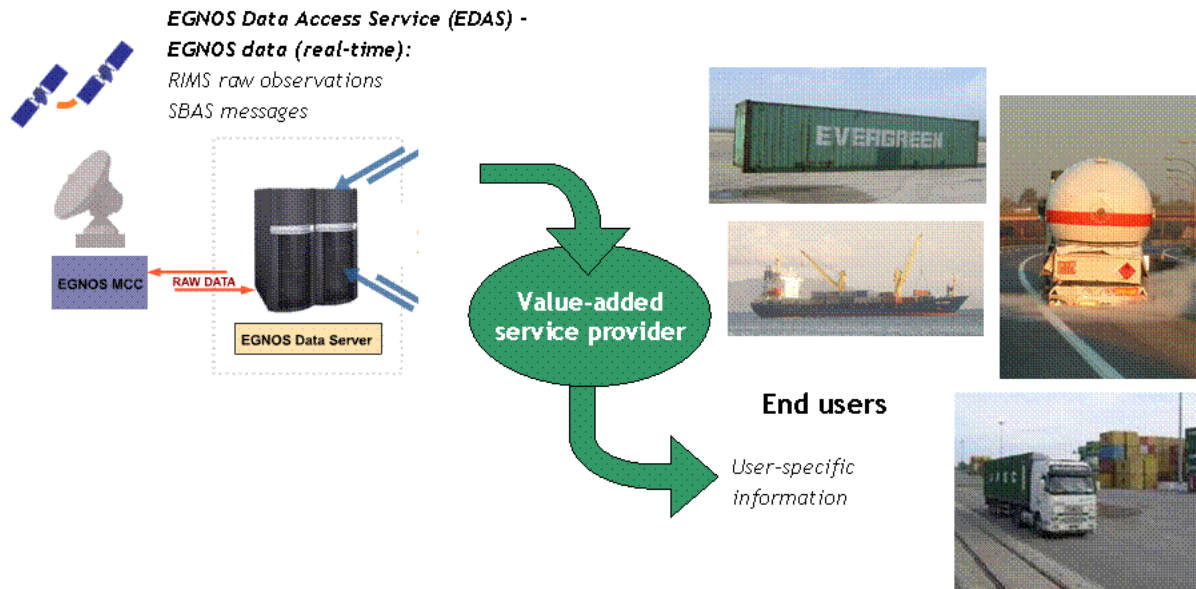
User-specific information

Figure 3 EGNOS/EDAS service architecture

EDAS is a server that gets the raw data directly from the EGNOS system and distributes it to Service Providers in real-time, within guaranteed delay, security and performance.

Downstream Value Added Services Service Providers (VAS SP) connect to EDAS to get EGNOS data, and implement solutions to create value added services. They deliver EGNOS data via different telecommunication means and/or process it and deliver products built on it.

Two classes of products can be implemented based on the combined use of EGNOS OS & CS and EGNOS data processing: CS-HPPS and CS-NAV addressing two types of use (see next table).

Name	Description	EDAS product	Reference market	Value for the user	
CS-HPPS	Distribution of historical and real time data collected from the network of EGNOS reference stations	RIMS data + other EGNOS data	High Precision Positioning professional users	Availability of raw GPS data collected by the EGNOS monitoring reference network	High precision
CS-NAV	Processing and distribution of the EGNOS Navigation Message via different telecommunication means	EGNOS Navigation Message	Professional regulated markets	▶ Enhanced availability of EGNOS service ▶ Use of EGNOS integrity (protection level)	Service guarantee and augmentation of availability

Table 3 EGNOS CS EDAS based service classes

The CS-HPPS targets High Precision Positioning use. It consists of the distribution of historical and real time data collected from the EGNOS monitoring reference network, which are used by the SP or directly by the final users as GPS Differential reference stations.

The CS-NAV targets the provision of value added services built on the processing and distribution of the EGNOS Navigation Message via different telecommunication means. It augments the continuity of EGNOS OS and exploits the value of the EGNOS integrity (such in urban areas, generally affected by lack of SiS continuity due to limited sky visibility). Such a value relies on a "guaranteed positioning" linked to the provisioning of a Protection Level that defines the level of confidence of the position. The user receives the EGNOS accurate position, velocity & time, plus the "circle" within the position is guaranteed (see next figure).

Figure 4 EGNOS CS-NAV services

The tracking & tracing services subject of the CWA are based on the CS-NAV.