EGNOS FACT SHEET

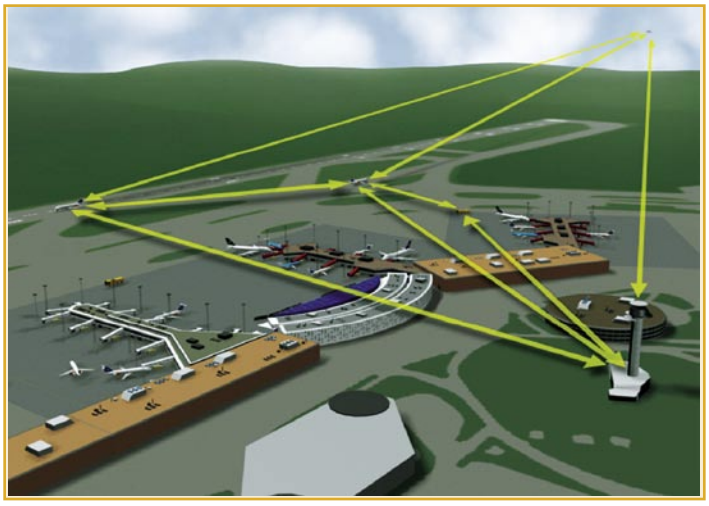
19: EXTENDING ACCESS TO EGNOS

EGNOS, as we all know, broadcasts its correction and integrity data from three geostationary satellites. While this approach is very effective in many environments, there are potential limitations at high latitudes and in urban environments, and this has prompted ESA to investigate the use of other data links. We have talked about SISNeT – providing EGNOS signals over the Internet – in previous issues. Here, you will see how an aviation VHF data link, VDL Mode 4, and RDS on FM radio can extend access to EGNOS.

EGNOS TRAN Using VDL Mode 4

ESA has recently funded a contract called EGNOS TRAN – EGNOS and Terrestrial Regional Augmentation Network – to provide enhanced navigation and surveillance functionality without the need for expensive infrastructure and in locations where EGNOS satellite visibility is limited. One EGNOS TRAN application is focusing on APV-1 precision approach and surface movement surveillance and guidance.

The aviation community has a very straightforward objective – to provide a seamless operation from departure gate to arrival gate. EGNOS availability, however, cannot always be guaranteed in difficult terrain and northern latitudes and this VDL Mode 4 concept, also known as GRAS (Ground-based Regional Augmentation System), is used to help overcome the lack of GEO availability and to compensate for the possible loss of EGNOS services. GRAS is a broadcast service that provides GNSS augmentation data to mobile aviation users using a VDL Mode 4 data link. VDL Mode 4 is an ICAO standardised self-organising TDMA VHF data link, providing digital communications between mobile users (aircraft and airport surface vehicles) and between mobile and fixed ground stations. It has been developed for CNS/ATM (communications, navigation and surveillance/air traffic management) aviation applications with protocols that support ADS-B (Automatic Dependent Surveillance) and similar applications through the broadcast of short repetitive messages with graceful adaptation to increasing traffic loads.



The VDL Mode 4/GRAS Concept

A VDL Mode 4/GRAS architecture comprises a number of VDL Mode 4/GRAS Stations (VGS) linked through a local ground network to an EGNOS Receiving Station (ERS). The ERS receives EGNOS signals from the EGNOS geostationary satellite and the GNSS signals from the GNSS constellation. The VGS computes optimum correction signals and integrity data from the ERS data and these are broadcast over the datalink to mobile users in the area as well as through a terrestrial network to other VGS for onward broadcast to other users.

This innovative combination of EGNOS and VDL Mode 4/GRAS technology not only extends the benefits of EGNOS using the terrestrial network to remote and inaccessible regions, but also provides and efficient communication, navigation and surveillance capabilities in these difficult regions.

More EGNOS TRAN demonstrations for car applications, involving GPRS based disseminations in city environments, are to follow later this summer.

RDS – The Radio Data System

Today, most of our car radios are equipped with RDS: we can receive traffic reports without having to listen to a particular radio station all the time; we do not have to retune the radio when travelling between different transmitter coverage areas; and we can see the name of the current radio station on the display.There are good reasons for using RDS to broadcast EGNOS corrections: RDS transmitters exist in many countries, so no additional infrastructure is required and service deployment could be rapid; and low-cost mass-market receivers are already available in many cars.Telediffusion de France's research

ESA Navigation Web Page:
www.esa.int/navigation

ESA EGNOS Web Page:
www.esa.int/EGNOS/

ESA EGNOS for Professionals Web Page:
www.esa.int/navigation/egnos-pro

ESA ESTB Web Page:
www.esa.int/ESTB

ESA EGNOS Help Desk:
EGNOS@esa.int

ESA Galileo Web Page:
www.esa.int/Galileo

EC Galileo Web Page:
http://europa.eu.int/comm/dgs/energy_transport/galileo/

FAA GPS Product Team:
http://gps.faa.gov/

Galileo Joint Undertaking:
www.galileoju.com

centre, TDF-C2R, is currently evaluating the feasibility of broadcasting
EGNOS data over RDS and is going to characterise the performance in a laboratory environment. Their initial activities have focused on adapting the EGNOS data so that it can be broadcast on the RDS channel. This has included selective data/message filtering, optimising the data update rate and designing a reliable transmission protocol.

The potential benefits are clear. In the leisure/service industry it is a low-cost route to improving car navigation systems and is likely to improve location based services. In the professional sector it should offer improved quality of service for fleet management, is a low-cost alternative to fleet management, and could support some form of route charging.