EGNOS FACT SHEET

10: EGNOS PASSES HELICOPTER TEST WITH FLYING COLOURS

Agusta A109 Helicopter

Helicopters are the utility vehicles of the sky, *par excellence*. Their unsurpassed manoeuvrability together with their load carrying capacity means that they are used by both the civil and military sectors for many tasks including air ambulances, search and rescue, and moving people and freight. The opportunities for EGNOS during the en route and precision approach phases of civil applications are clear, but there may also be prospects in the government sector as a result of the peace dividend.

A mid-life avionics update of the Belgian Army's Agusta A109 helicopter provides an opportunity to assess different satellite navigation systems. The Army's activities are directed primarily towards United Nations peace-keeping, mainly in the Balkans, and their aircraft have to comply with civil aviation regulations during peace-time. Consequently, civil systems may provide a viable solution, and this has prompted the Belgian Royal Military Academy to evaluate EGNOS.

In August 2001, the Royal Military Academy fitted an Agusta A109 helicopter with a dual frequency EGNOS receiver and a second dual frequency survey receiver to provide a reference trajectory. A single antenna was mounted on top of the tail. Two static reference stations were deployed for the trial, allowing differential and real-time kinematic trajectories to be computed.

The Agusta flew a sortie comprising three distinct sections: a steady liaison flight; a high-speed tactical flight along river valleys in southern Belgium; and stomach-turning "special" manoeuvres designed to stress the receiver hardware. These included 360 degree turns with banking angles up to 60 degrees, and parabolic trajectories with periodic positive and negative vertical accelerations. Accelerations greater than 2g were experienced!

The performance of EGNOS is generally expressed in terms of accuracy, integrity and availability. During the liaison section of the sortie, the EGNOS accuracy was stated as 1.2m (1σ), better than both the DGPS and GPS solutions.

Integrity requirements are specified according to the phase of flight and integrity is computed using data broadcast by the EGNOS satellites. The precision approach integrity model was applied throughout the entire flight … a truly demanding safety requirement.

The trials reported that the EGNOS AOR-E satellite was tracked for 98.3% of the time. Losses of availability can be accounted for by high banking angles causing airframe masking during the special manoeuvres. The availability would be higher if the helicopter maintained the liaison phase of flight and all three EGNOS satellites were operational.

These tests have shown how EGNOS can deliver operational benefits to helicopters in terms of performance and safety. There are also clear cost savings with respect to conventional DGPS resulting from removing the communications interface and overcoming the need for a dedicated ground segment.

Looking to the future, the challenge is to explore how these benefits can be extended to current users by developing EGNOS procedures for helicopters.

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

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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