THE IMPLEMENTATION OF THE EGNOS SYSTEM TO APV

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First in the Poland tests of the EGNOS SIS (Signal in Space) were conducted on 5th October 2007 on the flight inspection with SPAN (The Synchronized Position Attitude Navigation) technology at the Mielec airfield. This was an introduction to a test campaign of the EGNOS-based satellite navigation system for air traffic. The advanced studies will be performed within the framework of the EGNOS-APV project in 2008. The implementation of the EGNOS system to APV-I and APV-II precision approach operations, is conducted according to ICAO requirements in Annex 10. Definition of usefulness and certification of EGNOS as SBAS (Satellite Based Augmentation System) in aviation requires thorough analyses of accuracy, integrity, continuity and availability of SIS. Also, the project will try to exploit the excellent accuracy performance of EGNOS to analyse the implementation of GLS (GNSS Landing System) approaches (Cat I-like approached using SBAS, with a decision height of 200 ft). Location of the EGNOS monitoring station Chelm Town, located near Polish-Ukrainian border, being also at the east border of planned EGNOS coverage for ECAC states is very useful for SIS tests in this area. According to current EGNOS programme schedule, the project activities will be carried out with EGNOS system v2.2, which is the version released for civil aviation certification. Therefore, the project will allow demonstrating the feasibility of the EGNOS certifiable version for civil applications. Planned demonstration and trials will be provided on 2 or 3 Polish airports (central, eastern and western) chosen based on SIS analysis and EGNOS operational coverage in Poland. For creating and testing software and making other documentations we will use ESA standards like ECSS-E-40, ECSS-Q-80B. The Synchronized Position Attitude Navigation (SPAN) system is NovAtel's Global Navigation Satellite System - Inertial Navigation System (GNSS/INS) solution for applications requiring continuous position, velocity and attitude information. Using Inertial Measurement Unit (IMU) data in addition to GNSS, SPAN provides a high rate position, velocity and attitude solution which seamlessly bridges GNSS outages. The tight integration of the IMU to the receiver core improves GNSS performance by enabling faster signal reacquisition and quicker return to fixed integer status after a loss of GNSS signals. Synchronized Position Attitude Navigation. The paper presents information connecting with EGNOS/SPAN implementation in polish aviation and results of testing of EGNOS SIS on the flight inspection with SPAN technology.

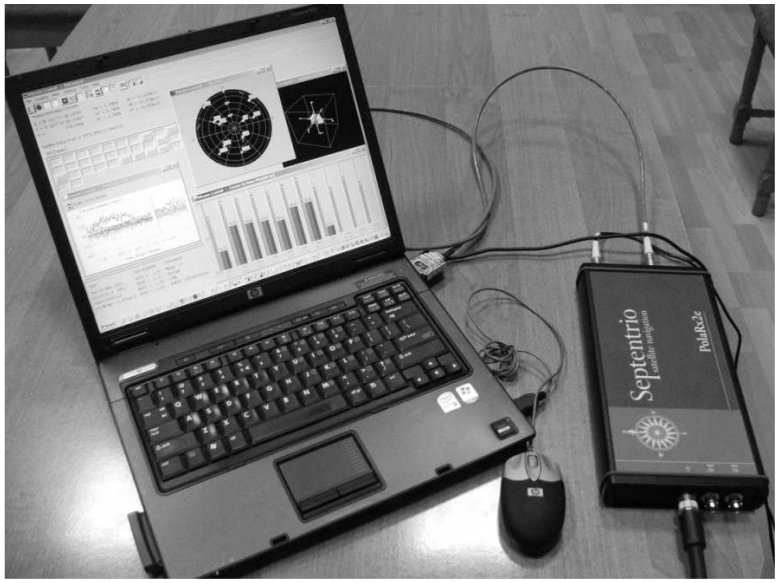

Fig.1. The test equipment configuration

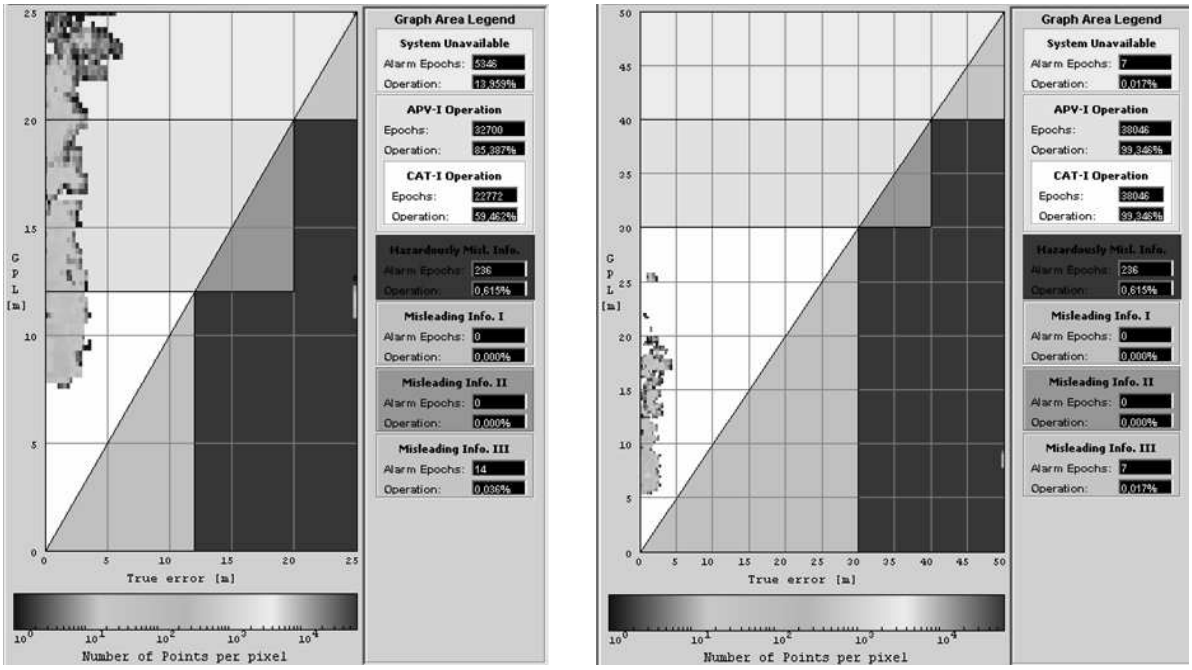

Fig.2. Misleading Information recorded by the monitoring station

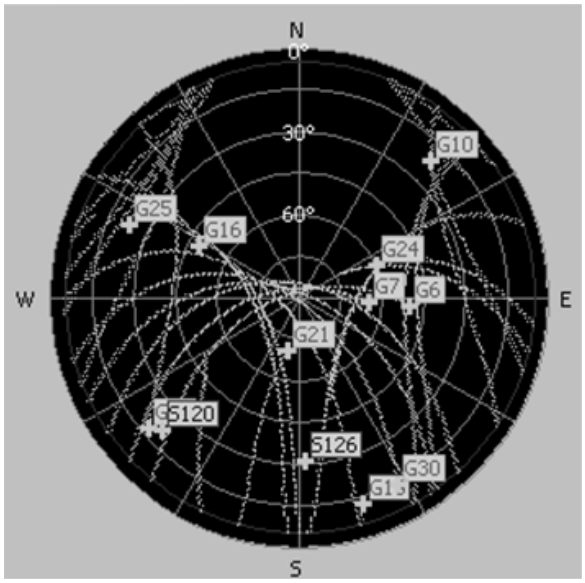

Fig.3. Sky Plot

On 5th October 2007 experts representing 7 institutions: The State University in Chełm, PANSA, AFIT, Polspace Sp. z o.o., The Technical University of Lodz, GPS.PL and ROYAL-STARAERO performed aircraft flight trials of a GPS receiver at the Mielec airfield. This was an introduction to a test campaign of the EGNOS-based satellite navigation system for air traffic. The advanced studies will be performed within the framework of the EGNOS-APV project in 2008.

Fig.4. Airplane and installed equipment

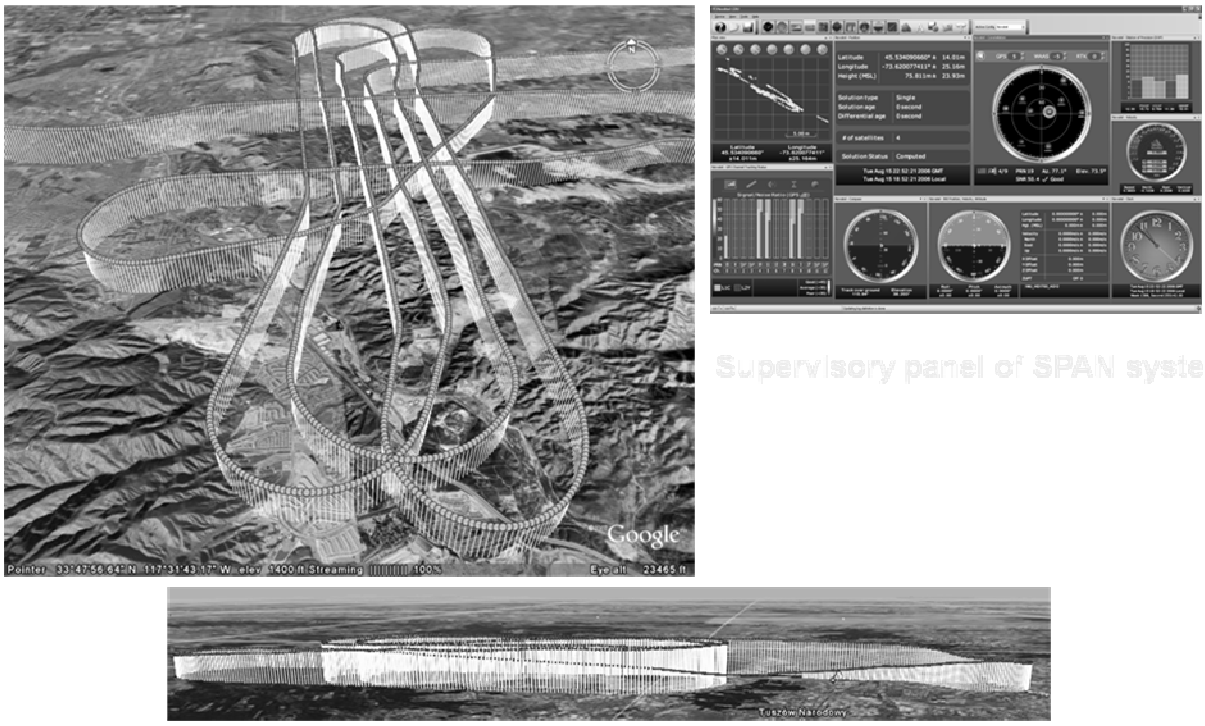

Fig.5. Results visualization with Google Earth.

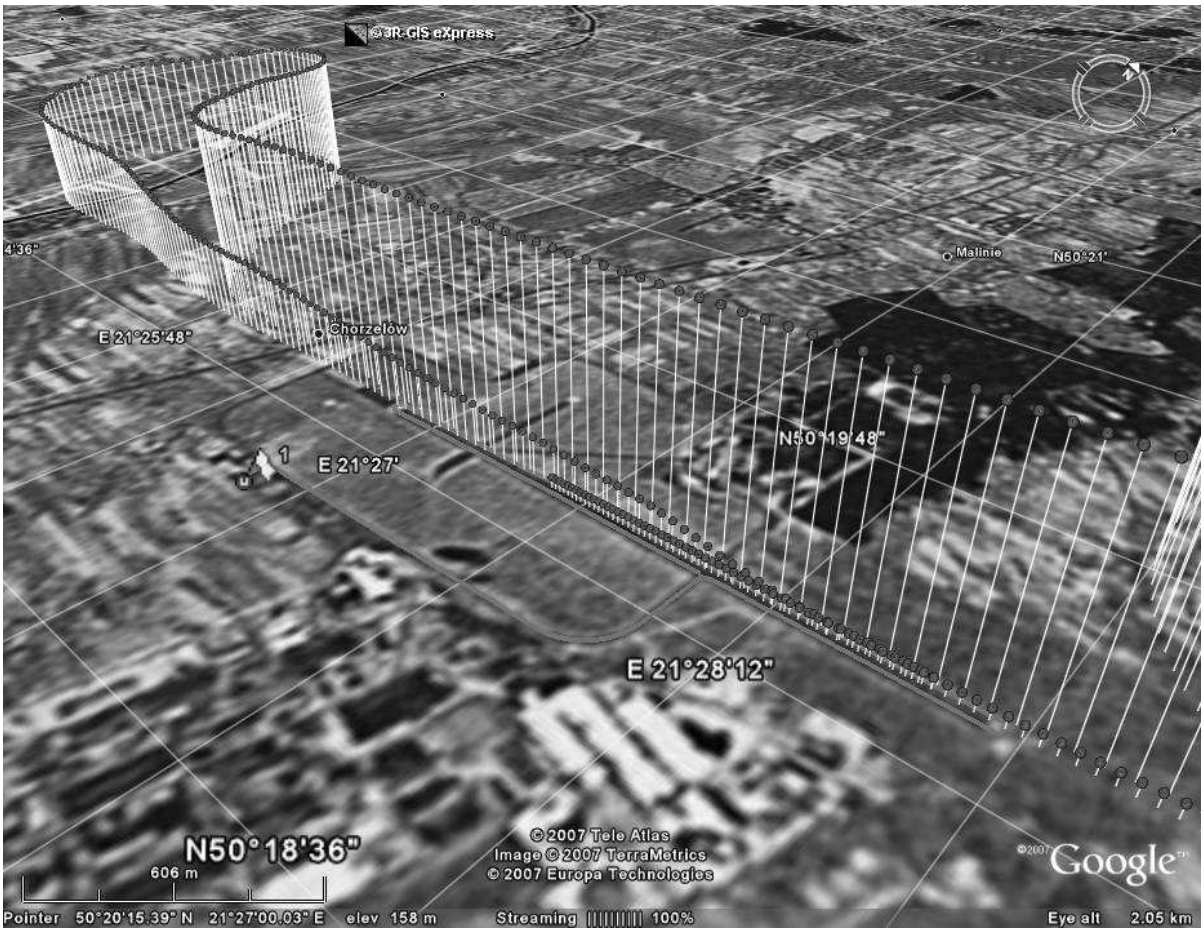

Fig. 6. Fly track visualization.