

5 Years

Flight Validation and Flight Inspection of LPV Procedures

Soon after the availability of EGNOS SoL service in March 2011, FCS carried out the Flight Validation of the LPV procedure at their home airport in Braunschweig (EDVE), Northern Germany.

Standardizing Flight Validation and Flight Inspection

The process of developing, validating and publishing new instrument flight procedures is subject to complex and stringent quality control processes as part of their formal approval.

Performance Based Navigation (PBN) procedures, including EGNOS-based LPVs, are not an exception and also need to be qualified with the highest levels of integrity. In order to standardize the necessary Flight Inspection and Flight Validation tasks, ICAO published Document 9906 Volumes 5 and 6 in 2012. These Standards and Recommended Practices describe the steps necessary to ensure that new procedures are thoroughly evaluated before publication, with the validation flight using a pre-production database acting as the final end-to-end test. The ICAO documentation also details requirements on pilot qualification and these documents are being adopted by many Flight Inspection service providers as the basis for their Flight Validation activities.

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Implementation of EGNOS LPV Procedures

Since that first validation of the LPV procedure in Braunschweig, over 30 LPV procedures have been published in Germany, at both regional airports and international airports that constitute important transport hubs within Europe. Outside Germany, FCS has supported EGNOS deployment by completing the Flight Validation of procedures designed by skyguide in Sweden during 2015. In 2016 FCS is planning Flight Validation missions in the Slovak Republic and in Austria as part of the GSA-funded IMPROWE project (with the first LPV200 approach for FCS), and again in Sweden where one of the approaches will be a RNP AR, also a first.

IFR Procedures for Helicopters

A particularly strong demand for Flight Validation of LPV and PinS helicopter procedures emerged in Switzerland, with the strategic decision of the Swiss EMS operator Rega to transition their complete operations to IFR. To support this



FCS King Air 350 (Fozair.net)



AW-109 SP over the Alps (Samedan) – ProuD Project

activity one of Rega's AW-109 SP helicopters was equipped with an FCS/Aerodata Flight Inspection System, named "HeliFIS", at the end of 2014. FCS has since supported Rega in the Flight Validation of several LPV approaches and PinS segments implemented as part of the Swiss "Low Flight Network" (LFN), used both by Rega and Swiss Air Force helicopters. In the future, RNP AR procedures will be implemented and connected to the LFN. In 2015 FCS also played an active role in the GSA-funded PROuD flight trials of a PinS/LPV approach to a hospital in Chur and a PinS/LPV approach into Samedan airport in Switzerland.

Validating the NAV database

Validating the NAV database is critical to LPV Flight Validation. In order to complete this activity FCS obtains a test (pre-production) database with the newly designed procedures. This special database is produced for the FMS 3000 in the FCS King Air through the standard certified processing chain involving Jeppesen and Rockwell Collins, using the same source data as that for the final procedure. To validate the database on the ground, FCS employs its purpose-designed "FIDIT" (Flight Inspection Database Integrity) tool, an extension of the "DbIT@" validation tool used by Lufthansa and Swiss Airlines to validate the NAV databases of their global fleets. FIDIT compares ARINC424 and FMS coding, both for waypoints and the LPV FAS data block, documenting the results and highlighting any discrepancies in a custom report format.

Advantages of Standardization

Given FCS's background and experience in the Flight Validation field, processes are stable and economies of scale allow for fixed cost items,

such as test database subscriptions, to have little influence on individual task costs. This combination makes Flight Validation by FCS cost-effective, with Flight Validation and Flight inspection of one runway end with two approaches, including the missed approach and transitions usually requiring no more than one flight hour. Combining several LPV approaches at nearby airports into one mission is also an easy way to reduce the cost of Flight Validation. A further advantage of standardized processes and a stable organization is the ability to manage issues and delays that may arise during the design and publication processes, and to respond to any questions arising after the flight with qualified answers based on experience.

“Standard reporting provided by FCS includes the pilot's Flight Validation Report, a Flight Inspection Report and a Database Validation Report

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About FCS

FCS Flight Calibration Services GmbH, primarily serves its ANSP shareholders in Germany, Switzerland and Austria with Flight Inspection and Flight Validation services. For this purpose, FCS operates two King Air 350 aircraft equipped with a Rockwell Collins Proline 21 cockpit and an Aerodata Flight Inspection System. FCS, as an EASA Part-SPO high risk specialized operator is IS-BAO SMS stage 3 audited/ registered and ISO9001 certified.

Standard reporting provided by FCS includes the pilot's Flight Validation Report, a Flight Inspection Report – containing data from the Aerodata Flight Inspection System relating to FMS and GNSS performance – and a Database Validation Report.