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1- Introduction

- François Grémy : DSNA/DO/SIA
  - National coordinator for Instrument Flight Procedures studies and publications (ANSP)

- Richard Amy : DSNA/SDPS
  - DSNA/HQ Navigation, Airspace and AIS manager

- Arnaud Limouzin : DSAC/ANA/SMN
  - Airports and air navigation direction
  - Mostly in charge of :
    - Oversight of PANS-OPS domain (ANSPs, procedure designers, procedure implementation)
    - Oversight of ATM changes (EC regulation)…
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2- APV-SBAS - Certification

- Initial certification by the French NSA of the ESSP:
  - Operator of the EGNOS system (European SBAS)
  - Certification as an ANSP (CNS provider)
  - Started end 2008
  - Participation of 8 NSAs (Portugal, Italy, Belgium, Spain, Germany, Switzerland, UK and France)
  - Granted in July 2010

- On-going certification and surveillance has started

- Operational needs
  - expressed mainly by business operators, general aviation and helicopters.
  - Every IFR operator on secondary aerodromes and other landing locations
2- APV-SBAS : National Task Force

- DGAC organizes three times a year meetings with major industrial partners and DGAC key experts to discuss APV EGNOS implementation:
  - Airbus / Airbus Transport International (ATI) operating Beluga / Dassault Aviation / Eurocopter
  - Thales Avionics / Honeywell / Rockwell Collins
  - Eurocontrol
  - ESSP
  - ANSP/ Controlers / Procedure designers / ANS / Regulator
2- APV-SBAS : National Task Force

- As EGNOS SoL is now operational, discussions are focused on operational feedbacks :
  - LPV Procedure encoding issues
  - Procedure designers training
  - ATC training and phraseology feedback
  - Onboard implementation solution
  - Approval process
  - EGNOS performance, NOTAMs issued
  - Publication perspectives
  - On going international discussions (FPL 2012, ..)
  - ....
2- APV–SBAS : Safety activities

- 2006 : first experimentations in Limoges (ATR42) + definition of the needs for APV-SBAS flight inspections
- 2007 : Generic Safety assessment of the APV-SBAS Conops undertaken by DSNA (in coordination with DSAC) :
  - Total system approach :
    - ANSPs (ATCO, publication, …)
    - Aircraft operators
    - On-board systems
    - Procedure design
    - EGNOS SiS
    - Data bases stakeholders
  - Based on experimentations made in Clermont-Ferrand
  - Use of non-operational EGNOS signal until early 2011
  - Output :
    - Safety requirements
    - Safety recommendations
    - SBAS approach for Clermont-Ferrand RWY 26
2- APV–SBAS : Safety activities

Framework for making specific safety assessments:

- ANSP-oriented
- Each time an APV-SBAS procedure is implemented on a runway
- Uses a subpart of the outputs from the generic safety case
- Simpler and shorter than the generic safety case
- Meets EC 2096/2005 regulation which requires that each change is subject to a safety assessment.
2 - APV–SBAS : last steps before implementation

Global aspects:

- Publication of an aeronautical information circular (AIC):
  - AIC France A 03/11 « Use of the EGNOS safety of life signal in French Airspace »

- EGNOS NOTAMs implementation:
  - Inform SBAS users of planned SBAS outages
  - Described in the « Working agreement » between DSNA (French ANSP) and ESSP
2- APV–SBAS : last steps before implementation

Local aspects :

- For each SBAS procedure :
  - Flight inspection of the FAS data block
  - Runway approval for LPV operations (or limited ops)
  - Implementation of the framework for specific safety assessment

- Publication of APV-SBAS started in France with :
  - RNAV RWY 31 in Pau – Pyrénées (LNAV and LPV min ops)
  - RNAV RWY 26 in Clermont – Ferrand (one NPA and one LPV)
  - RNAV RWY 27 in Paris - Le Bourget (LPV only procedure)
2- APV–SBAS: implementation in Europe

Before implementing APV SBAS procedures in France, European ANSPs have to:

- Contact the French NSA:
  - Alain Printemps (airports and air navigation director)
  - Pierre Outrey (head of ANSPs certification unit)

- Establish a « working agreement » with the ESSP:
  - Provision of EGNOS NOTAMS
  - GNSS data recording
  - Collaborative decision making

- Establish a safety assessment:
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3- APV-Baro

- Important need expressed by main transport carriers operating fixed wing aircraft already equipped with baro-VNAV capable avionics
  - Easy operational use (already used as a guidance on conventional procedures)
  - Reduced costs for airlines with potential lower approved operational minimums

- The process of implementing APV baro-VNAV operations started more recently in France than on APV-SBAS

- No CNS provider to certify
3- APV-Baro

- French DGAC organizes a national taskforce in order to discuss the way APV-Baro could be implemented in France:
  - ANSP (DSNA)
  - NSA (DSAC)
  - Regulator (DTA)
  - Procedure designers (DSNA and ENAC)
  - Aircraft operator (Air France)
  - …
3- APV-Baro

- Purpose of this Task Force:
  - Define a framework for the design and publication of APV baro procedures
  - Define the required information in order to operate these procedures (on ground / on board)
  - Define a flight inspection methodology
  - Follow and stabilize the evolution of the design criteria
  - Customize the Eurocontrol safety assessment
  - Evaluate the operational minimums on several runways
  - Define a pioneer site in order to enforce the conclusions of the TF
3- APV-Baro

- **Where are we?**
  - A project of APV-baro procedure has been designed
  - First implementation is planned in Brest – Bretagne RWY 07 end of 2011 or early 2012.
  - The definition of the framework to achieve specific safety assessments is on going

- **Still some open topics:**
  - Application of AMC 20-27
  - ATCO phraseology
  - QNH and T° criticity
  - Operational approvals of operators
  - …
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4- **Common issues : runway approval**

- Airport regulation in France does not define criterias for the approval of runways with APV procedures

- Publication of a national directive:
  - Defines an AMC before the high level regulation is updated
  - Based on the prescriptions of ICAO DOC 8168 (PANS-OPS)
  - For APV procedures with OCH < 300ft : precision approach criteria and no obstacle in OFZ for APV baro
  - For APV procedures with OCH > 300ft : NPA approach criteria
  - Regional offices of the French NSA shall verify that the runway meets the right requirements before the publication
4- **Common issues : continuity loss of GPS**

- Impacts **all** RNAV-GNSS approaches
- Aircraft operators have to define « contingency procedures » :
  - OK for big airlines
  - But for small operators ?
  - And private pilots ?
- This issue could be more safety-critical for APV procedures :
  - OCH can be smaller
  - Final approach gradient vary with T° for APV-Baro
- Need for additional requirements for ANSPs and procedure designers ?
  - ICAO doc 8168 does not encompass « abnormal » operations
- Discussions are on-going.....
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5 – DSNA APV Policy

- DSNA Navigation Policies
  - To apply ICAO resolutions from A36 & A37: an APV for “every instrument runway ends” (30% by 2010, 70% by 2014, 100% by 2016)
  - To increase safety during approach phases using vertical guidance with an absolute reference system (SBAS with Egnos).
  - Rationalize the heavy ILS infrastructure (25 cat III, 82 full cat I, 12 LLZ) in the French metropolitan territory (covered by Egnos). Reducing costs for the ANSP.
  - To provide service continuity for users when NDB and approach VOR become obsolete.
  - To maintain ILS cat III capacity in majors airports
  - To share some APV implementation materials with interested parties
5 – DSNA APV Policy: implementation materials

- The EGNOS Working Agreement (WA)

This Agreement formalizes the operational and technical terms of exchange between ESSP SAS and DSNA, in order to support in particular the operational introduction and use of EGNOS LPV approaches within France.

**ESSP** - owner of the EGNOS service

« provision contract »

- ESSP SAS shall provide the Service within all metropolitan France

- ESSP SAS shall provide DSNA with the information of the availability and service level of the Service

**DSNA** - French ANSP

- DSNA shall publish approach procedures based on the Service

- DSNA shall deliver to its airspace users the information on the availability of these procedures
5 – DSNA APV Policy: implementation materials

- **The existing Safety studies**
  - RNAV GNSS approach in radar & non-radar area
  - SID RNAV1 in radar area
  - STAR RNAV1, or transitions to RNAV approaches, in radar area

SID & STAR RNAV1 in non radar area studies will soon be launched
An APV-Baro study will soon be finished

All these Safety studies are generic document designed to support the DSNA agents in charge of the procedure deployment.
5 – DSNA APV Policy: relationships

- To work with the main actors on the coming changes (ILS rationalization, Aircraft avionics equipment, …)
  - Aircraft operators
  - Airport operators
  - Other ANSPs

A meeting for aircraft companies operating in France will be held in DSNA Headquarters by the end of the year in order to present them the DSNA APV strategy and the LPV deployment plan.

Airport operators are contacted when an LPV implementation will prompt the non renewal of their already existing conventional Navaids.
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6 – Publication planning

- Study and Publication plan is driven by DSNA navigation policies
  - A balance is made between ICAO resolutions, safety improvements with vertical guidance, conventional navaids rationalization and service continuity to define priorities.
- Publications enablers
  - Support from end users (airlines, manufacturer)
  - Airports commitment to upgrade old approach systems
- First APV implementations have been conditioned by a mix of these needs
# Publication planning (2011)

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6 – Publication planning (2011)

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- Already published: 55 RNAV GNSS (LNAV)
- And 3 LPV
6 – Locations of first LPVs
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## 7- AOB: APV vs. ICAO concepts

→ No need for a new approach classification!

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7-AOB : LPV implementation

- To support LPV implementation, DSNA is happy to make available to the interested ANSPs its:
  - LPV safety studies (available in French only)
  - EGNOS Working Agreement signed with the ESSP (available in English).

- Points of contact:
  - Safety studies: Corinne Bousquet, Richard Amy
  - Working Agreement: Benoit Roturier, Richard Amy
Thank you for your attention

Any question?