

Enabling a harmonised implementation of SBAS-based operations in european airspace

EGNOS Service Provision Workshop
27-28 September 2016 (Prague)
Aline Troadec
EUROCONTROL

INTRODUCTION

- SBAS in ICAO context
- European mandates relevant to EGNOS

EUROCONTROL ACTIVITIES:

- Tracking procedure deployment
- Tracking aircraft equipage
- The RNAV Approach implementation Support Group (RAISG)
- Other EUROCONTROL Activities

- SBAS is identified as the **minimum system required for RNP APCH to LP and LPV** (ICAO PBN manual - doc 9613)
- Local considerations might require that SBAS is used for other operations such as **RNP 0.3 helicopter procedures**
- SBAS is a solution to meet **ICAO Resolution 37-11** (“**APV** at all instrument runway ends by end 2016”)
- This also supports **EANPG’s priority** agreed in November 2013 (“Approach with vertical guidance - any **3D approach** - at all runway ends”; for improved safety)
- These high level objectives are translated into **European regulation**

.... see next slide

European mandates relevant to EGNOS

- **No mandate on the aircraft**, however operators shall be equipped as required for intended operations
- **Mandates on ANSP/airports** for the deployment of ATS routes/ Instrument Flight Procedures (IFP) as follows (in addition to local mandates) :

Phases of flight	PCP IR	EASA Opinion 10/2016
Final Approach	RNP APCH (<u>LPV</u> and LNAV/VNAV) 24 EU major airports (+ Istanbul) By 1 January 2024	RNP APCH (<u>LPV</u> or LNAV/VNAV) at every instrument runway end without Precision Approach procedure (ILS, MLS, GBAS) or RNP AR APCH as required by obstacles Before 30 January 2020
SID/STARs	RNP 1 + RF 24 EU major airports (+ Istanbul) By 1 January 2024	« as required » <i>New ATS routes/IFP to be:</i> - “RNAV 1” or “RNP 1 + additional functionalities” - <u>RNP 0.3</u> for rotorcraft <i>As of 6 December 2018</i>
En-route	<i>No mandate for deployment</i> <i>However, AF#3 requires EU MS to implement Free Routes at or above FL310 from 2022</i>	<i>Current requirement for RNAV5 still applies</i> <i>However, transitions between the en-route network and the SIDs/STARs to be consistent with the SIDs/STARs served « as required »</i>

EGNOS relevant aspects

Tracking procedure deployment at PCP airports

- 18 / 25 airports with APV today (23 by 2024) :

London Heathrow (EGLL)

Paris CDG (LFPG)

London Gatwick (EGKK)

Paris Orly (LFPO)

London Stansted (EGSS)

Milan Malpensa (LIMC)

Frankfurt Int. (EDDF)

Madrid Barajas (LEMD)

Istanbul Ataturk (LTBA)

Amsterdam Schiphol (EHAM)

Munich FJ Strauss (EDDM)

Rome Fiumicino (LIRF)

Barcelona El Prat (LEBL)

Dusseldorf Int. (EDDL)

Zurich Kloten (LSZH)

Brussels National (EBBR)

Oslo Gardermoen (ENGM)

Stockholm Arlanda (ESSA)

Berlin Brandenburg (EDDB) ()*

Manchester (EGCC)

Palma de Mallorca (LEPA)

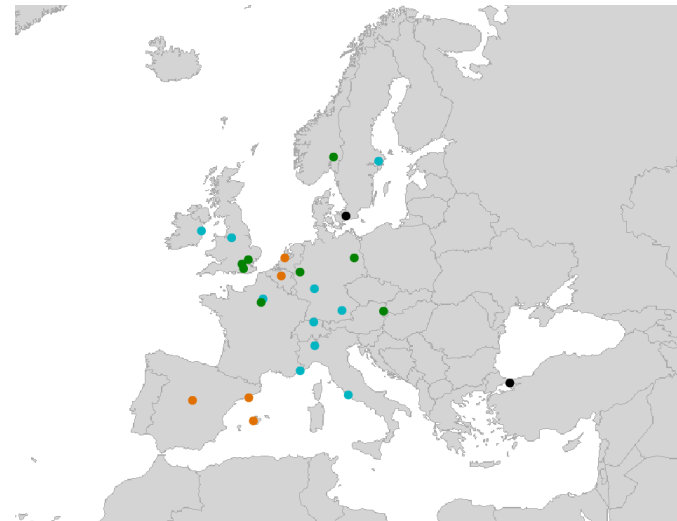
Copenhagen Kastrup (EKCH)

Vienna Schwechat (LOWW)

Dublin (EIDW)

Nice Cote d'Azur (LFMN)

(*) (under construction)



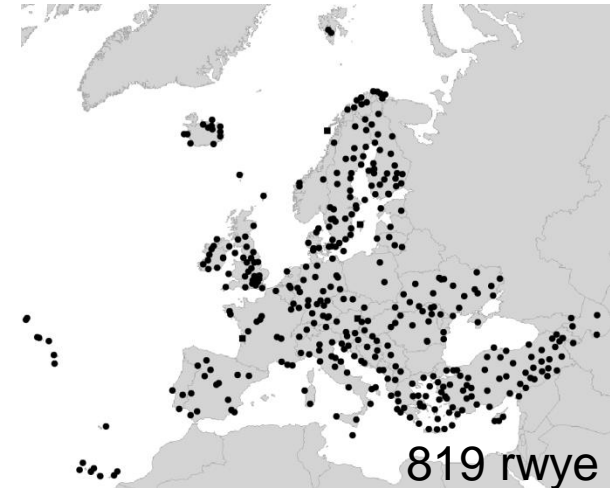
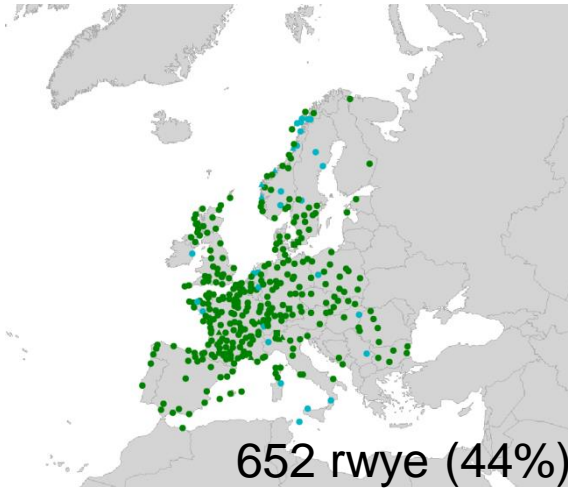
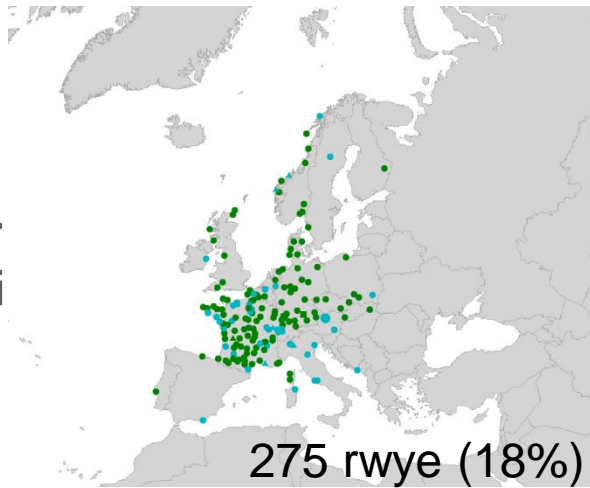
- In other terms:
 - 62 / 124 runway ends (50%) with APV today
 - 94 / 124 (77%) by 2024

Tracking procedure deployment over ECAC

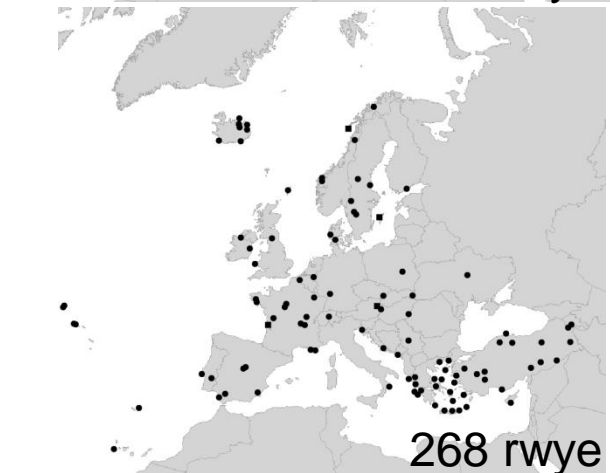
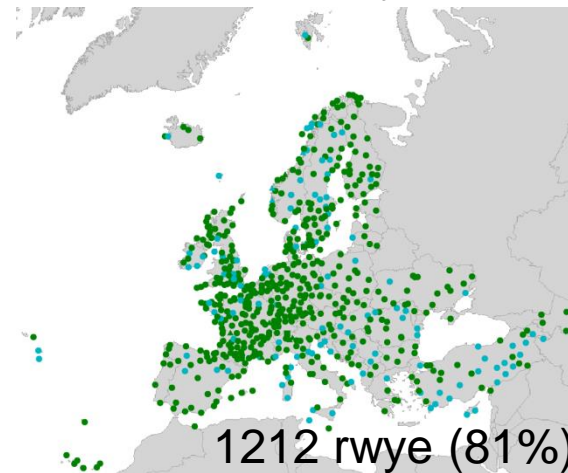
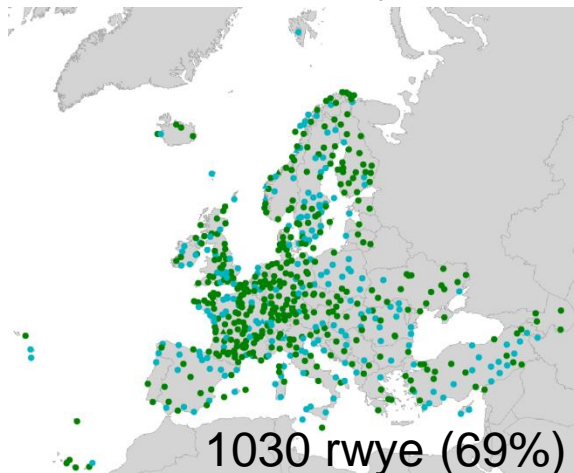
12 Sept 2016

2020 +

LPV



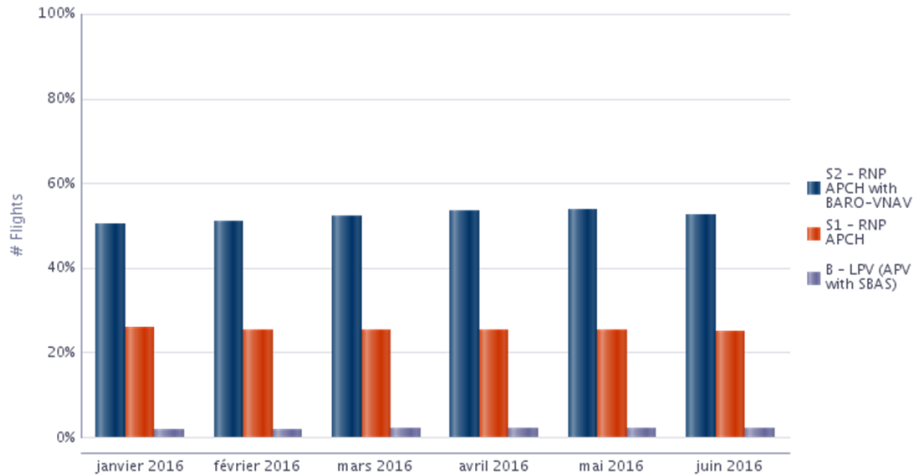
3D



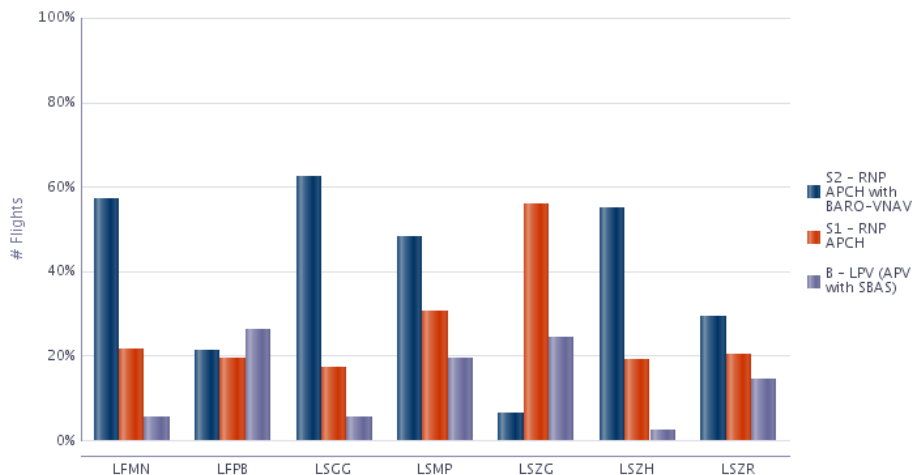
1496 instrument runway ends in total in ECAC

Source: EUROCONTROL PBN Approach Map Tool (<https://ext.eurocontrol.int/pbn/>)

RNP APCH aircraft equipage



Capable flights (Jan to June 2016)



Capable flights to LPV equipped airports

- Analysis of capability declared in Flight Plans (CNS dashboard):
 - flight and aircraft characteristics
 - Analysis at different levels: Global, Airport, Operators, Aircraft make/model/series
- **Access by external users to the dashboard** (National ANSP, Airports, CAA and Airlines) under preparation according data policy principles
- No indicator is available on when these functions are used (i.e. no statistics are available on the nb of approaches flown)

Analysing Airspace users' needs (example of an analysis made for GSA and EBAA)

- Purpose: to identify “new” airports where LPV publication would be relevant and could be supported by GSA-funds.
- Analysis in 3 steps:
 1. establishing the list of airports where certain operators fly
 2. comparing this list with the list of airports where LPV procedures are published or planned to be published
 3. proposes a list of airports where LPV publication would be beneficial
- Criteria used for prioritisation:
 - Traffic on the airport
 - ILS availability (airport with full/partial/no ILS coverage)
 - LNAV/VNAV availability (accounting for the possibility to allow the use of EGNOS for LNAV/VNAV procedures)
 - The existence of publication plans

The EUROCONTROL RNAV Approach implementation Support Group (RAISG)

- RAISG is an open forum animated by EUROCONTROL
- RAISG meets twice a year
- Typical attendance is above 50 persons
- 2/3 of the audience is made of ANSP and CAA. Datahouse, Industry, the military community, Universities, Operators, ESSP and the GSA are also represented
- Main objective is information sharing to support harmonised implementation of RNP APCH throughout Europe
- “Guidance Material for the Implementation of RNP APCH Operations” (known as ICAO EUR doc 025)
- Other material is available at <https://ost.eurocontrol.int/sites/RAISG>
- RAISG 11: 30 Nov & 1 Dec 2016 / Prague / hosted by the GSA (<http://www.eurocontrol.int/events/eleventh-meeting-rnav-approach-implementation-support-group-raisg-11>)

Some implementation issues raised in RAISG

- Implementation of a procedure can take **up to 3 years**
- Causes of **delays** include:
 - Lack of flight inspection aircraft suitably equipped or
 - Lack of of procedure design and safety oversight ressource.
 - High cost of flight validation and navigation databases
- **Publication at non-instrument runway** raises other challenges (e.g. minimum airport equipment remains a requirement, high quality obstacle data required, absence of local ATS service is a serious obstacle)
- **GNSS information** evolution; what's needed?

EUROCONTROL aims at improving awareness of the different actors, adresses challenges and provides targeted support in order to ease and speed up implementation.

EUROCONTROL « keeps the big picture » through:

- Involvement in ICAO Panels and some EASA RMT
- Memorandum of Cooperation with the FAA (Action Plan)
- a 7 years Framework Partnership Agreement with the GSA (from April 2015) – 8 areas of work
- Involvement in implementation projects such as:
 - SESAR 1 and SESAR 2020 projects
 - In GSA-funded projects (as a technical advisor to the GSA)
 - *INEA-funded project (SPICE) – under preparation*

Visit also www.eurocontrol.int/articles/rnav-approaches

or send your questions to rnav.approach@eurocontrol.int

Thank you for your attention.

