

# SBAS DEPLOYMENT

MARCH 2024

**AIRFRANCE** 

# SBAS BENEFITS

SBAS CONCERNS ALL AIRLINE FUNDAMENTALS

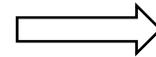
REGULATION	PBN Implementing Rule 2030
SAFETY	LNAV/VNAV Barometric settings
ENVIRONMENT	Fuel savings and Noise exposure reduction Shorter trajectories, closer alternates Flexible paths, Increased Glide Slope
CUSTOMERS	Reduce disruptions Smooth approaches



# FOCUS ON SAFETY

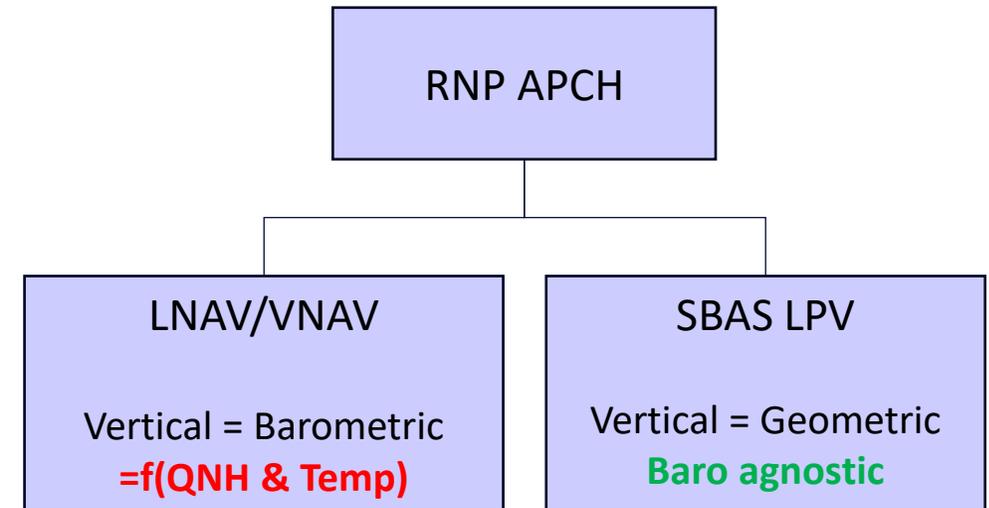
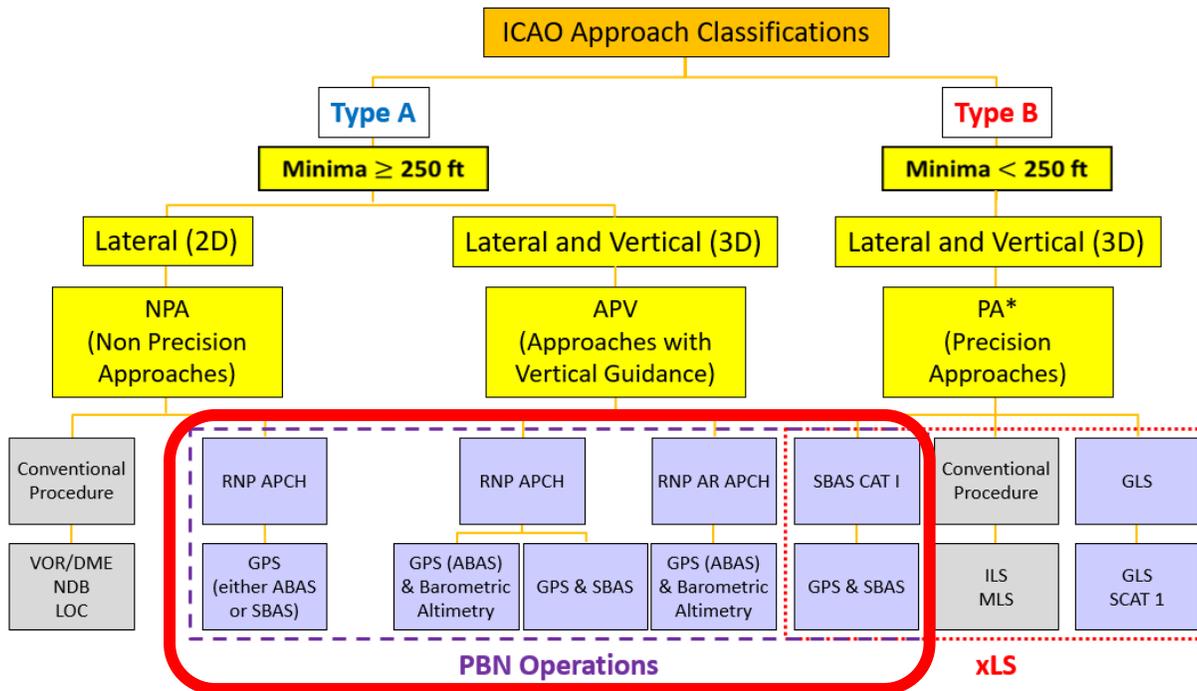
## 2030 : PBN OPERATIONS

PBN Implementing Regulation



Jan 24  
Jun 30

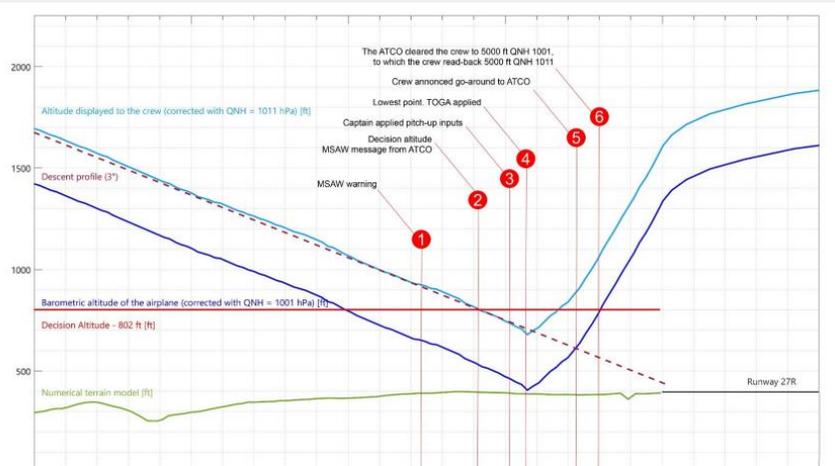
RNP APCH to all runway ends  
PBN (RNP APCH) Operations normal  
ILS & conventional contingency



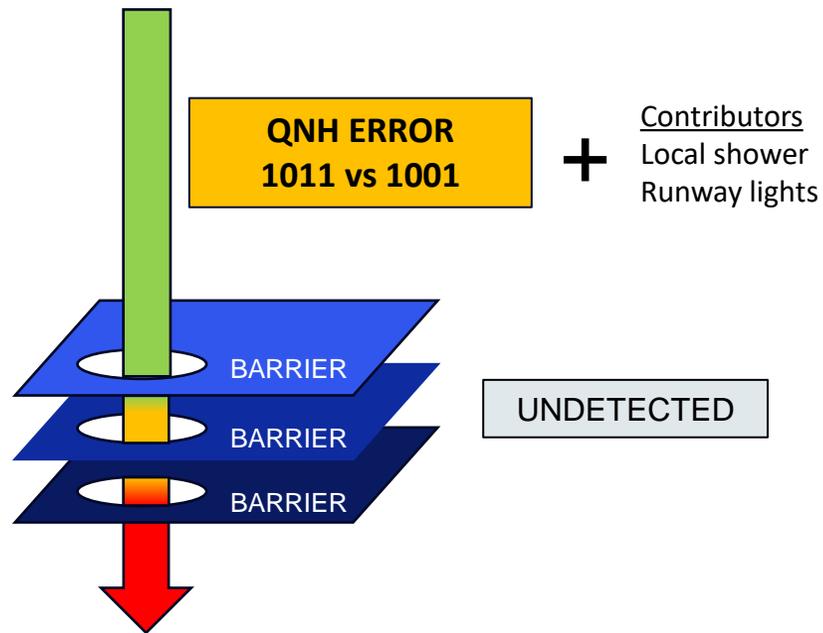
# FOCUS ON SAFETY

LNAV/VNAV: BAROMETRIC SETTING ERRORS HAPPEN

1001 1001 1001  
 1001 1001 1001  
 1001 1001 1001  
 1011 1001 1001  
 1001 1001



## LNAV VNAV CLASSICAL



Contributors  
 Local shower  
 Runway lights

## LNAV/VNAV APPROACH

- ✓ No exceptional weather
- ✓ Aircraft OK
- ✓ People OK
- ✓ Procedures OK

Airbus A320  
 May 23/2022 - CDG

## SERIOUS INCIDENT - QUASI CFIT

BEA Bureau Enquête Accident – Preliminary Report

6 ft Radio alti  
 0,8 NM Runway

SBAS LPV is not QNH error sensitive

# AIRCRAFT EQUIPAGE

## THREE CATEGORIES

LINEFIT	RETROFIT	NOT PROPOSED
 <p>A320</p> <p>A350</p> <p>A220</p> <p><b>Perfect, but often optional</b></p> <ul style="list-style-type: none"> <li>• SBAS LPV perfectly integrated</li> <li>• Light training</li> <li>• Very good feedback</li> <li>• Should not be optional , like ILS !</li> </ul>	 <p>777</p> <p><b>Good STCs, some challenges</b></p> <ul style="list-style-type: none"> <li>• Cockpit integration &amp; Procedures</li> <li>• Costs &amp; aircraft stops</li> <li>• Training</li> <li>• It takes years</li> </ul>	 <p>787</p> <p><b>Not understood</b></p> <ul style="list-style-type: none"> <li>• Long lasting airline requests</li> <li>• Need to change</li> </ul>
<p><b>CHALLENGING BC</b></p>		
<p><b>SBAS LPV EQUIPAGE IS STILL NOT EASY !!!</b></p>		



# AIRCRAFT EQUIPAGE

AIR FRANCE KLM GROUP: EQUIP WHEN POSSIBLE

				
EQUIPPED	A350 A220	A320NEO	A320NEO	
STUDY	777 787	777 787 737		E JETS
NOT EQUIPPED	A330 A320		737	

Linefit

Retrofit  
787 AF-KL official RFC to Boeing  
777 Selection on-going



Funded by EUSPA



# SERVICE CONTINUITY

EASA SIB 2024-03

NOV 23

EGNOS ground system update (v242B1)  
Revealed non-compliance of some  
airborne receivers

FEB 24

Safety and operational impact  
under study

JUN 24+

Receiver retrofit  
expected



Ground/Board update synchronization :

Early communication needed to anticipate impact on avionics and operations



# OTHERS

## OTHER EXPECTATIONS

- Global SBAS
  - Africa : ANGA entry into service ASAP
  - South America : support deployment studies
- GNSS Perturbations is a general concern
  - DFMC / EGNOS V3
- CAT 3 : Need GBAS CAT 3
  - SBAS and GBAS complementary, not opponents



# CONCLUSION

- SBAS is a key enabler for PBN
- Air France-KLM group go for SBAS
- Equipping aircraft is still not easy
  - Business case
  - Cockpit integration
  - Availability
- GNSS perturbations in a PBN context





**THANK YOU**

