



SBAS-ASECNA Programme Status

EGNOS Annual Workshop

”SBAS in the world” agenda item

3-4 October 2017

Athens, Greece

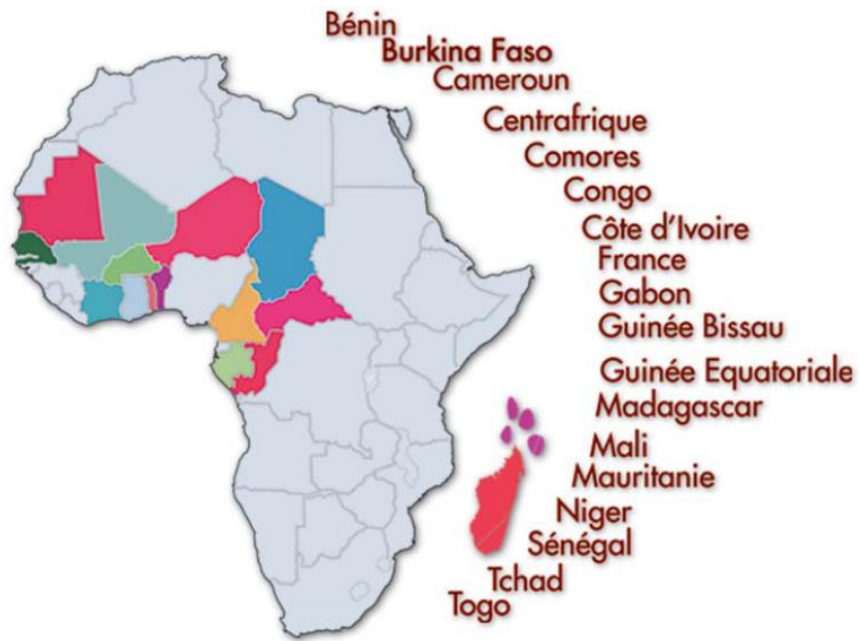
ASECNA at a glance



Agency for Air Navigation
Safety in Africa
and Madagascar



Benin, Burkina Faso, Cameroun, Centrafrique, Congo, Côte d'Ivoire, France, Gabon, Guinée Bissau, Guinée Equatoriale, Madagascar, Mali, Mauritanie, Niger, Sénégal, Tchad, Togo, Union des Comores



Cooperative management of a Single Sky of 16,1 millions km²
(1,5 * Europe)

SBAS-ASECNA genesis & history

2003-06

- AFI GNSS/EGNOS test bed

2005

- Resolution taken by ASECNA Member States on GNSS, including EGNOS/GALILEO, service implementation in ASECNA

2005-06

- ISA feasibility studies

2007

- Deployment of Nouakchott RIMS (EGNOS)

2007

- Cooperation agreement between ASECNA and European Space Agency on EGNOS services

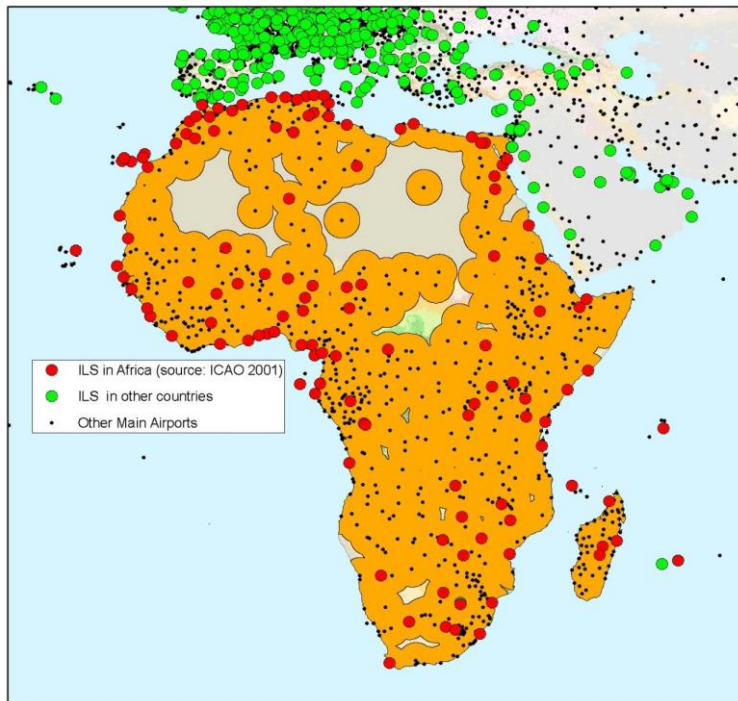
2011-16

- Resolution taken by ASECNA Member States on ASECNA involvement in the EGNOS/GALILEO introduction in Africa
- Preliminary feasibility study on SBAS-ASECNA + R&D activities
- SAGAIE network exploitation & related iono studies
- Signature of the ASECNA-EU international agreement

2017

- **Mandate of Mohamed Moussa => Accelerate and extend the provision of SBAS services as a key enabler of the SAS**

SBAS-ASECNA services



Safety lessons learned

% of runways ends ILS equipped

IATA forecasting 2013-17 CAGR : 5,3%



Need for RNP APCH APV
(ASBU Block 0 essential element)



LNAV/VNAV (Baro) (short-term)
LPV/LP (SBAS) (medium-term)



SBAS-ASECNA services

SBAS-ASECNA services

- Key enabler of Single African Sky
- Enhancement of PBN and ADS-B operations
- Benefits much more important than in any other part of the world
- For approach services
 - Effective solutions for CAT-I operations
 - Significant and sustainable improvement of flight efficiency and safety in the very large numbers of runway ends not served by ILS today
 - Service continuity during ILS maintenance and renewal periods
 - Overcome of the known safety and operational limitations of the technical constraints of LNAV/VNAV operations
- Not requiring any local ground infrastructure and staff

SBAS-ASECNA strategic directions

- **Strategic vision:**
 - Prepare the future and strengthen the positioning of the Agency as an added-value services provider and as the reference instrument of the African Union for air navigation safety
- **Directions:**
 - Ownership of the SBAS infrastructure
 - Control of SiS and autonomous provision of SBAS services to end users
 - Potential for SBAS services outside ASECNA area
 - Accelerate the development of SBAS in the whole African continent in cooperation with the African Union
- **Service provision objectives:**
 - En-route, terminal and approach PBN operations
 - Support to ADS-B operations

SBAS-ASECNA strategic directions

CAT-I equivalent services
« everywhere every time »

enabled by ILS + SBAS ... + GBAS (tentative)

Main driver

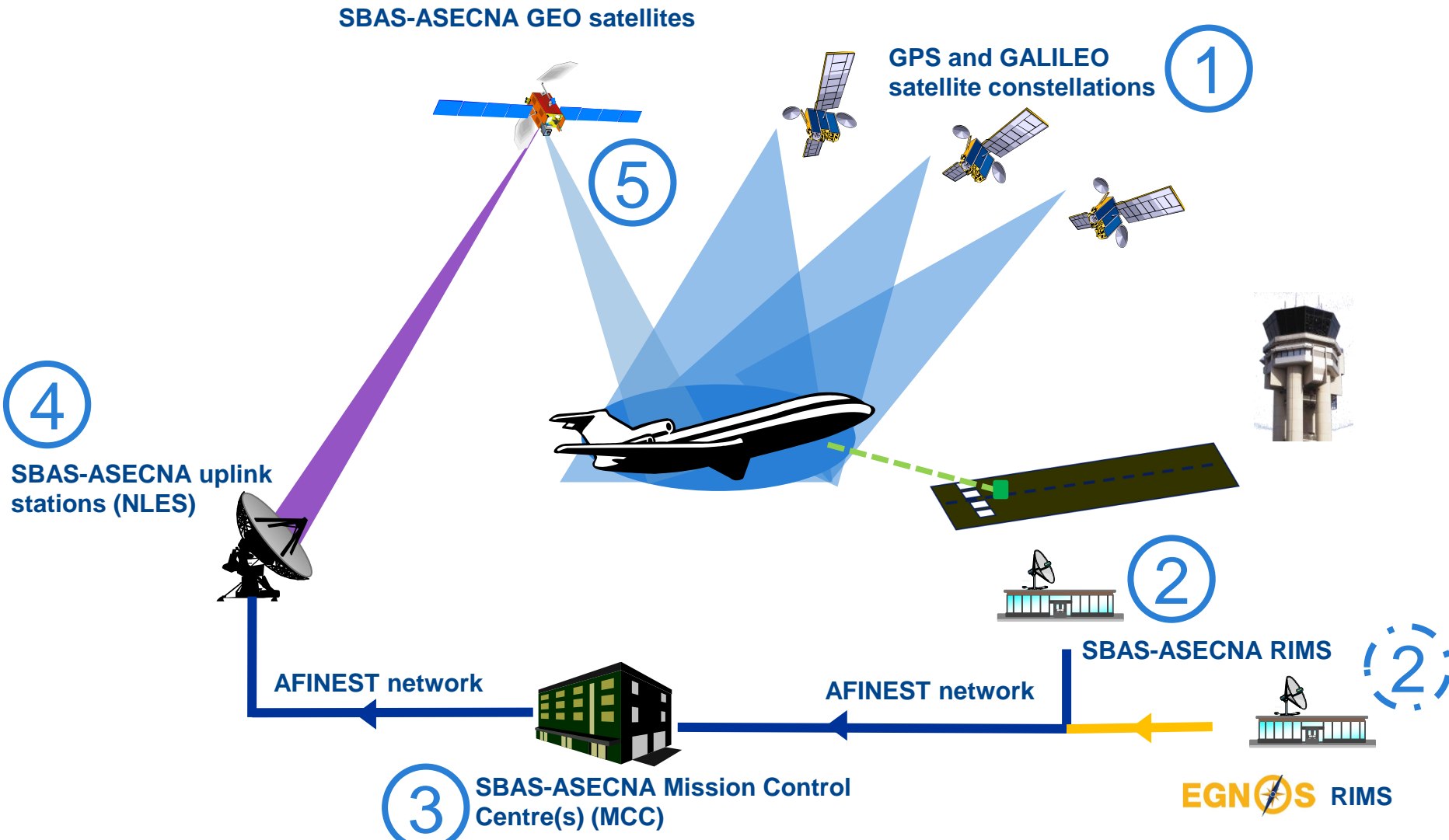
- **Timeframes:**
 - **Step 1:** **Early SBAS services (L1) from 2021/2022**
=> Service levels: APV, CAT-I ...
 - **Step 2:** **Full SBAS services (DFMC) beyond the horizon 2028/30**
=> Service levels: CAT-I autoland ...

Open service to be also provided for non-aviation applications

SBAS-ASECNA users

- Benefits of SBAS today acknowledged by airspace users
 - Flight safety benefits
 - Flight efficiency benefits
- « Best capable - best served »
- Positive worldwide tendency:
 - Most of the new aircraft models offer or are planning to offer SBAS capability
 - Most of the aircraft expected to be SBAS capable in 2025
- Upcoming dialogue with ASECNA-airspace users to support the integration of SBAS in their navigation strategy

SBAS-ASECNA architecture concept

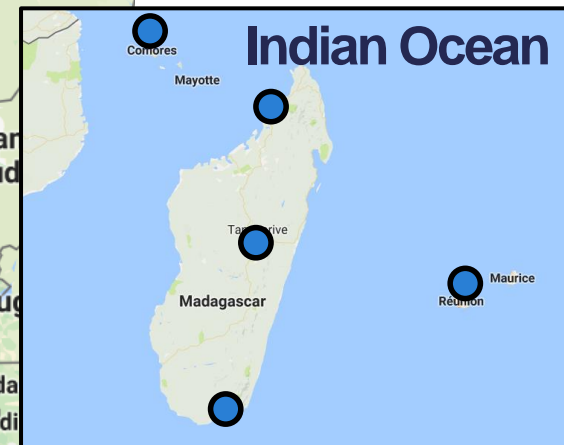


SBAS-ASECNA architecture concept



(only)
indicative
infrastructure
locations

-  SBAS-ASECNA RIMS
-  SBAS-ASECNA MCCs
-  EGNOS RIMS



Western & Central Africa

R&D: MAGNIFIC

HORIZON 2020

- Flight campaign the week of 21st November 2016
- Route Dakar-Lomé at night with ASECNA ATR42-300 to collect GPS and Galileo data



- Evaluate ionosphere impact in GNSS signals during an equatorial flight at night
- Characterise Galileo performances for aeronautical user
- Share experience with potential users (ASKY)

- First time in Africa an aircraft can be positioned using only Galileo signal. And second time worldwide!

R&D: MAGNIFIC

HORIZON 2020

- Procedures designed and flown by ASECNA and PildoLabs (using PildoLabs Platero platform). Signal generation by Thales Alenia Space.
- Decision Height improved compared to LNAV (250 ft vs. ~400 ft) at both runway ends
- Asky pilots feedback extremely positive: SBAS can change their day to day safety.



Early services: phase B

- **Preliminary Architecture Definition Study**
- **Objectives:**
 - Define the incremental/evolution path for Early Services with the best architecture options, taking into consideration:
 - coverage * performances, benefits / costs (CAPEX/OPEX) ... => supported by CBA
 - expendability and upgradability towards DFMC
 - Prepare and provide a clear view on the implementation phase (C/D) including detailed development/implementation and evolution plans for Early Services, and a transition plan towards Full Services
- **Partners:**
 - Agence Française de Développement (AFD)
 - European Commission (EC), European GNSS Agency (GSA)
 - French Space Agency (CNES)

EGNOS in Africa Support Programme

Executed by the JPO, a pan-African entity to coordinate and support harmonised SBAS/EGNOS development and services provision in Africa

- Implementing measure of the Africa-EU Strategic Partnership
- Phase 2016-17 (funded by EU and ASECNA): to accelerate the adoption of SBAS/EGNOS in Africa
- Regional modular approach foreseen:
 - Northern (**M1**),
 - West-Central (**M2**),
 - Eastern Africa (**M3**),
 - Southern (**M4**)
- Status: on-going consultations with RECs for the creation of modules



THANK YOU FOR YOUR ATTENTION



Julien Lapie - Technical Advisor to the Director of Air Navigation Operations