Satellite Navigation Programme Update (EGNOS)

EGNOS Service Provision Workshop
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Copenhagen
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ASECNA at a glance

- Member States
ASECNA at a glance

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

Africa-EU Strategic Partnership: a widespread multilateral political support to satellite navigation in Africa

- 3rd Partnership: Regional Economic Integration, Trade and Infrastructure - Second Action Plan (2011-2013) adopted by the Africa and EU Heads of State and Government at the 3rd Africa-EU Summit (November 2010) - Satellite Navigation as a priority

- Recommendations of the 5th Africa-EU Business Forum (March 2014)

- 'Roadmap 2014-2017' adopted by African and EU Heads of State at the 4th Africa-EU Summit (April 2014) - Commitment to provide sustainable and adequate financial and human resources, and establish governance and financing schemes, for the deployment EGNOS in Africa
Policy background

ASECNA policy framework

2005

- Resolution n°2005 CM 44-11 taken by Member States:
  - Requests the strengthening of the ASECNA-ESA technical cooperation for the implementation of EGNOS in Africa
  - Asks for the support of European institutions to benefit from the deployment of EGNOS/GALILEO to meet the ASECNA operational needs

2011

- Mandate of the Director General:
  - Programme « Renewal of the Agency »: strategic direction for the use of innovative and enabling technologies, including the extended use of satellite navigation services over the African Continent
Policy background

ASECNA policy framework

- **Resolution n° 2011 CA 120-18 taken by Member States**
  - Supports the involvement of the Agency in the implementation of EGNOS/GALILEO satellite navigation services
  - Requests the Director General to continue proceedings with the relevant European Organisations for the effective participation of the Agency in the initiatives aiming at deploying EGNOS/GALILEO over the AFI Region

- **ASECNA satellite navigation programme (EGNOS/GALILEO)**
Operational needs

37% of Africa is 250 km away from ILS equipped airport:
- main international airports
- only one runway end

87% of Africa is 250 km away from a main or regional airport

IATA forecasting 2013-17 CAGR : 5,3%

ASECNA strategic directions

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

Need for RNP APCH APV : 

Safety lessons learned
Strategic directions

• **Vision:**
  - Prepare the future
  - Anticipate and manage of a major technological leap, leading to a sound change in the nature of services and of their model of governance due to their global character
  - Strengthen the positioning of the Agency as an added-value services provider, in an increasing competitive environment

• **Strategy:**
  - A progressive step-by-step approach with programmatic decision points
  - Seeking for quick wins and early benefits with pioneer services
  - Incremental implementation:
    • Services levels - coverage and performances, infrastructure etc.
    • Expendability and upgradability towards future EGNOS technology evolutions
    • Gradual transformation of jobs and competencies
Objectives

- **Pursuing:**
  - Ownership of the infrastructure
  - Control and provision of Signal in Space (SiS)
  - Provision of services to end users

- **Objectives:**
  - **Step 1:** Provision of *Early* EGNOS-based services (LPV/LP, L1) by 2019/20
  - **Step 2:** Provision of *Full* EGNOS-based services (LPV/LP, L1/L5) by 2023 onwards
Towards early services

- Past activities in cooperation with ESA:

  - AFI GNSS/EGNOS Test-Bed
  - ISA Feasibility Studies
  - ASECNA-ESA cooperation agreement
    Extension of the EGNOS operational services across the Africa region, Galileo services and additional elements in Africa
  - Nouackchott RIMS deployment
Towards early services

- ASECNA Programme

Preliminary feasibility study

Ionosphere characterisation
SAGAIE & MONITOR II

COM network characterisation
GEO Survey

Preliminary architecture definition study

+ R&D projects: SIRAJ, ACCEPTA, MAGNIFIC …
Towards early services

SAGAIE & MONITOR II Stations
Towards early services

• Preliminary Architecture Definition Study

• Objectives:
  • Define the incremental path for Step 1 with the best architecture options, taking into consideration:
    • coverage * performances, benefits / costs (CAPEX/OPEX)
    • expendability and upgradability towards future EGNOS evolutions, schedule of development of EGNOS assets etc.
    • complementarity with GBAS
  • Prepare and provide a clear view on the implementation phase (C/D) including a detailed development & implementation plan

• Technical officer: (under discussion)

• Procurement officer
Cooperation and external relations

International agreement (under negotiation)

Procurement Officer (phase B)

Cooperation (services provision)

Technical Officer (under discussion)
(System Development) & Cooperation (MONITOR, EGEP…)

Cooperation (missions)

Cooperation (SAGAIE, MONITOR…)

Synergies

Africa-EU Partnership

EGNOS Africa-JPO
ASECNA-EU international agreement

- To lay down the terms and conditions for the provision of SBAS services in ASECNA based on the European Satellite Navigation Programme EGNOS
- In accordance with Article 218 of the Treaty on the Functioning of the European Union (TFEU)
- Opening of negotiations authorised by the Council of EU (25-26/09/14)
- Negotiations, launched on 3 March 2015 in Dakar, progressing satisfactorily
EGNOS-Africa Joint Programme Office

JPO role as a Pan-African GNSS/EGNOS coordinating entity

- Part of the institutional framework to ensure harmonized, safe and efficient SBAS/EGNOS services in Africa
- A core Capacity building Team for Africa
EGNOS-Africa Joint Programme Office

EGNOS implementation in Africa - ‘Modules’ creation

• Can now support all types of applications for future programmes related to GNSS/EGNOS in Africa

• Developed ‘GNSS/EGNOS services implementation roadmap’, a comprehensive strategy document based on a ‘Module’ concept which provides to the Stakeholders, the necessary guidelines to address EGNOS deployment in Africa

• The modular concept as recommended in the Roadmap will drive EGNOS implementation in Africa

• It is elaborated based on the regional cooperation framework through the RECs and with due consideration of on-going initiatives (ASECNA, MEDA, RSA)
EGNOS-Africa Joint Programme Office

EGNOS implementation in Africa - ‘Modules’ creation

- Four modules have been recommended for Africa:
  - Northern (M1),
  - West-Central (M2),
  - Eastern Africa (M3),
  - Southern (M4)

- Status: initial consultations RECs on-going for the modules
## Proposed EGNOS services for Africa

<table>
<thead>
<tr>
<th>EGNOS v2 L1 services</th>
<th>Date</th>
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<tbody>
<tr>
<td>Open Service GPS</td>
<td>2020</td>
</tr>
<tr>
<td>Safety of Life NPA GPS</td>
<td>2021</td>
</tr>
<tr>
<td>Safety of Life NPA+APV1+LPV200 GPS</td>
<td>2023</td>
</tr>
</tbody>
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<table>
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<tr>
<th>EGNOS v3 DFMC services</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>Open Service GPS, GPS+GALILEO</td>
<td>2025</td>
</tr>
<tr>
<td>Safety of Life NPA GPS, GPS+GALILEO</td>
<td>2026</td>
</tr>
<tr>
<td>Safety of Life NPA+APV1+LPV200 GPS, GPS+GALILEO</td>
<td>By 2028</td>
</tr>
<tr>
<td>Safety of Life Maritime</td>
<td>TBD</td>
</tr>
<tr>
<td>EDAS services</td>
<td>TBD</td>
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EGNOS-Africa Joint Programme Office

Potential applications in non-Aviation

- Surveying, Mapping and GIS
  - To benefit the 90% unsurveyed rural land in Africa
  - To enable acquisition of fundamental and specific geospatial datasets
- Agriculture
  - Agriculture is a priority in Africa Economy agenda
  - Optimizing mechanised system will further support the mechanisation trend
- Maritime/Road/Rail
  - To complement vessel maritime applications and cost effective and safe vessel navigation solutions for inland waterways
  - To enable road regulation and usage control, vehicle e-tolling solutions
  - To provide cost effective alternatives for train control and signaling, rail track surveying
  - To support the development of a multimodal transport system, as per NEPAD ‘fully connected African Continent’ concept
THANK YOU FOR YOUR ATTENTION

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