I. Overall benefits

II. Benefits by application
   I. Aviation
   II. Rail
   III. Agriculture
   IV. Survey/Mapping
   V. Maritime
   VI. Other domains
I. Overall benefits (1/2)

Aviation:
- Less CFIT (Controlled Flight Into Terrain)
- ADS-B improvement
- Traditional navaids replacement
- Less DDC (Delays, Diversion, Cancellations)

Rail: Cost savings due to reduced maintenance of signalling equipment

Agriculture: Reduction of inputs and yield increase

Cartography: Cost effective solution where high-accuracy low-cost service is desired

Maritime: Support to navigation both in Open seas and in In-land waterways

Other applications (e.g., road, LBS) are expected to foster Africa’s economic development
I. Overall benefits (2/2)

**PRELIMINARY FIGURES**

**EGNOS in Africa cumulative discounted net benefits** (2011-41)

<table>
<thead>
<tr>
<th>Category</th>
<th>Value (€m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation</td>
<td>211</td>
</tr>
<tr>
<td>Rail</td>
<td>268</td>
</tr>
<tr>
<td>Agri</td>
<td>186**</td>
</tr>
<tr>
<td>Survey/Map</td>
<td>24</td>
</tr>
<tr>
<td>Maritime</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>705</td>
</tr>
</tbody>
</table>

Benefits of other applications (e.g., road, LBS) still to be preliminarily quantified

*Discount rate: 8%; **Only selected SSA countries
I. Overall benefits

II. Benefits by application
   I. Aviation
   II. Rail
   III. Agriculture
   IV. Survey/ Mapping
   V. Maritime
   VI. Other domains
<table>
<thead>
<tr>
<th>Benefit</th>
<th>EGNOS added value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidents reduction</td>
<td>Improved safety of flights through reduction of CFIT</td>
</tr>
<tr>
<td></td>
<td>(Controlled Flight Into Terrain)</td>
</tr>
<tr>
<td>ADS-B improvement</td>
<td>Better route optimization by improving ADS-B</td>
</tr>
<tr>
<td></td>
<td>(Automatic Dependent Surveillance-Broadcast)</td>
</tr>
<tr>
<td>Navaids reduction</td>
<td>Costs reduction due to phasing out of some navaids</td>
</tr>
<tr>
<td></td>
<td>(VOR and NDB)</td>
</tr>
<tr>
<td>Decision height reduction</td>
<td>Less Delays, Diversions and Cancellations (DDC)</td>
</tr>
<tr>
<td></td>
<td>occurrence in African airports</td>
</tr>
</tbody>
</table>
EGNOS in Africa cumulative undiscounted net benefits on a 30 years timeframe for the aviation industry (2011-41)

Millions of Euro

- Cumulative undiscounted benefits: 1,670
- Equipage investments: 1,180
- Procedures investments: 311
- Infrastructure capex: 171
- Infrastructure opex: 136
- Cumulative undiscounted net benefits: 1,311

Discounted* net benefits: 211.1€m for aviation

* With a 8% discount rate
### Current situation

- African railway network is **poor, mostly single line and with low traffic**
- The **costs** of classical **safety** measures are extremely **high**
- **Command-control systems are expensive** and cannot normally be justified for railway of low traffic density

### EGNOS benefits

- EGNOS in Africa could lead to **a decrease in maintenance and investments costs** and an increase in capacity or availability of the infrastructure,
- In a low traffic network as in Africa, EGNOS could allow for **strong costs savings in signaling equipment**
II.III. Agriculture (1/2)

- High precision agriculture at a low cost
- Reduction of environmental impact through lower use of pesticides and fertilizers

<table>
<thead>
<tr>
<th>Activity</th>
<th>Soil preparation</th>
<th>First Treatments</th>
<th>Seeding</th>
<th>Treatment after planting</th>
<th>Harvesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>For each cultivation</td>
<td>Primary tillage</td>
<td>Secondary tillage</td>
<td>Fertilizer application</td>
<td>Seeding</td>
<td>Plant protection products application and fertilizers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Harvesting</td>
</tr>
<tr>
<td>EGNOS impact on cultivations</td>
<td>2.36%</td>
<td>2.36%</td>
<td>2.49%-3.55%</td>
<td>0-3.55%</td>
<td>0-2.36%</td>
</tr>
</tbody>
</table>

AGRICULTURE
II.IV. Survey/ Mapping

- EGNOS in Africa could be used in **cartography applications** were a meter accuracy is considered enough

- In **cadastral applications**, SBAS has some potential especially in rural parcels surveying

- In the **energy sector**, routine surveying and maintenance tasks can be performed with EGNOS, relying on a high-accuracy low-cost service
II.V. Maritime

- River Information Systems (RIS) **could be used for the African rivers/ basins**, also leveraging on EGNOS integrity and accuracy to support traffic- and transport management.

- EGNOS can **provide navigation support services** to precisely guide small ships from port entrance to an assigned moorage place.

- The embryonic market of **Personal Location Beacons** can exploit EGNOS high accuracy.
II.VI. Other domains

- Reduced transport time
- More effective logistics
- More effective emergency management
- Vehicle tracking (esp. in case of theft)

- Pedestrian navigation
- Location-based advertising
- Real-time info on local public transport