



# EGNOS: a satellite navigation system for Europe, and an opportunity for South Africa!

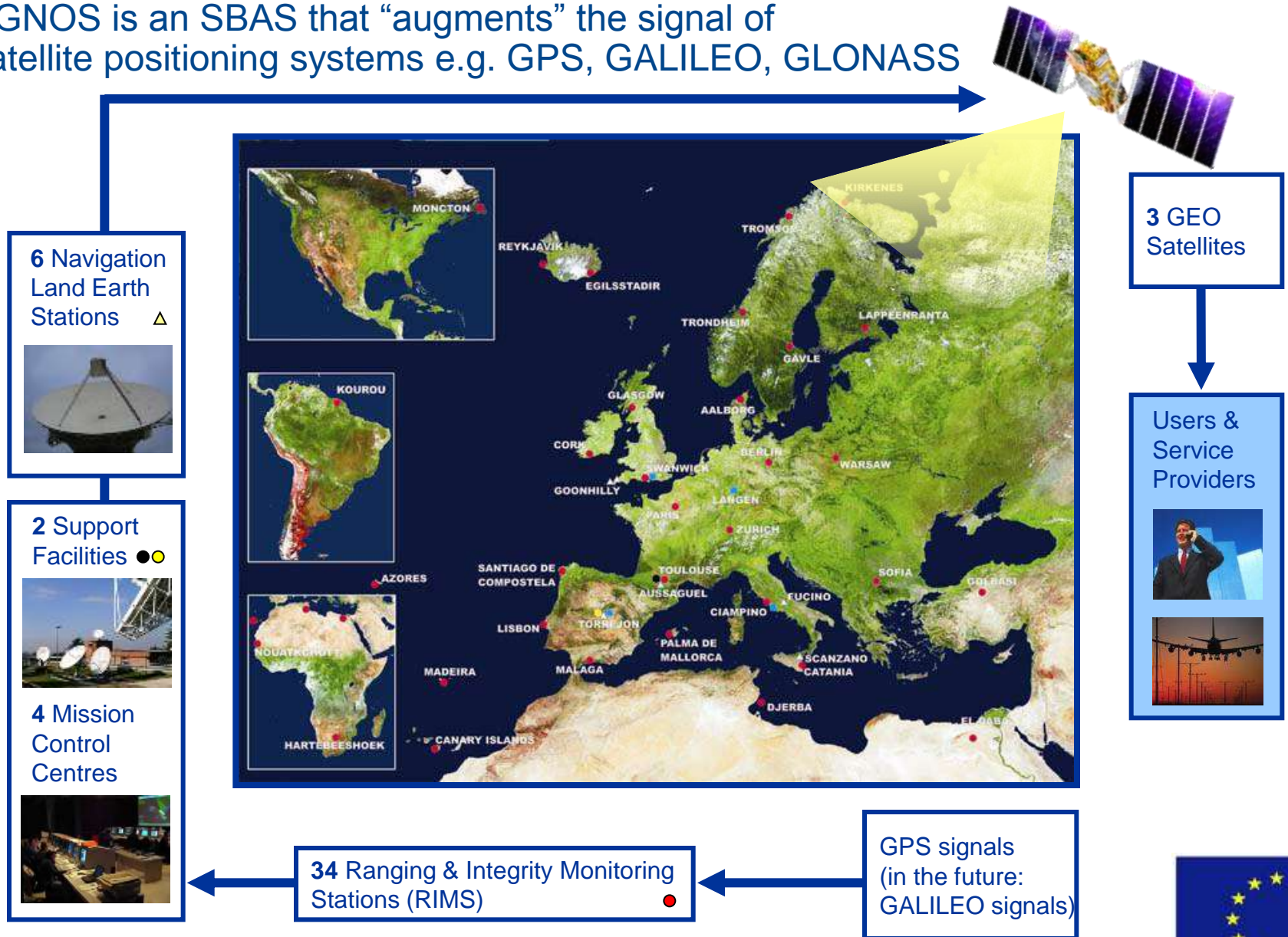
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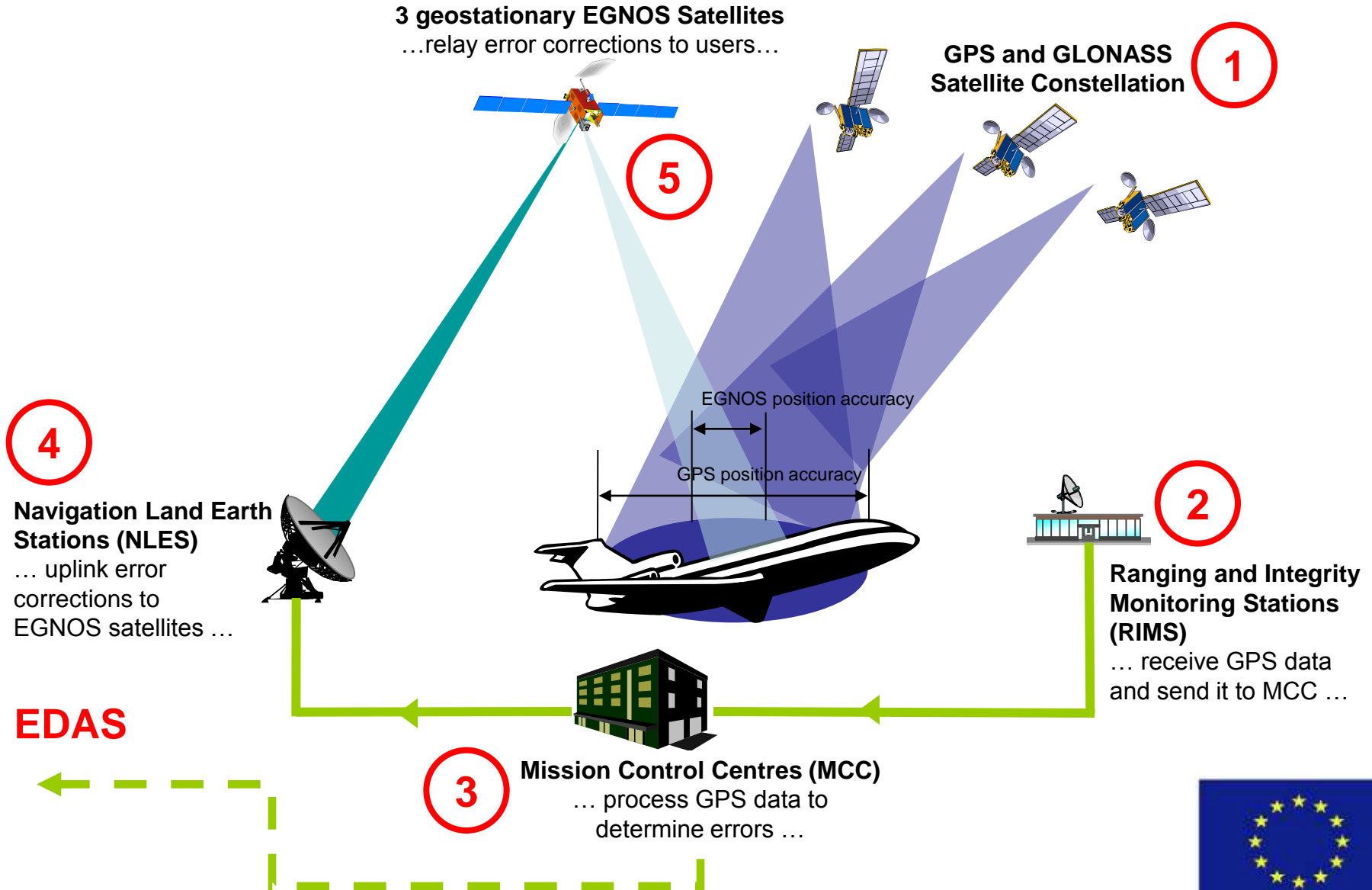


# EGNOS System Architecture

EGNOS is an SBAS that “augments” the signal of satellite positioning systems e.g. GPS, GALILEO, GLONASS



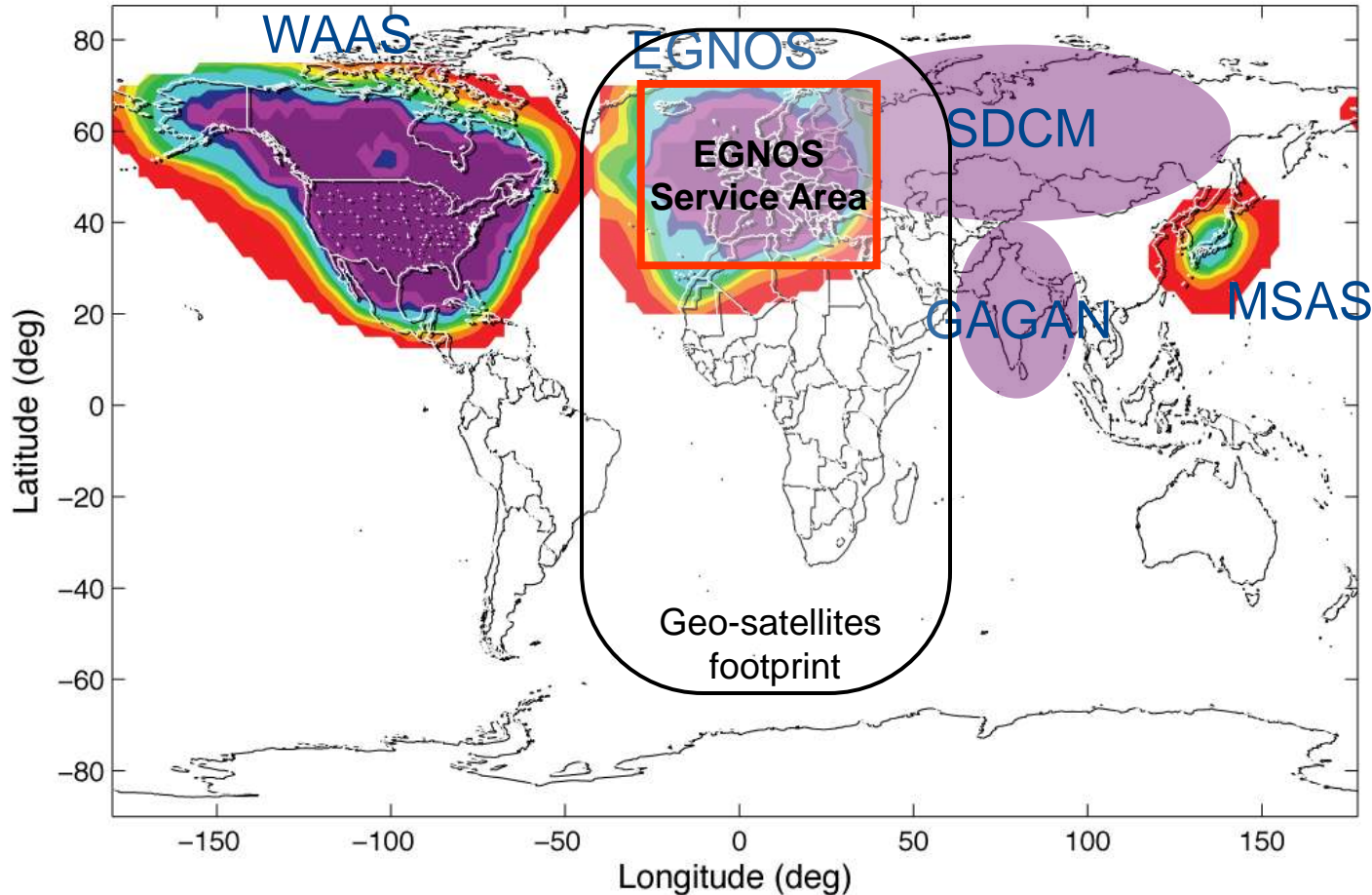
# EGNOS System Architecture





# Towards a worldwide SBAS coverage

Availability as a function of user location



- Bilateral EU-US forward looking initiative

- Multilateral (UN) developments (ICG)

- ICAO endorsement



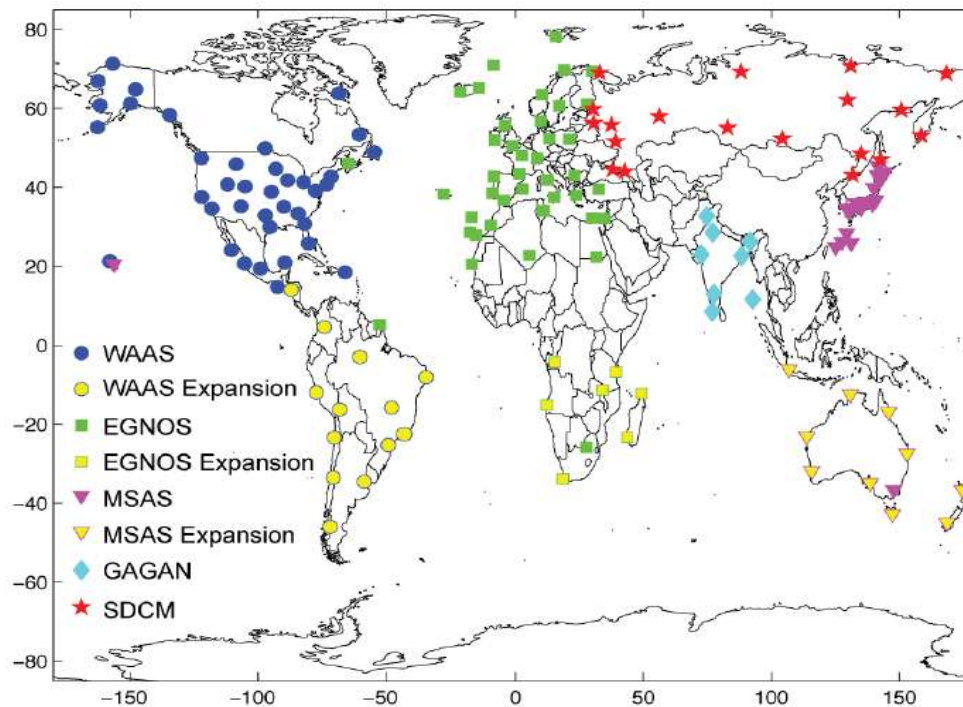
< 50% > 50% > 75% > 85% > 90% > 95% > 99% > 99.5% > 99.9%  
Availability with VAL = 35, HAL = 40, Coverage(99%) = 7.54%

Source: Stanford University



# Potential further coverage

## Expanded Networks






- Service coverage could be extended through deployment of sole **ground** infrastructure, sharing **space** segments of the existing systems
- **Less stations** will be needed as SBAS technology evolves (see EGNOS V3)

(\*) source: FAA (US). Location of ground stations is only indicative



EGNOS will deliver its services on a very long-term basis

Service	Characteristics	Service Status	
<b>Open Service</b>	accuracy ~1m, free of charge	available since October 2009	
<b>Safety of Life Service</b>	accuracy ~1m, free of charge compliant to aviation standards (integrity)	available since March 2011	
<b>Commercial Service (EDAS)</b>	accuracy <1m, corrections provided by terrestrial networks	betatest service since 2008 service to be made available in 2011	

# Benefits of SBAS in Africa

- The economic **opening-up of airports and isolated regions**, by making regional airports currently not equipped with the traditional aid instruments (ILS, VOR, DME) accessible to national, intercontinental, and intra-continental flights
- Facilitated **exchanges with Europe**, through the harmonisation of operational flight procedures between African countries and the rest of the world
- Savings on **investments at local level**, by reducing drastically the need and maintenance costs of ILS-type ground facilities in the airports
- **Safer, cheaper, eco-friendly** guidance during airport approaches
- Positive and very substantial repercussions in other sectors, such as the **railways, inland waterways, agriculture** and the **territory planning**
- Reduction of costs and greater reactivity for **humanitarian interventions**

SABS in Africa brings benefits for various economic sectors. Total **Net Present Value** of over **500€m** over the 2012-2042 (30 years) period

# A stepwise signal corrections delivery

Technical Implementation can follow an **incremental, modular** approach

- Coverage of Mediterranean area and the North Africa (ongoing) *CURRENT*
  - Ground stations of EGNOS in Tunisia, Egypt, Algeria, Mauritania, and Morocco
  
- APV-I services in Southern Africa *SHORT TERM*
  - Work in progress
- NPA coverage of the entire African continent\*
  
- APV-I coverage of Africa *LONGER TERM*

(\* ) Upon planned MSG (Message) 27 modification, EGNOS NPA coverage will already extend over Africa to 20 degrees South



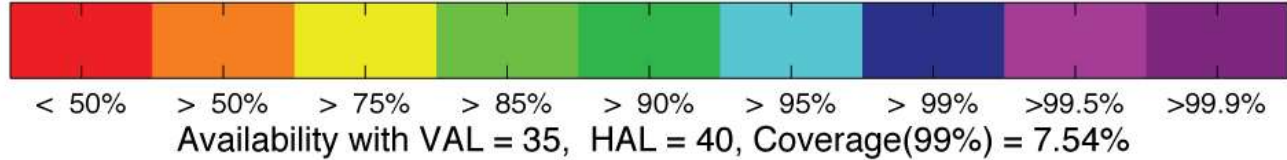
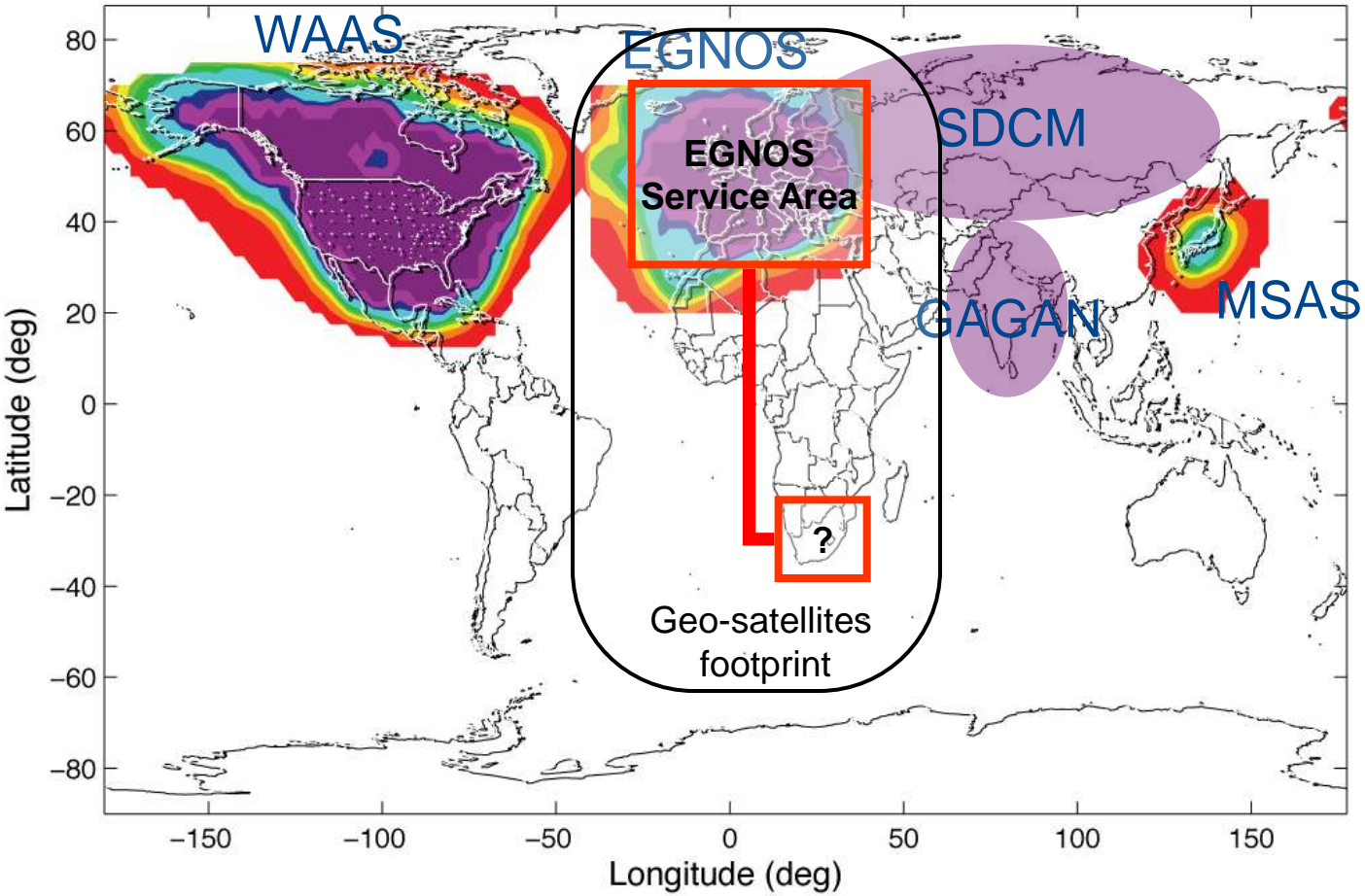


# From signal delivery to full service provision

- Stepwise and modular approach to deployment with some countries (eg RSA) or regional organisations (eg ASECNA) as precursors
- Financing capital and operational expenditure
- Certification process
- Liability principle
- Participation in governance
- Local service provision
- Regional (Suddern Africa) issues

# The RSA actor towards world-wide SBAS coverage?

Availability as a function of user location



Work in progress:

- ESESA
- «EGNOS and Africa» EU-AU Initiative

Source: Stanford University





Thank you for your attention

**Michel Bosco**  
**European Commission**  
<http://www.satellite-navigation.eu/>

