ESESA EGNOS Service Extension to South Africa

# EU-South Africa Space Cooperation


## ESESA Aviation Workshop 26th – 27th October 2010

ESESA is a project co-funded by the EU 7th FP and South Africa

# South Africa and Europe: Partners in space

- Operating as part of CNES S-band network since 1984
  - ✓ Tracked Ariane 4 launches from Guyana
  - ✓ Tracks French LEO and GEO satellites for transfer orbit and operations
  - ✓ Tracks Mini and Micro missions
  - ✓ Tracks ESA spacecraft
- Receiving data from European EO satellites
- Hosting European ground infrastructure for space missions
- Collaborating in the EC Frame Program in earth observation and navigation

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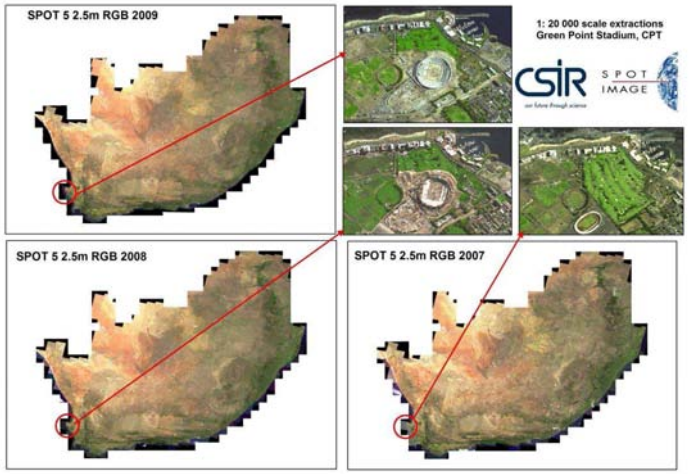
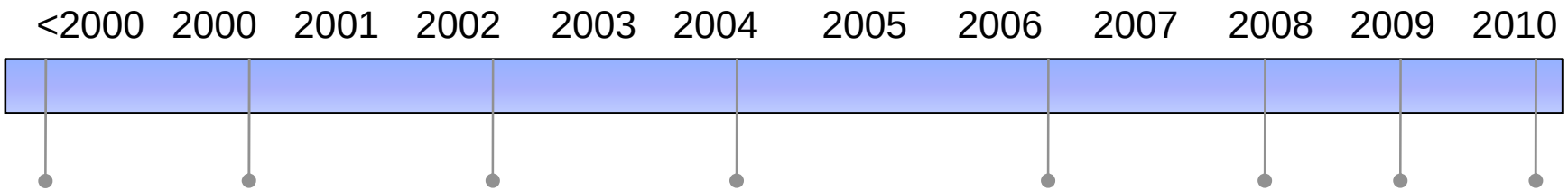
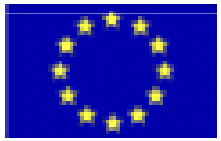


# Hosted Equipment timeline



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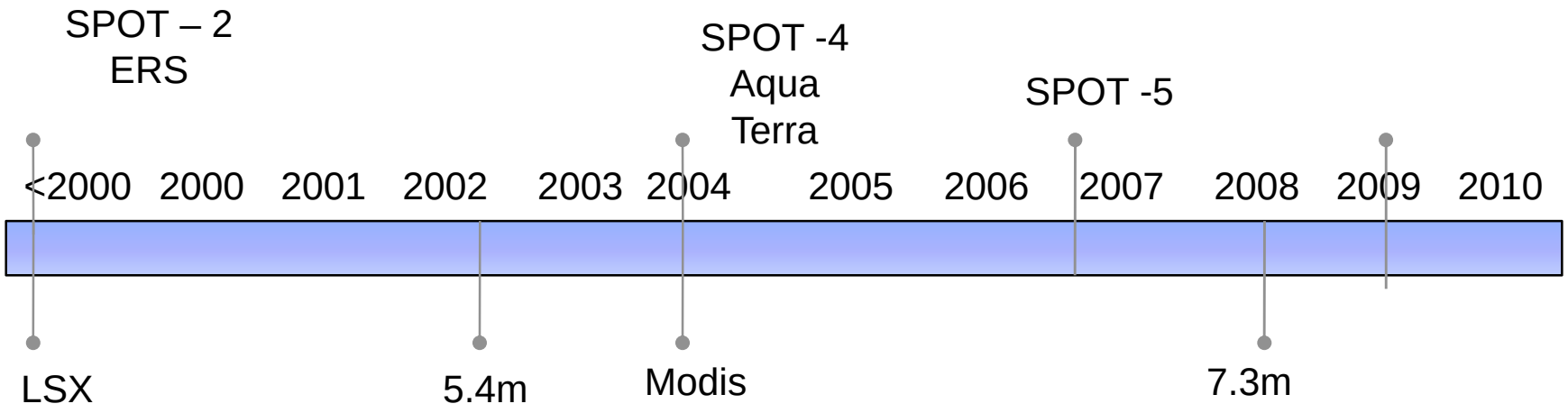
# EO reception timeline




# EU South Africa Dialogue

- Started due to bilateral in February 2009
- Followed up in:
  - ✓ June 2009 Brussels
  - ✓ November 2009 Pretoria
  - ✓ July 2009 Brussels
  - ✓ November 2010
    - DST to meet EU at highest level and report back on progress
- Themes:
  - ✓ Earth observation: GMES Africa
  - ✓ Space Science: Astronomy
  - ✓ Navigation: EGNOS Extension
- DG Enterprise in EC want South Africa to commit through DG level letter.
- DST want to have DoT involved before committing to the system

# Overview of current ‘landscape’

- Space activities in South Africa
  - ✓ Space Policy: the DTI (Trade and Industry)
  - ✓ Space Strategy: DST (Science and Technology)
- The National Space Strategy:
  - ✓ Environmental & Resource Management,
  - ✓ Health, Safety & Security, and
  - ✓ Innovation and Economic Growth.
- CSIR
  - SAC
  - NRE
  - Meraka
- Astronomy
  - SAAO
  - HartRao
  - SKA
- HMO
- Sunspace
- ISSA
- TEI’s

# Migration to South African National Space **Agency**

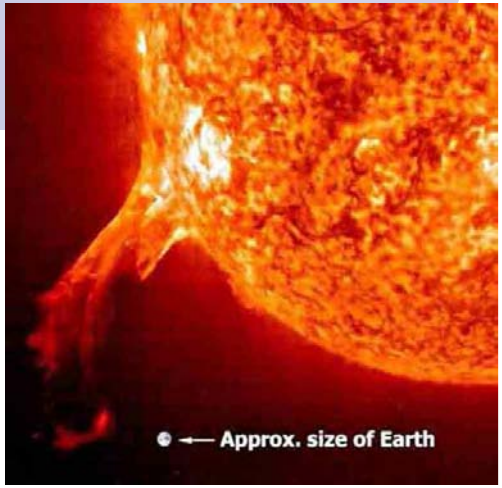
- Space Themes:
  - ✓ Earth Observation
  - ✓ Space Science
  - ✓ Communication
  - ✓ Navigation

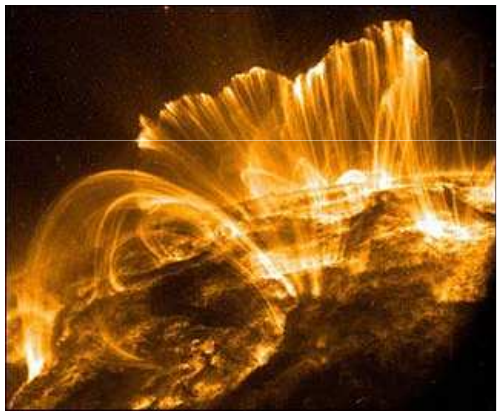
- Proposed Centres
  - ✓ Earth Observation Centre
  - ✓ Space Operations Centre
    - ✓ TT&C
    - ✓ Navigation
  - ✓ Space Engineering Centre
  - ✓ Space Science Centre

# Earth Observation (EO)

- Operations
- Advanced RS Technology
  - ✓ SAR
  - ✓ Image Processing
  - ✓ Infrastructure
  - ✓ Classifications
  - ✓ Geomorphology
  - ✓ Impact Projects
- Examples:
  - ✓ Dwelling inventory
  - ✓ Land use classification

# Space Science



- Space weather
  - ✓ Electric power is modern society's cornerstone technology on which virtually all other infrastructures and services depend," the report notes. Yet it is particularly vulnerable to bad space weather. Ground currents induced during geomagnetic storms can actually melt the copper windings of transformers at the heart of many power distribution systems. Sprawling power lines act like antennas, picking up the currents and spreading the problem over a wide area.
  - ✓ The problem is interconnectedness. In recent years, utilities have joined grids together to allow long-distance transmission of low-cost power to areas of sudden demand. It makes economic sense—but not necessarily geomagnetic sense. Interconnectedness makes the system susceptible to wide-ranging "cascade failures."

# Communication

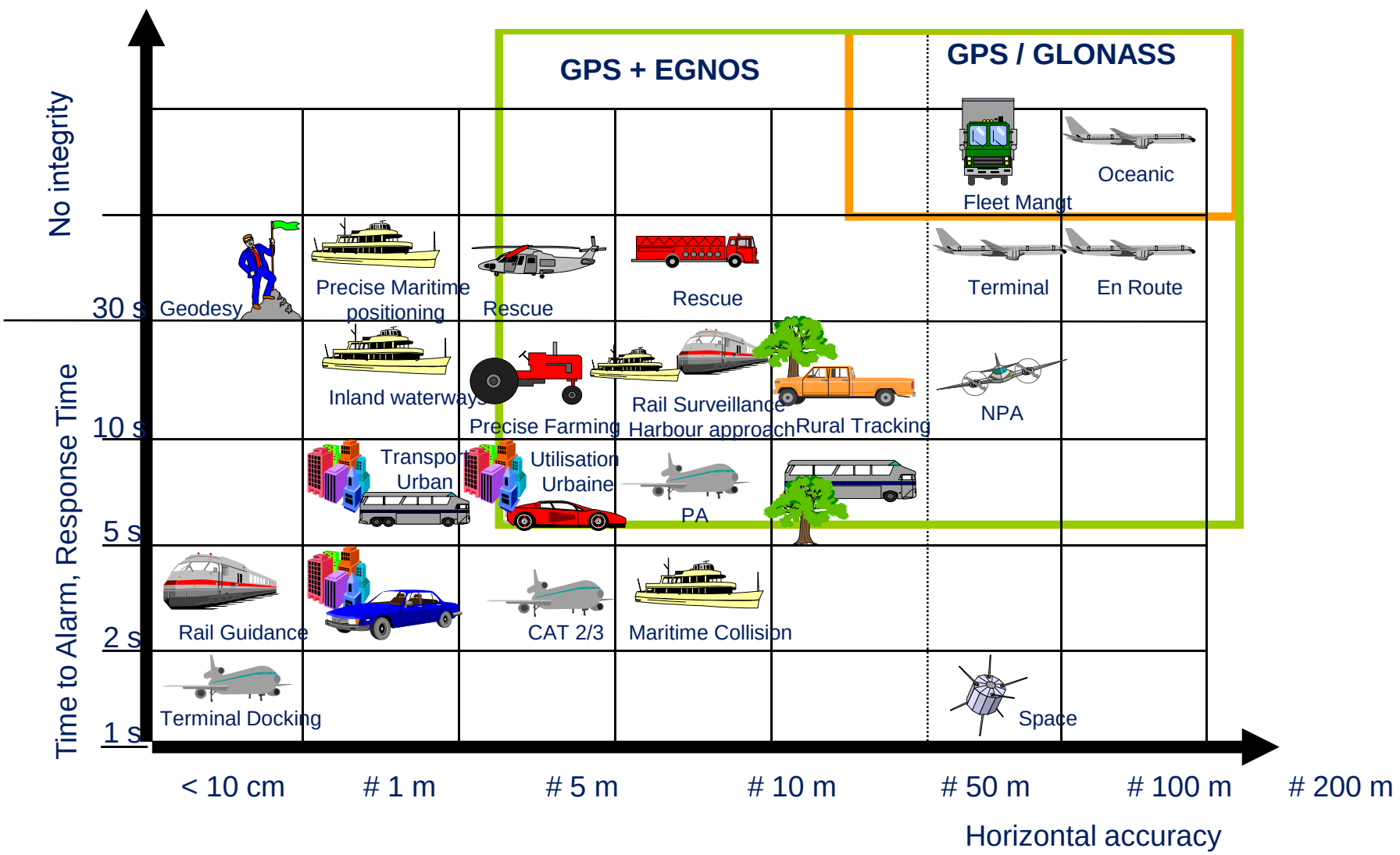
- Least developed aspect of SANSA strategy
- Current landscape:
  - ✓ Fibre
    - Rapid expansion of network in Africa
  - ✓ GSM
    - Focussed on population dense areas
  - ✓ VSAT
    - Backhaul overtaken by fibre
    - Focus on broadband ISP's
    - Value added services
    - DTH broadcast
  - ✓ Mobile satellite
    - Asset management
    - Remote access

- Strategy will focus on delivering communications to disenfranchised

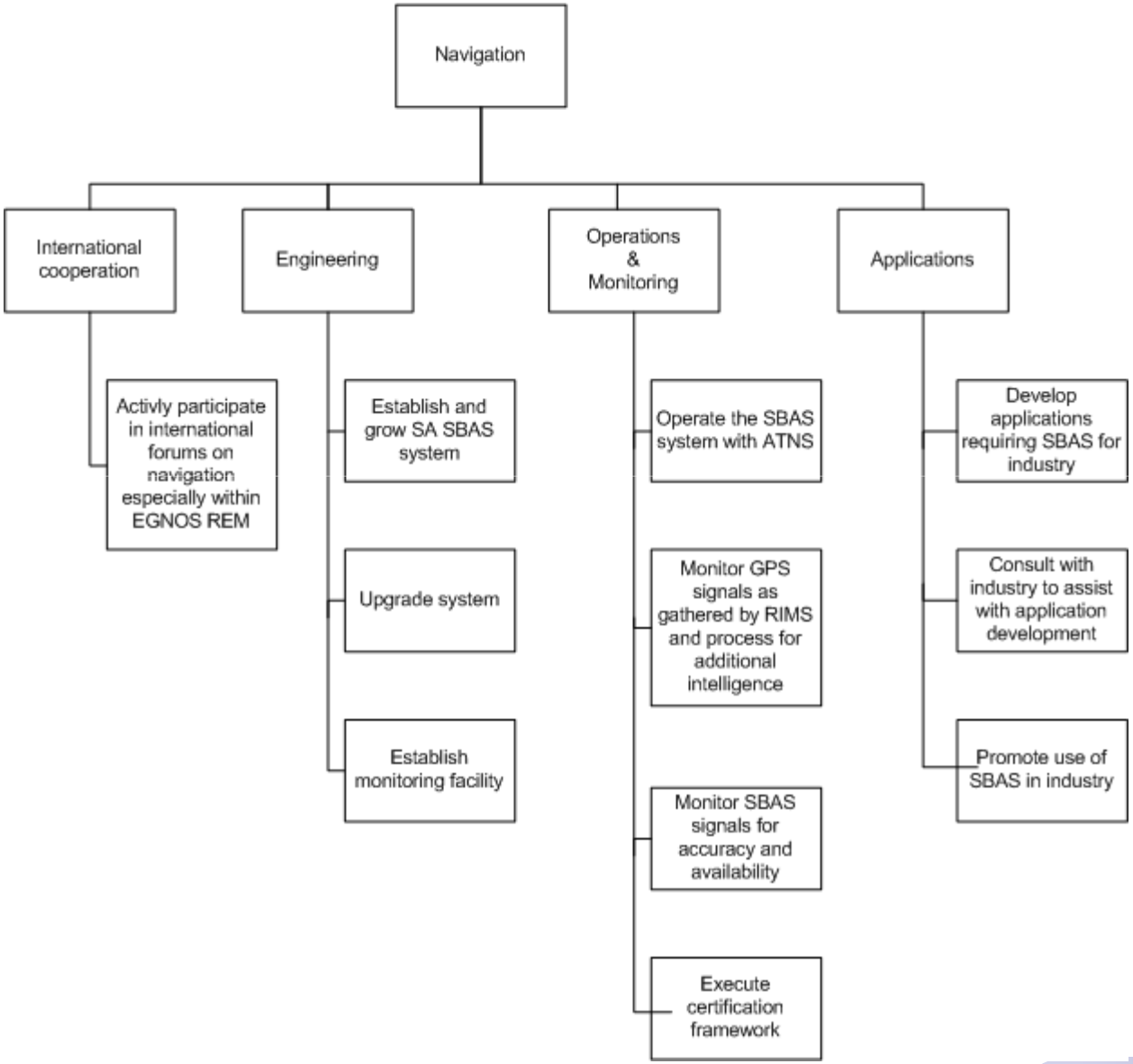
# Navigation

- EGNOS RIMS
- FP6: AFSAGA
- EU South Africa Bilateral: EGNOS extension to Southern Africa
- FP7 ESESA
- Galileo Hosting

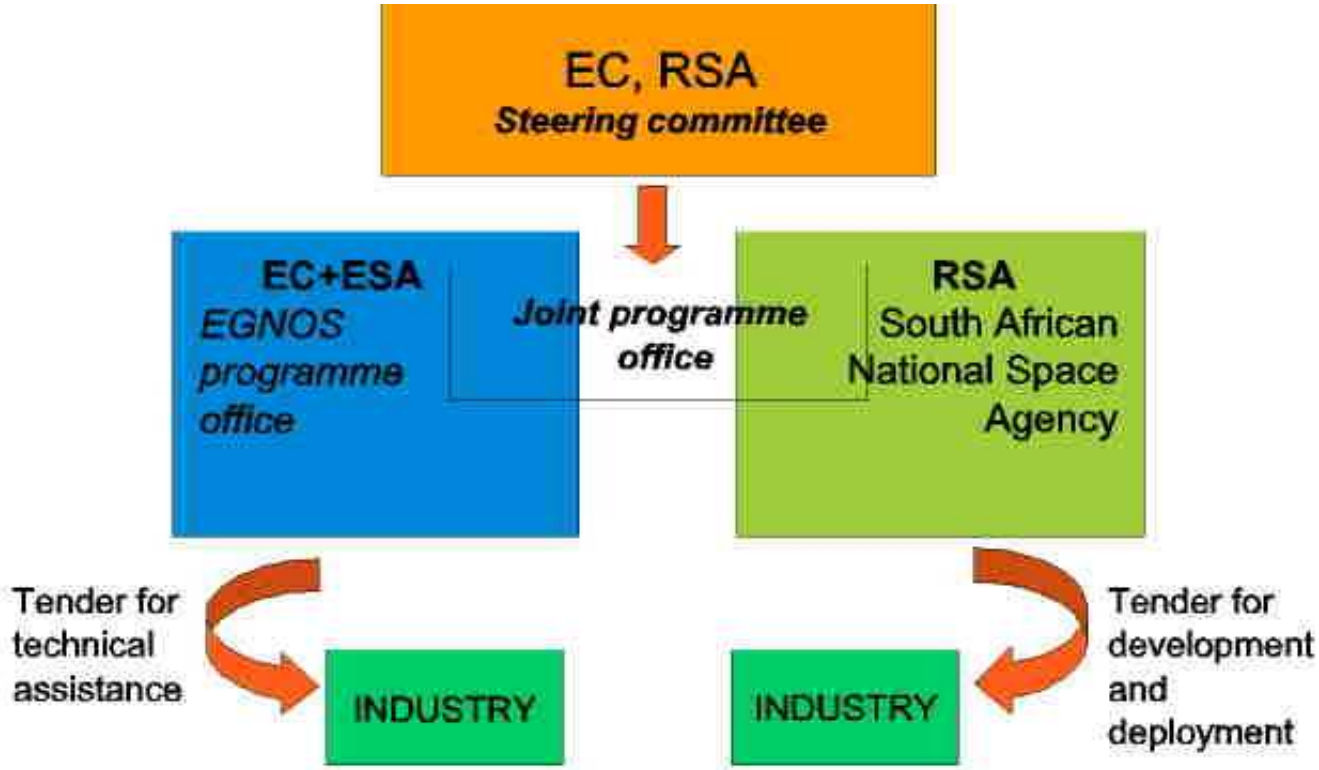
# Application space



# Navigation in Space Agency

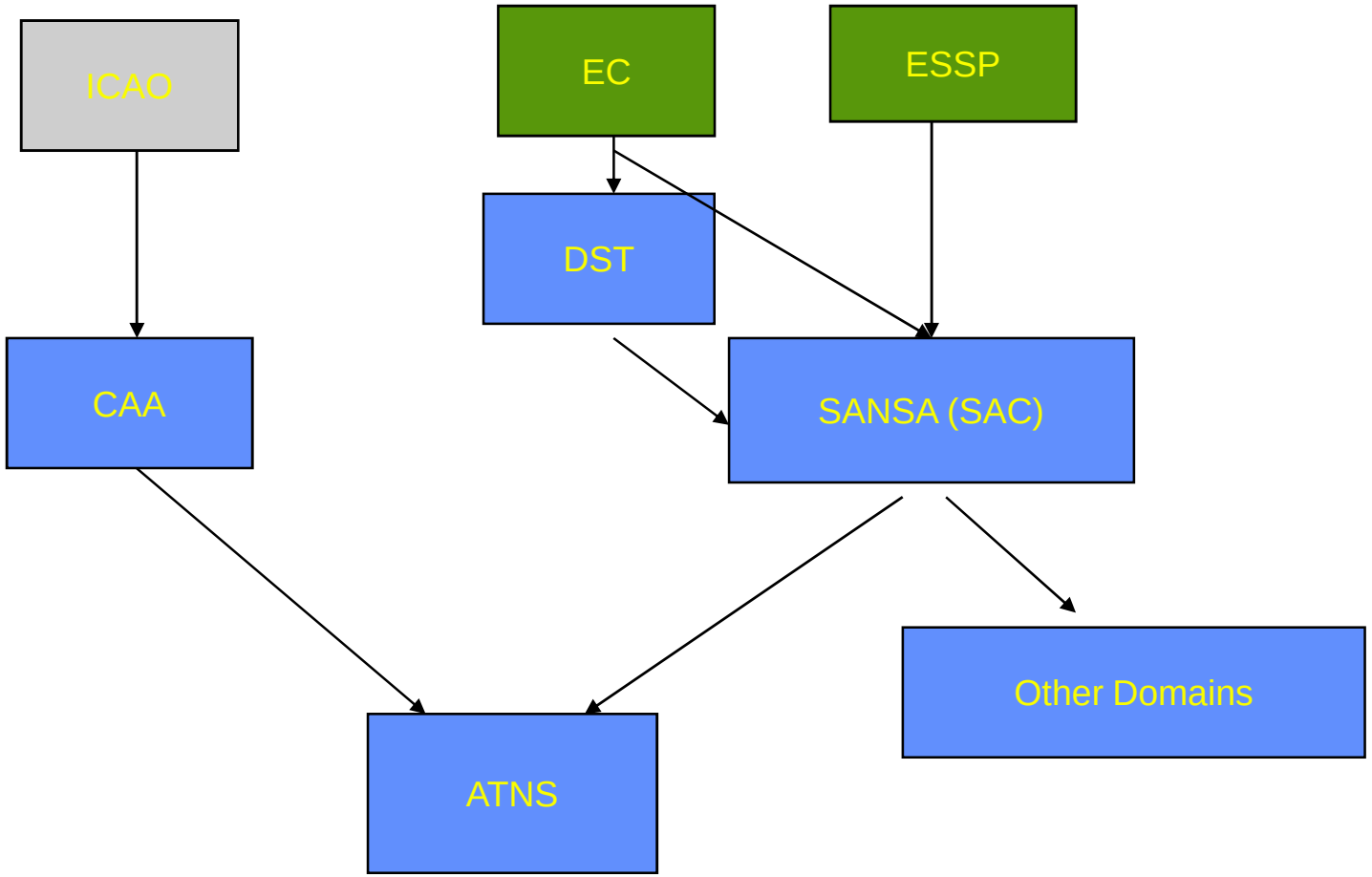


# Governance structure



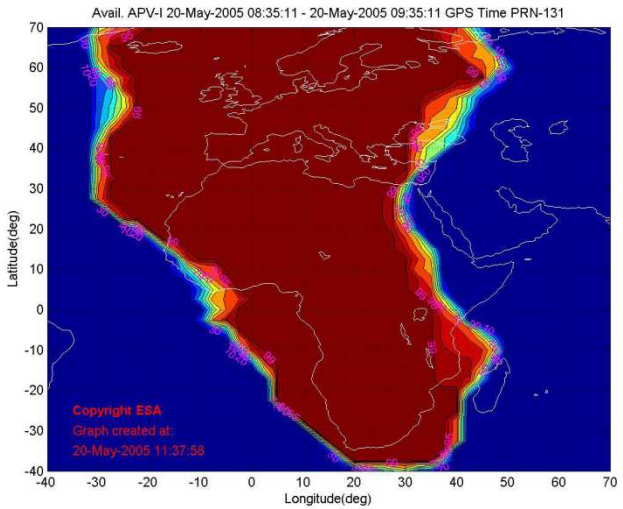

**Picture 1 – Governance scheme for the project implementation**

# Structure for SBAS in South Africa



# EGNOS prototype in Africa

- ISA: Interregional Satellite based augmentation system in Africa
- Reference stations installed in Africa (from 2002 to 2006)
- Provides corrections similar to those available in Europe
- Managed from Hönefoss, in Norway


**The EGNOS prototype success in Africa has proven technical feasibility of a fully operational system**