Argentine National Space Program

CONAE

Fernando Raúl Colomb

rcolomb@conae.gov.ar

PORSEC 2004

November 29 – December 3 2004

Concepción- Chile

CONAE-National Commission on Space Activities

- **CONAE is a specialized agency created in May 1991 to be in charge of national space activities**
- **It is now under the authority of the Ministry of Foreign Affairs, International Trade and Worship**
- **It has a Strategic Plan: the National Space Program, issued in 1995 and revised periodically, the latest version (2004-2015) is now undergoing its approval process.**

Primary Developments

International Position and Agreements

Geographic Extension

Argentina: A Space Country

Population Distribution

Level of Economic Development

Vulnerability to Natural Disasters

Associative International Cooperation

An approach entailing a set of conditions:

- **Benefits for both parties**
- **Coherence with each party´s space program**
- **No exchange of funds**
- **At the same technological level**

Agreements signed with:

Algiers, Belgium, Brazil, Canada, China, Denmark, European Space Agency, France, Germany, Italy, Ukraine, Russia, Spain, United Kingdom and United States.

Participation in International Initiatives:

UNESCO/ESA monitoring of world heritage sites

International charter ¨Space and Major Disasters¨

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The National Space Program

The Space Program particularly emphasizes the use and scope of the concept of "*Space Information Cycle*".

It comprises the set of information from space which together with information from other sources will have a relevant impact on certain socioeconomic activities within the country.

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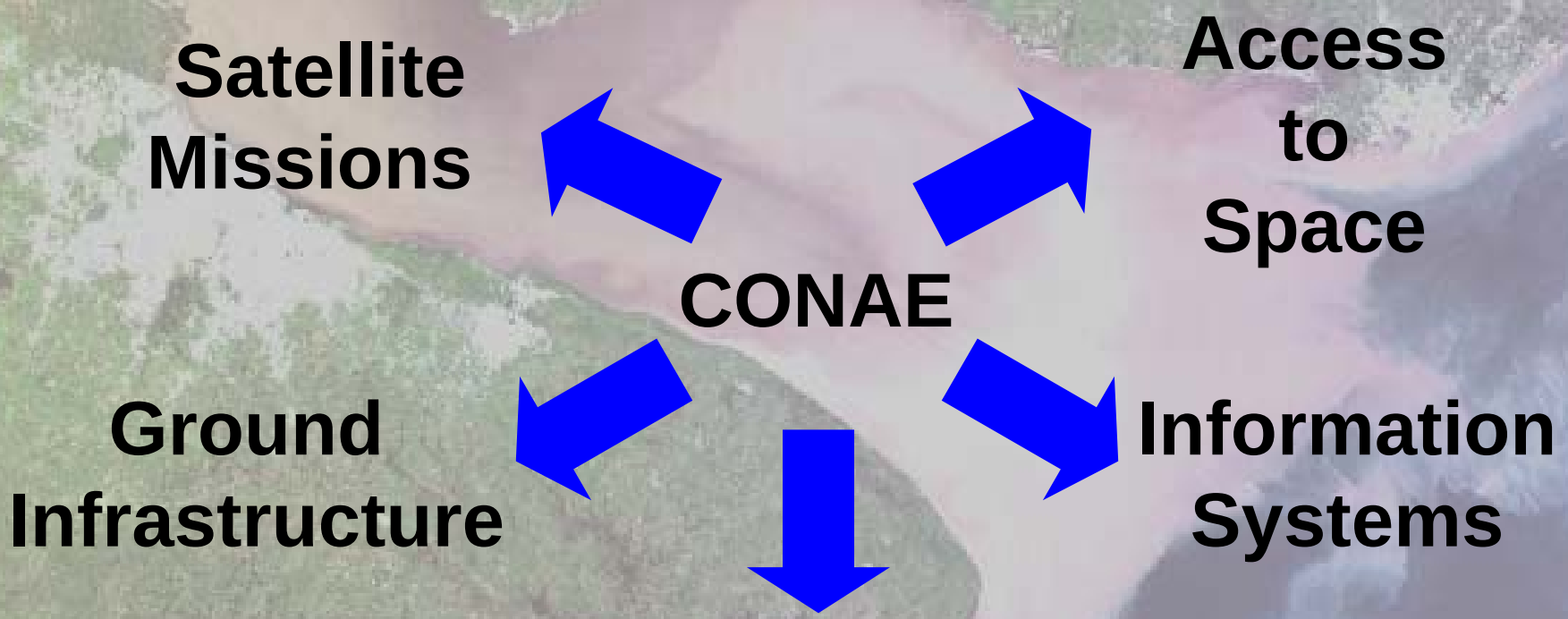
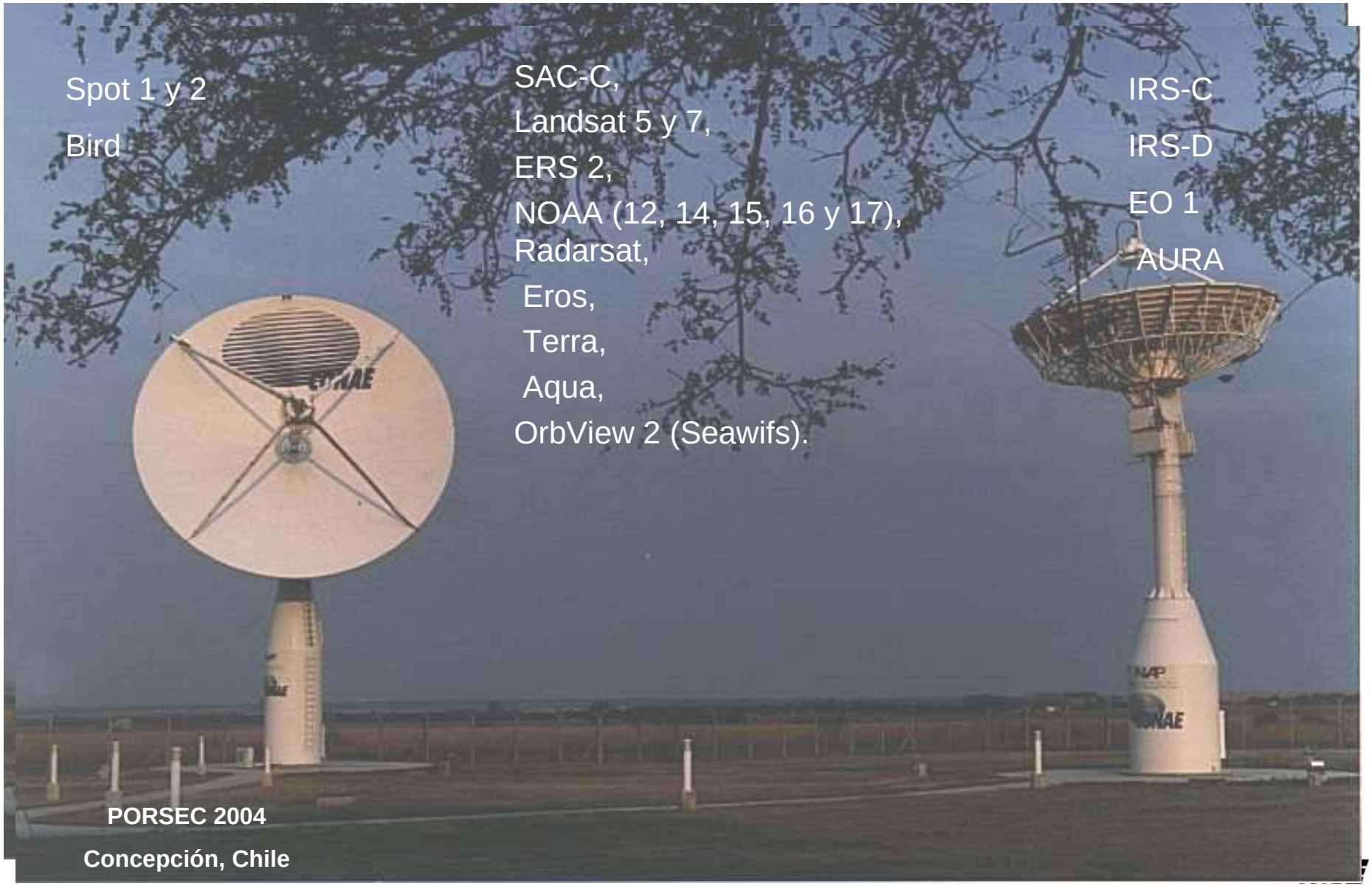
Complete Information Cycles

- **Cycle I: Information related to agricultural and livestock, fishing and forestry activities.**
- **Cycle II: Information related to hydrology, climate, sea and coasts.**
- **Cycle III: Information necessary for emergency management.**
- **Cycle IV: Information related to monitoring of the environment and natural resources.**
- **Cycle V: Information related to cartography, geology and mining production.**
- **Cycle VI: Information related to health applications.**

Courses of Action



Cordoba Ground Station



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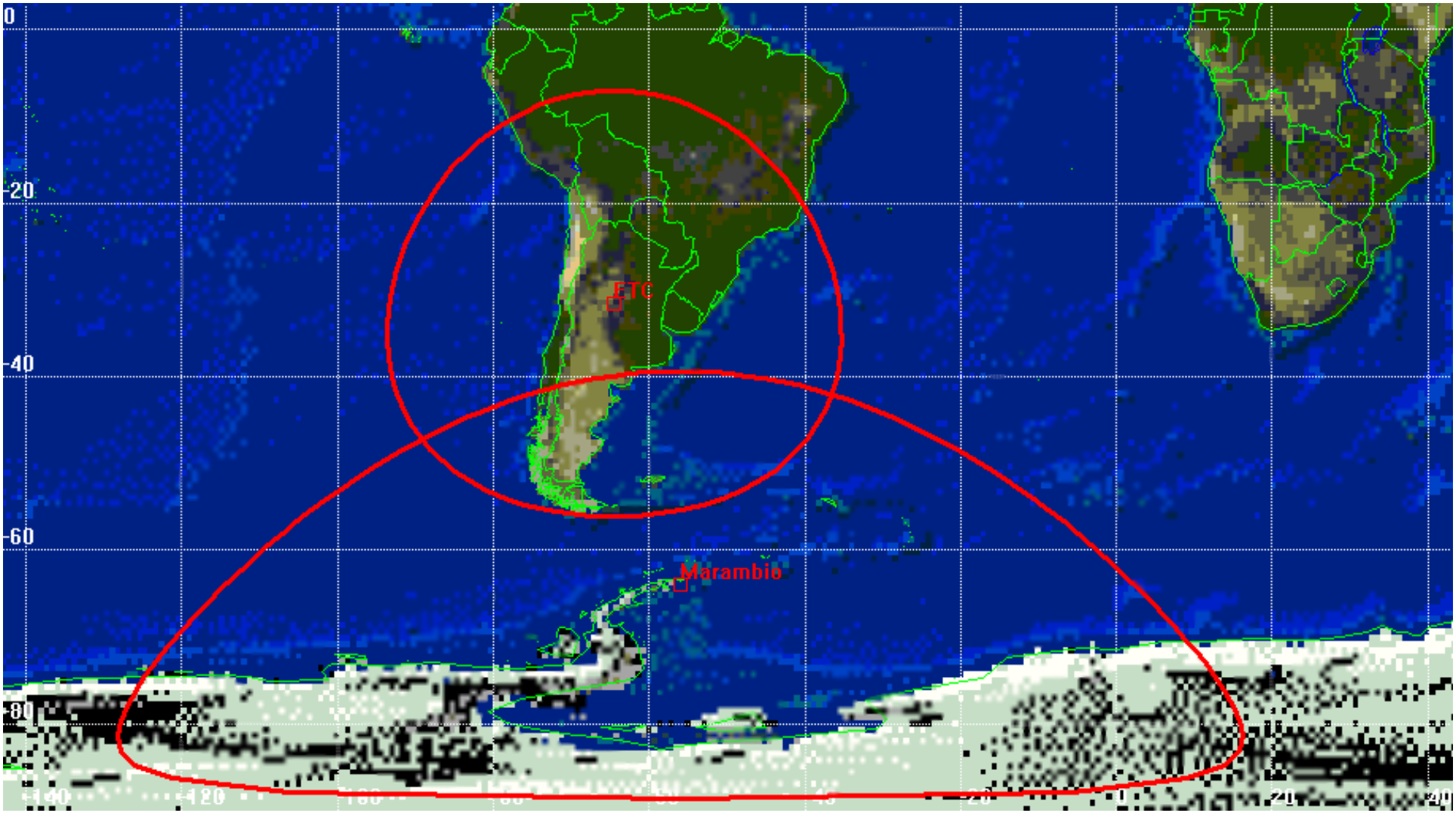
Cordoba Ground Station

- Antenna of 3.6 m for TT&C in S band
- Antenna of 7.3 m for downlink in X & S bands
- Antenna of 13 m for TT&C in S band and downlink in X band
- Two antennas in L band for NOAA & OrbView2 satellites
- Fully automatic, in 30 sec conmutes from one satellite to another
- Products in catalogue within one hour after satellite pass
- More than 20000 images distributed since its inauguration in 1997 (the first year the station worked with a DLR antenna) and more than 1000 standard products by month
- 15 Gbytes acquired daily

Footprints of the Cordoba and Antacrtica (Marambio) Ground Stations



Satellite Systems

The National Space Program provides for two satellite series, depending on the main instruments they carry on board.

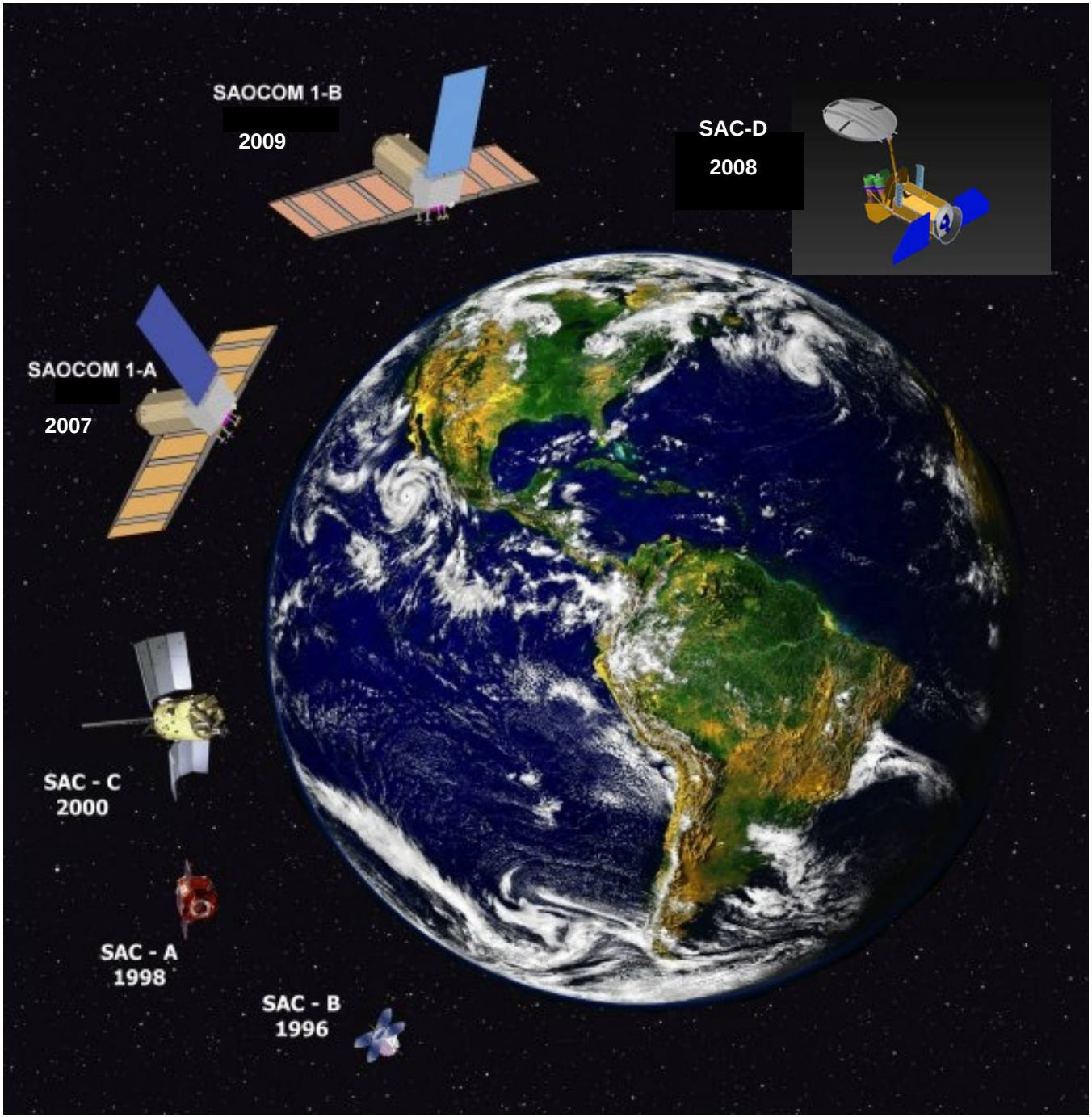
SAC Series

Instruments centered on the optical range and passive microwave range.

SAOCOM Series

Instruments centered on the active microwave range (SAR).

ARGENTINA IN SPACE



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SAC-A Argentine Satellite:

The Satellite seen from space, cloud background, part of the Arabian Peninsula and the Indian Ocean

- Differential global position system
- Magnetometer
- Remote sensing panchromatic camera
- Qualification of Solar Cells produced by CNEA
- Procedures for operation control

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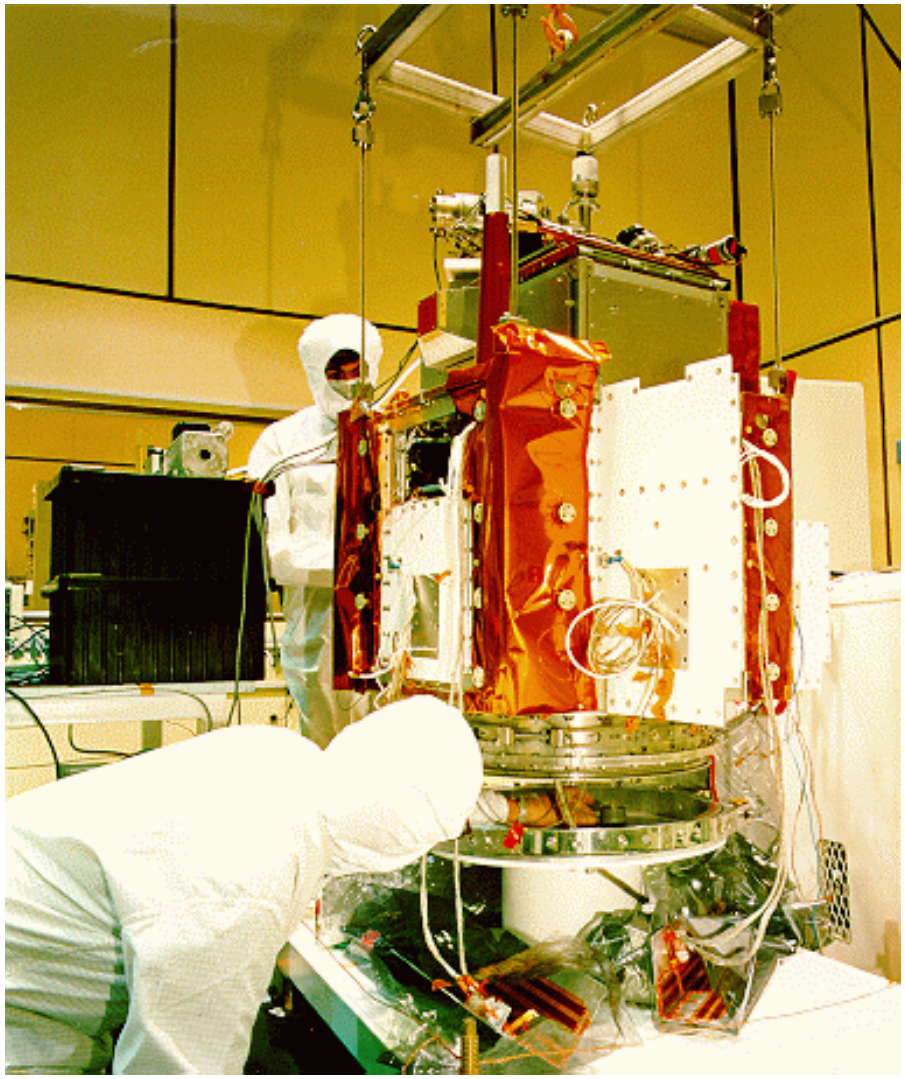
Satellite SAC-A was positioned in orbit in December 1998
from the Endeavour Space Shuttle

SAC-B Satellite

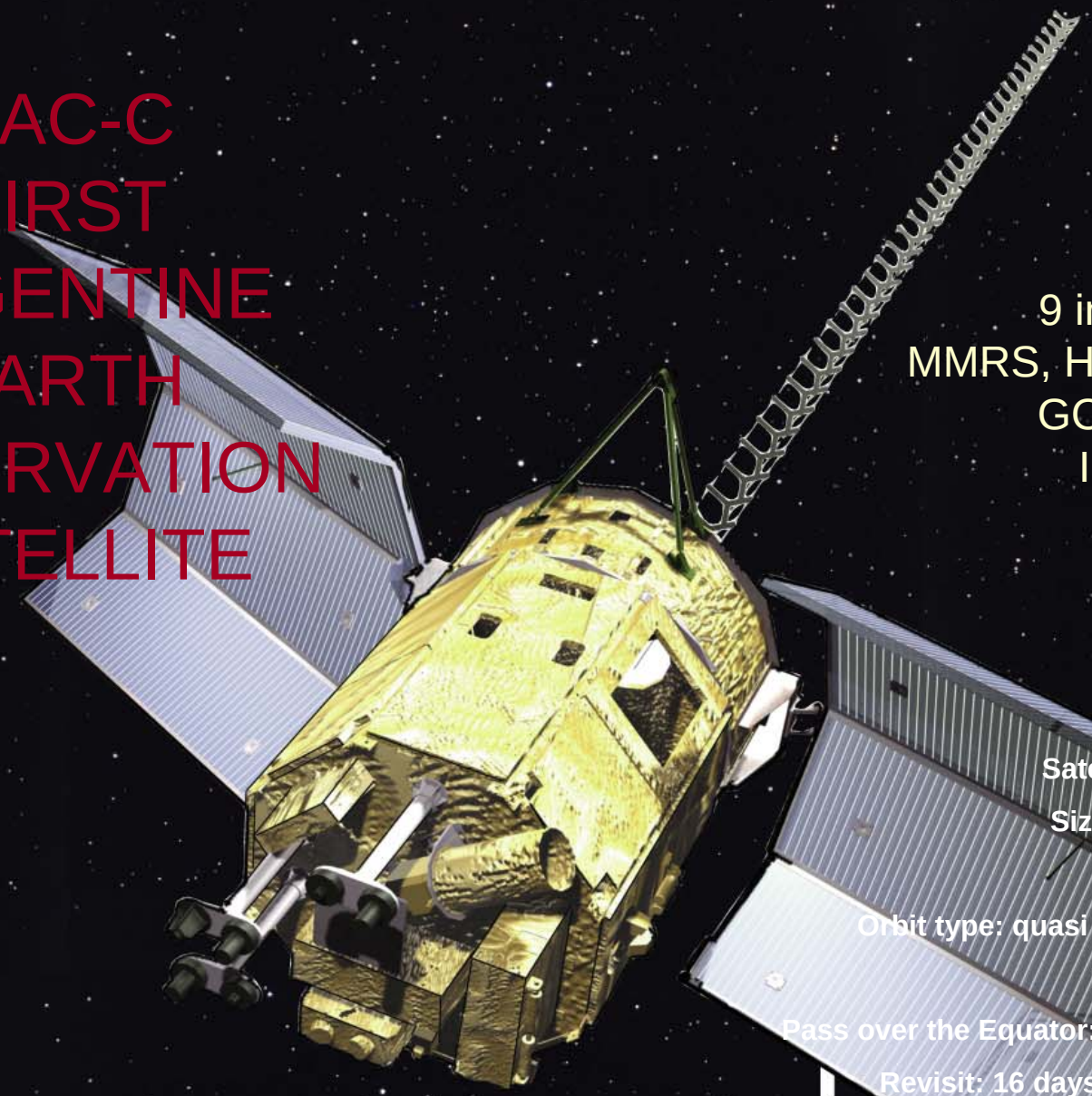
Launched in November 4, 1996, it was designed for solar and astrophysical studies.

The third Pegasus stage failed and SAC-B was not detached from HETE, the other satellite included in the dual launching



SAC-B in INVAP, Bariloche, ready to be sent to Brazil testing facilities

SAC-C FIRST ARGENTINE EARTH OBSERVATION SATELLITE



9 instruments:
MMRS, HSTC, HRTC, DCS
GOLPE, MMP
IST, INES
ICARE

Satellite weight: 475 kg

Size: 1,85 m x 1,68 m x 2,2 m

Orbit altitude: 705 km

Orbit type: quasi polar – Sun synchronous

Inclination: 98.21 degrees

Pass over the Equator: 10.15 AM (+/- 6 minutes)

Revisit: 16 days, with 7-9 days subcycles

Launched on November 21, 2000

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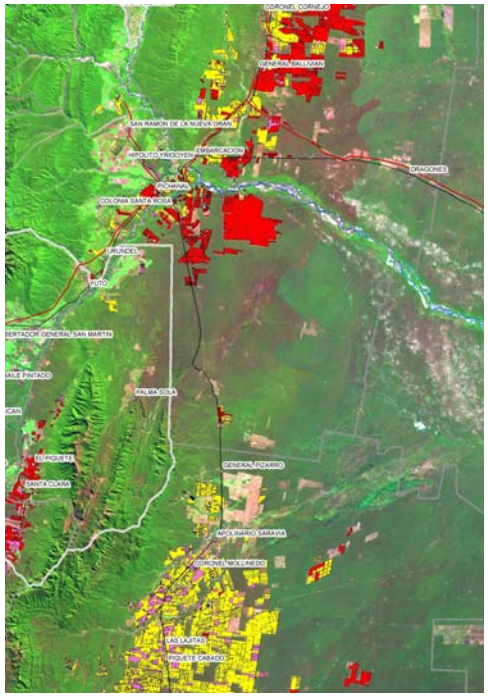
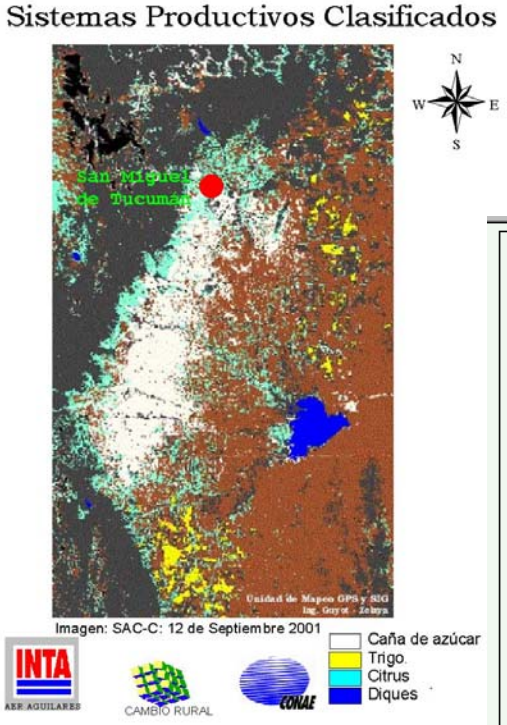
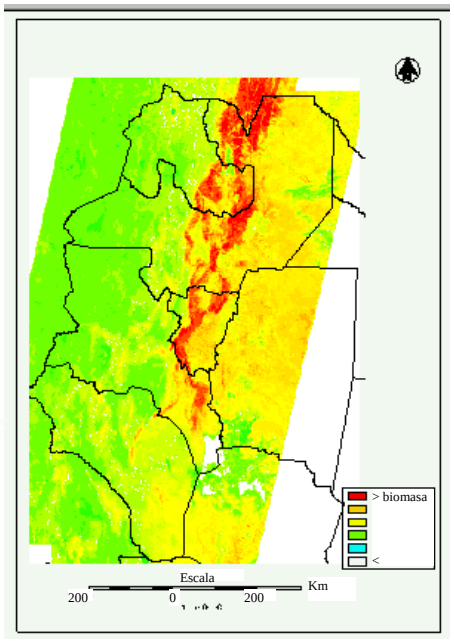
SAC-C Results: Crop Estimation- Cycle I



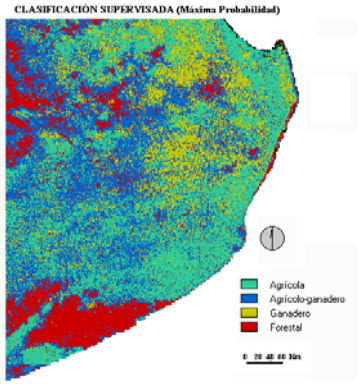
INTA- SALTA



INTA-Aguilares

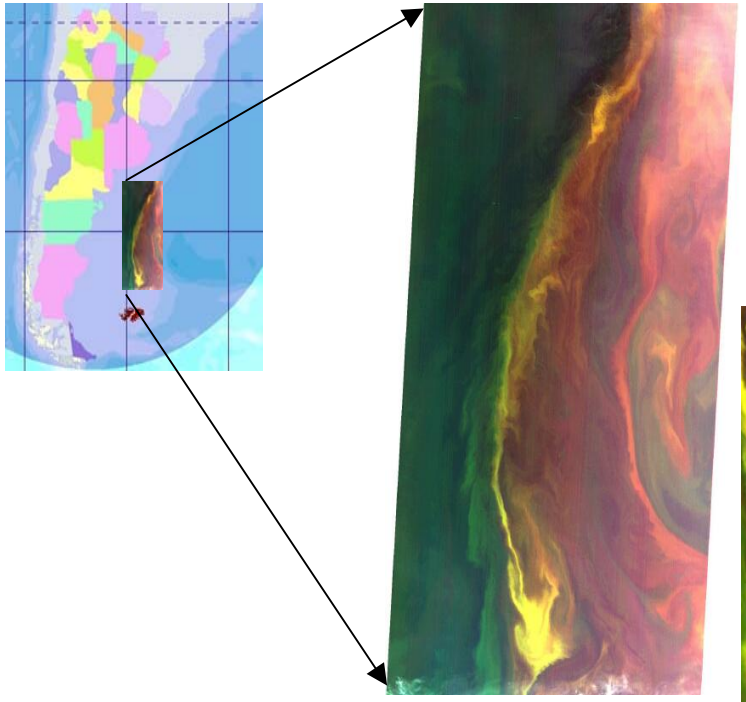


UBA- IFEVA



UNICEN

SAC-C Results: Marine and Coastal Studies - Cycle II



CENPAT- IAFE- CONAE

CONAE- FREPLATA

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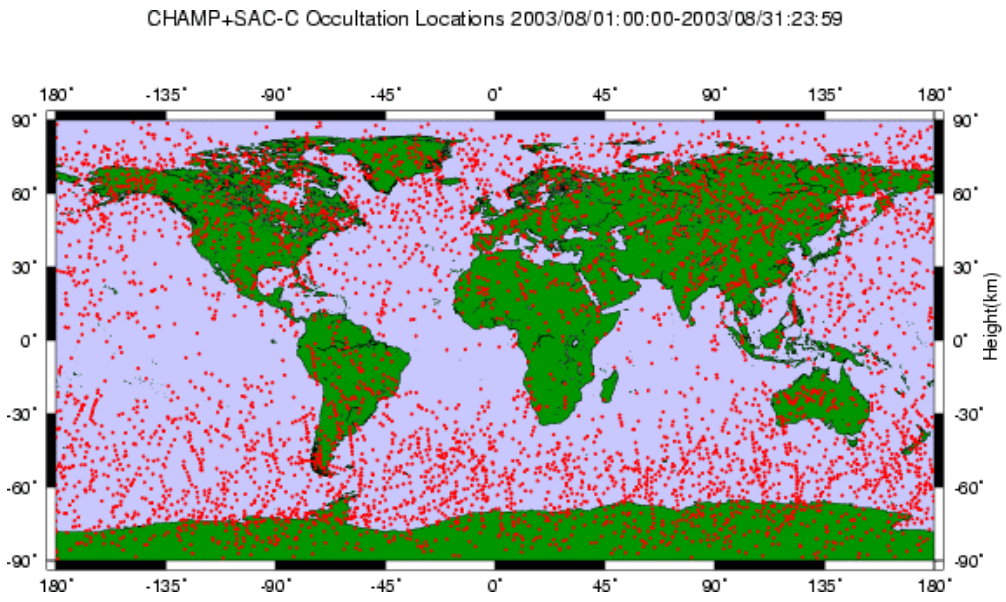
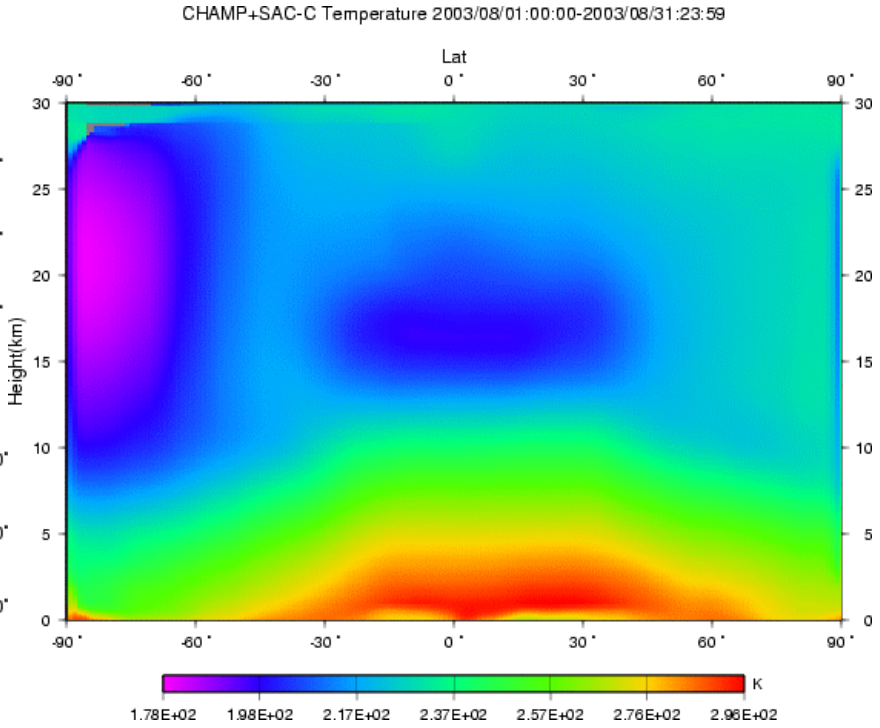
SAC-C Results: GOLPE





SAC-C Results: MMP

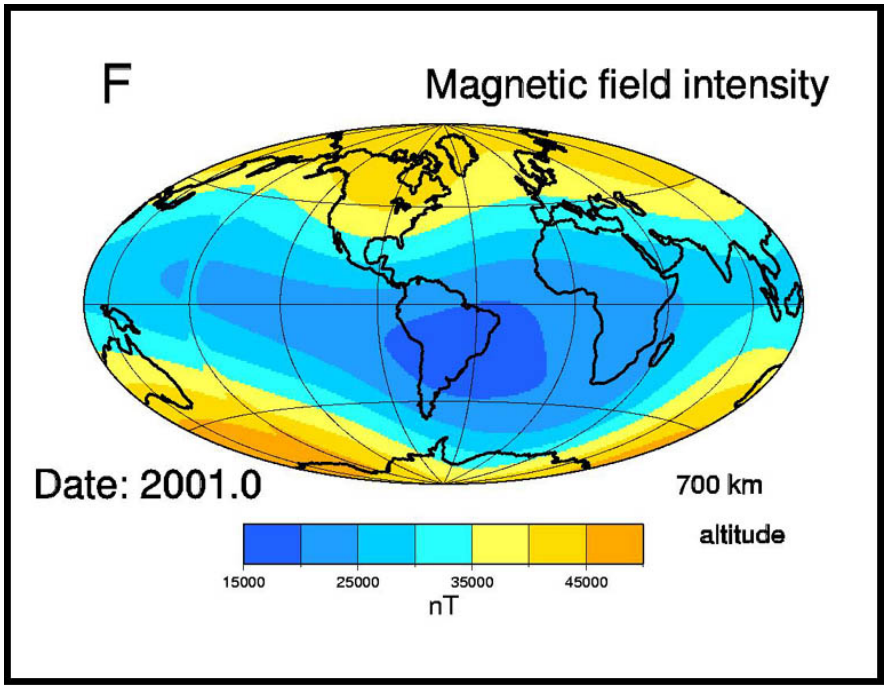


Figure 2: Magnetic field at beginning of SAC-C mission

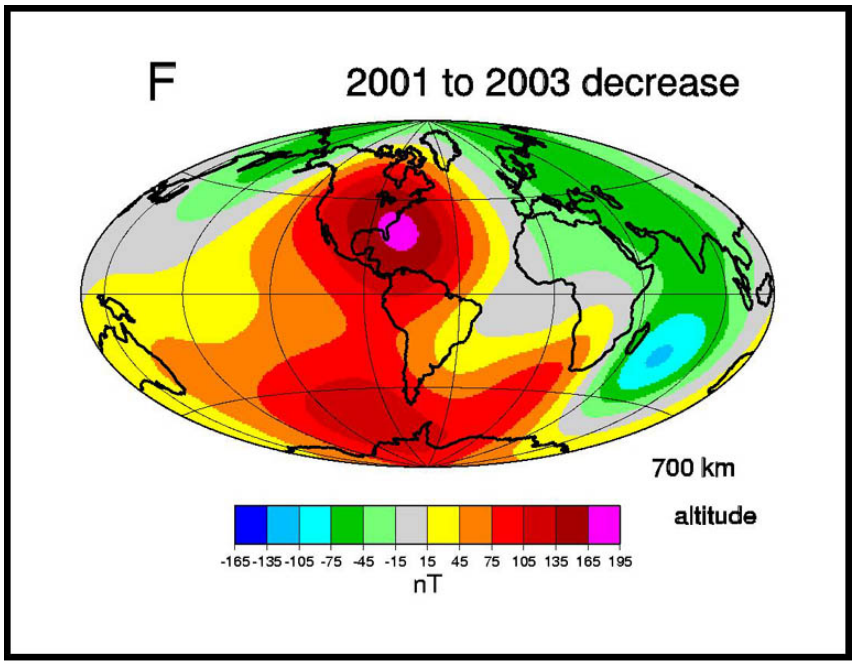
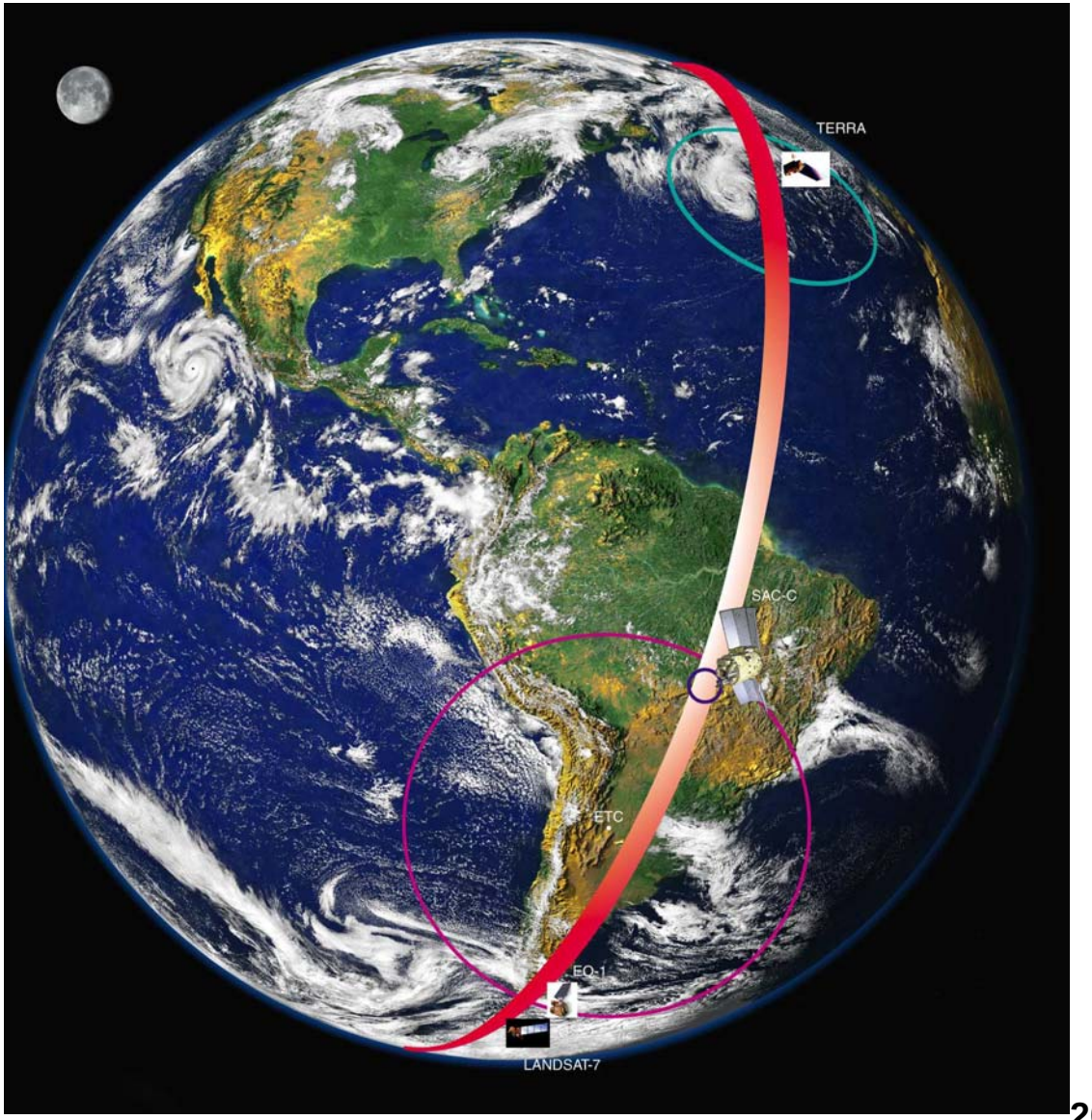


Figure 3: Magnetic field changes since SAC-C launch

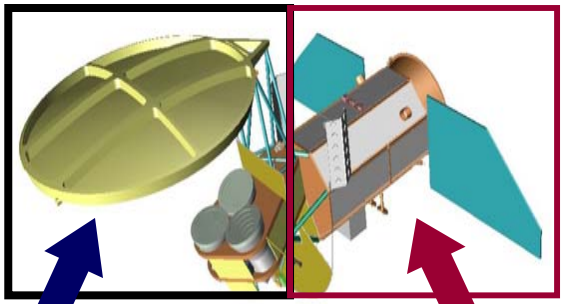
The Morning Constellation



Partnership

AQUARIUS/SAC-D

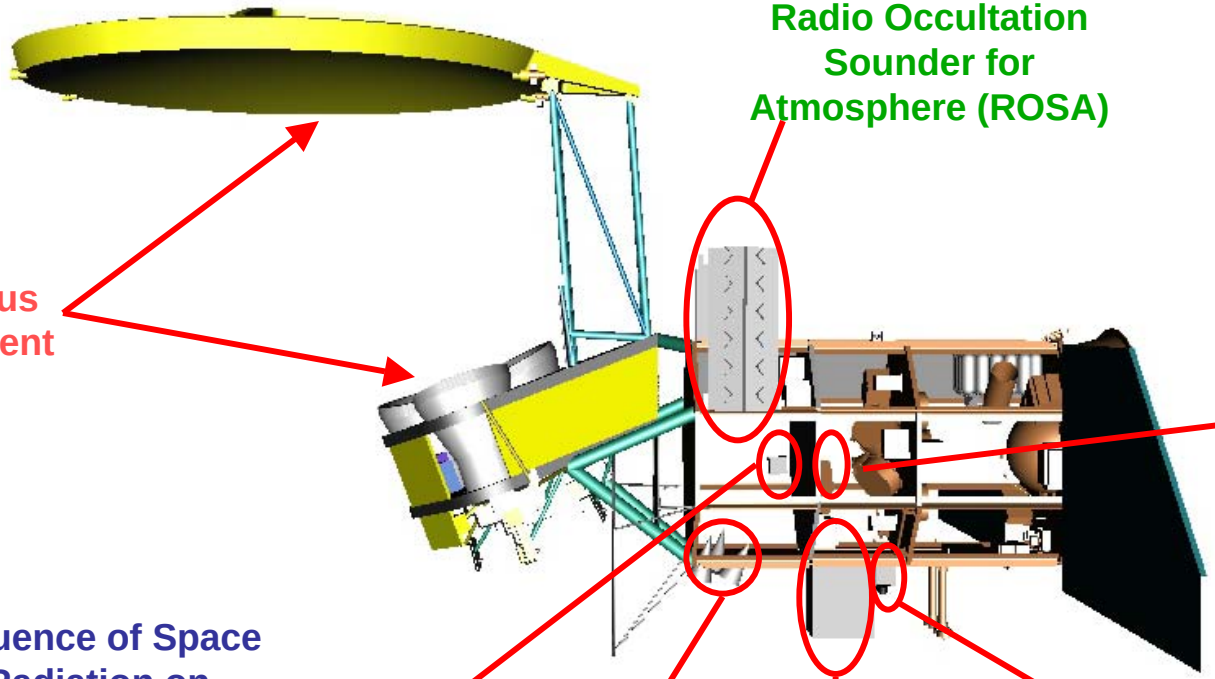
International Partnership Mission



- **Aquarius Salinity Microwave Instrument**
- **Launch Vehicle**

- **Service Platform and SAC-D Science Instruments**
- **Mission Operations & Ground System**

Observatory Flight Configuration



Radio Occultation Sounder for Atmosphere (ROSA)

Aquarius Instrument

Data Collection System (DCS)

Influence of Space Radiation on Advanced Components (ICARE) & Orbital System for an Active Detection of Debris (SODAD)

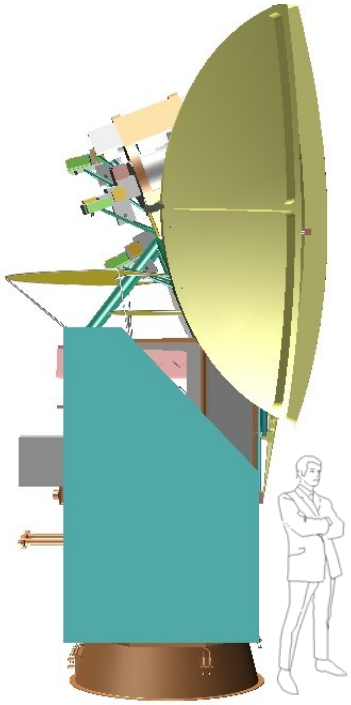
Microwave Radiometer (MWR)

New IR Sensitivity Technology (NIRST)

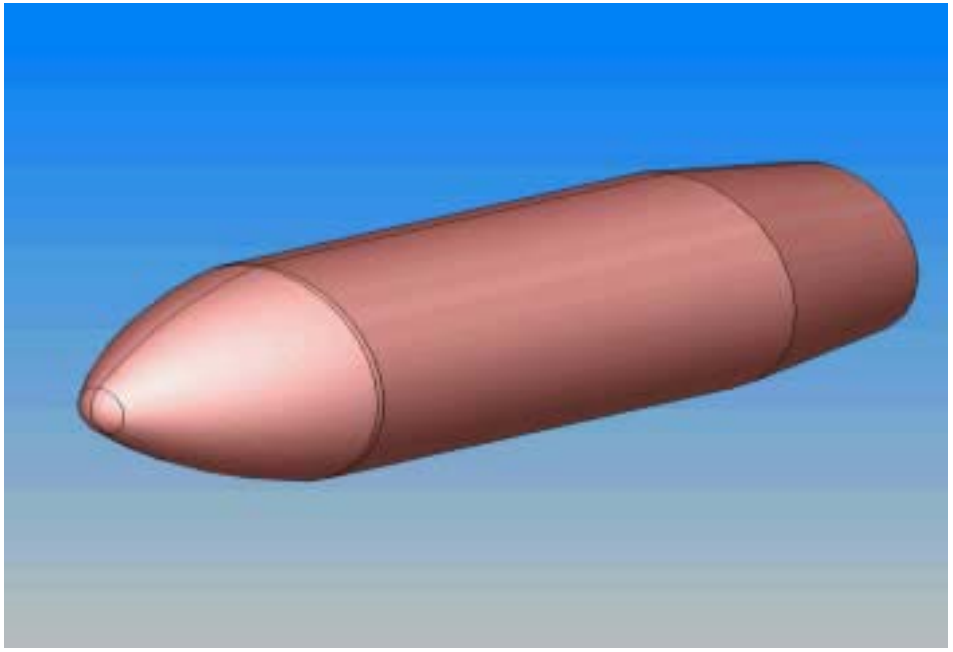
High Sensitivity Camera (HSC)

Observatory

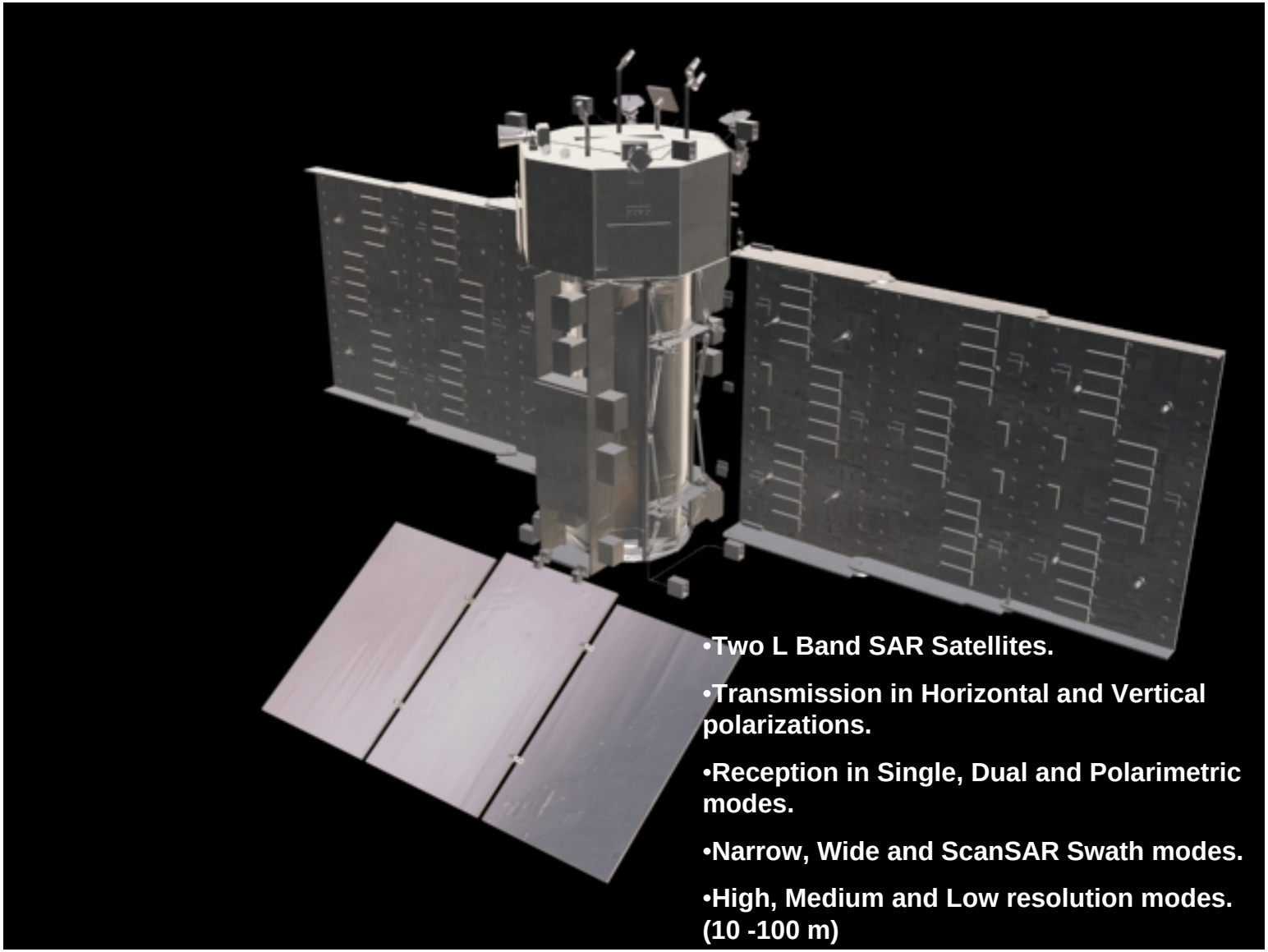
- **Observatory dimensions (stowed)**
  2,6 m (diameter) x 5,5 m
- **Sized for Delta-II (7320-10C) shroud**



Launch configuration

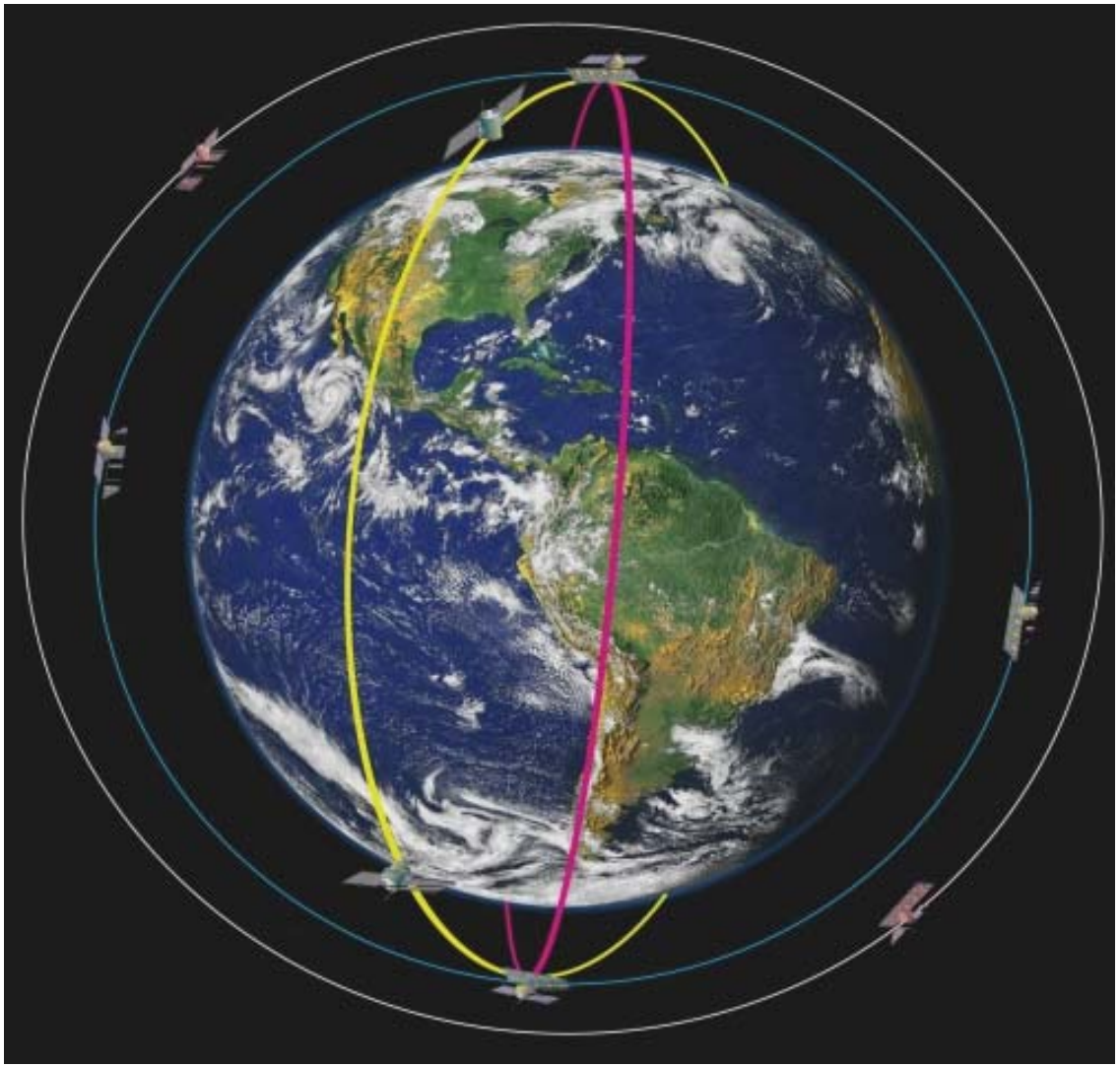


SAOCOM Mission



- Two L Band SAR Satellites.
- Transmission in Horizontal and Vertical polarizations.
- Reception in Single, Dual and Polarimetric modes.
- Narrow, Wide and ScanSAR Swath modes.
- High, Medium and Low resolution modes. (10 -100 m)

SAOCOM / COSMO-Skymed (SIASGE)



Orbits shown: 4

Angular Distribution: Approx. 30 degrees between orbital planes.

4 SAR X Band (Italy)
2 SAR L Band (Arg)

Revisit Time (400 km swath):
12 hours