COMISION NACIONAL DE ACTIVIDADES ESPACIALES

(The Argentinean National Commission of Space Activities)

SAOCOM MISSION OVERVIEW

Laura Frulla, CONAE

Presented by: D. Caruso, CONAE

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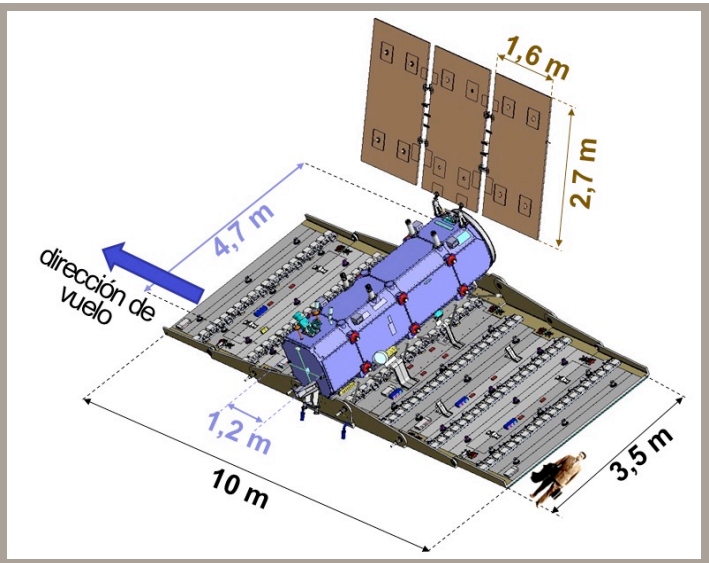
SAOCOM Mission Objectives

- To satisfy user needs in Argentina demanded by society and economic and productive sectors and the National Space Program:
  - agriculture, fishing and forestry,
  - weather and climate, hydrology and oceanography,
  - emergencies,
  - environment and natural resources of land and sea,
  - urban areas, cartography,
  - geology, mining and territorial planning,
  - health
- To operationally integrate the SIASGE System composed by Argentine-Italian SAOCOM Constellation and the Italian COSMO-Skymed Constellation in order to implement a double band (X+L) SAR joint Mission between ASI and CONAE

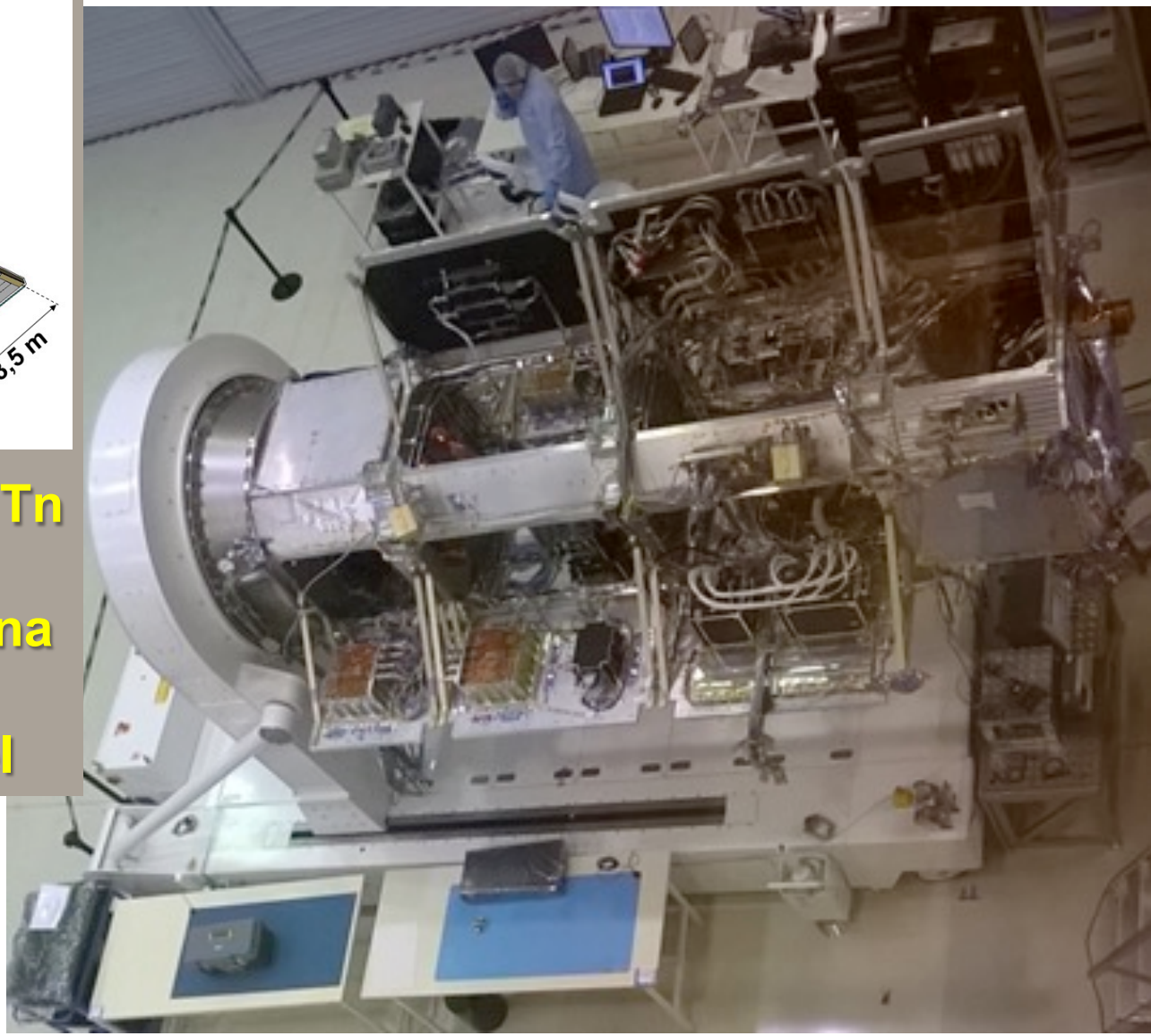
SAOCOM Mission Main Driver

- To support agricuture, hydrology-including floods and emergencies
- To generate operative soil moisture maps
- To explote SAR interferometric capability

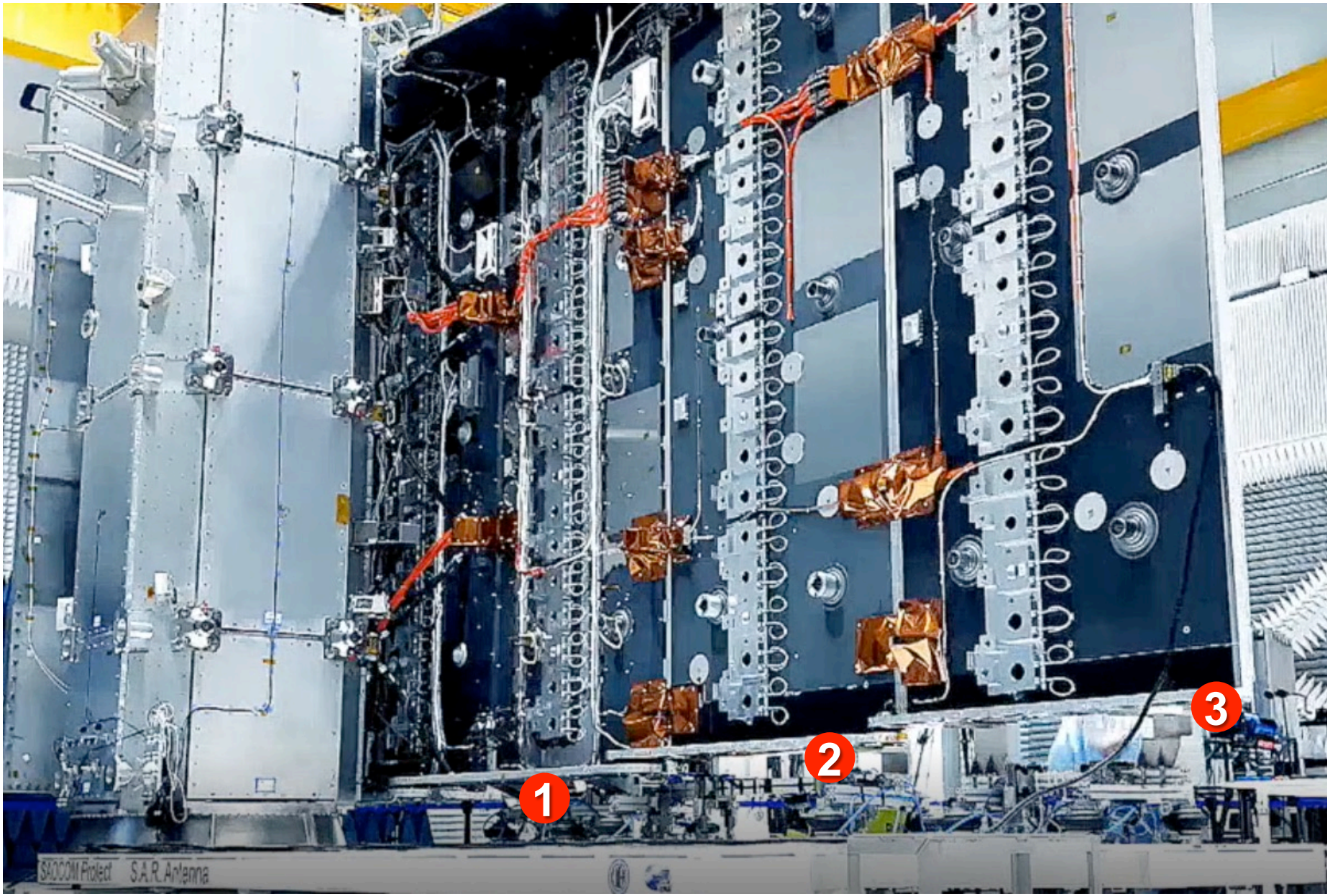
Satellite Body



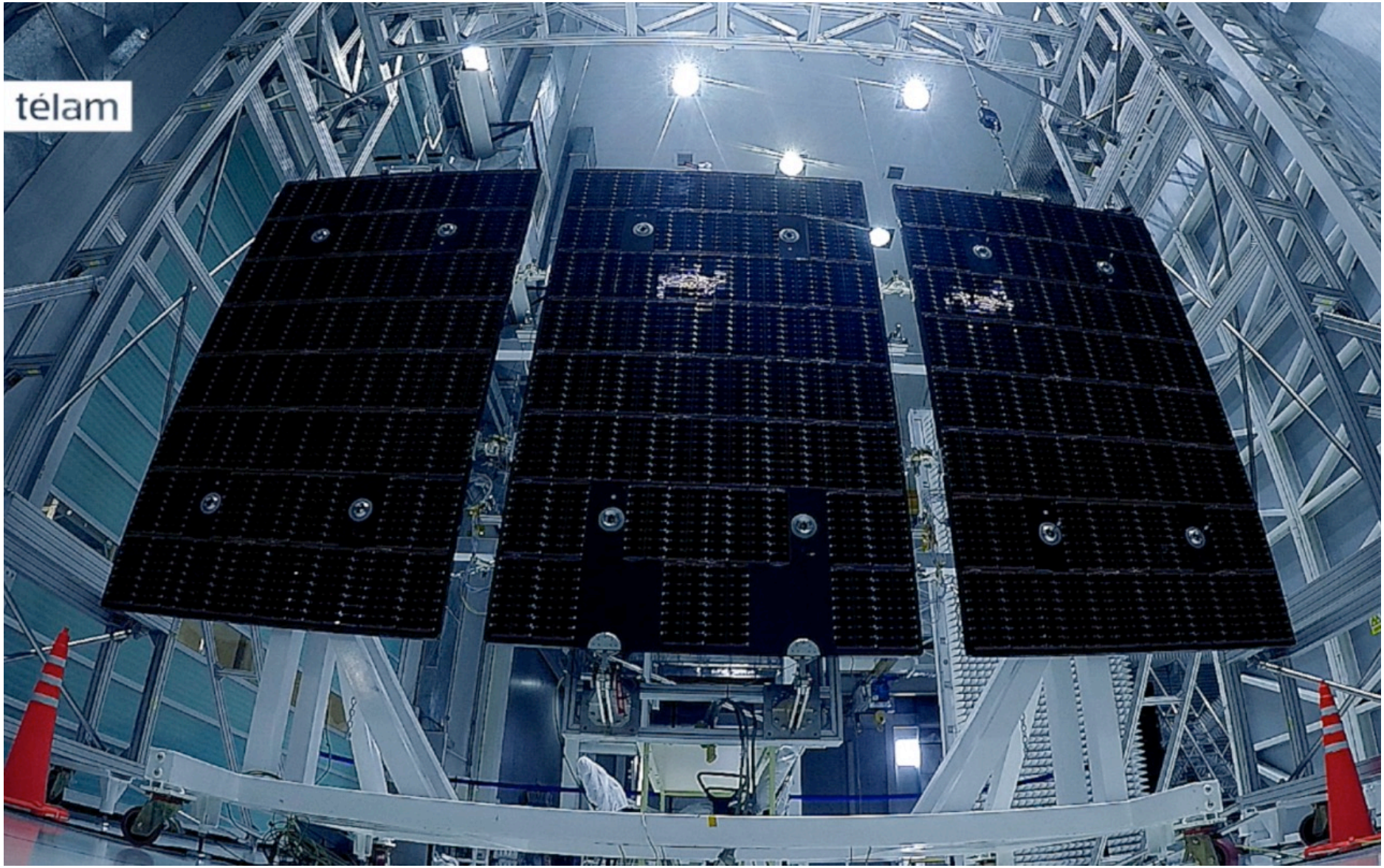
- Satellite weight: 3 Tn
- 35 m^2 SAR antenna
- 13 m^2 solar panel



Half Antenna



Solar Panels



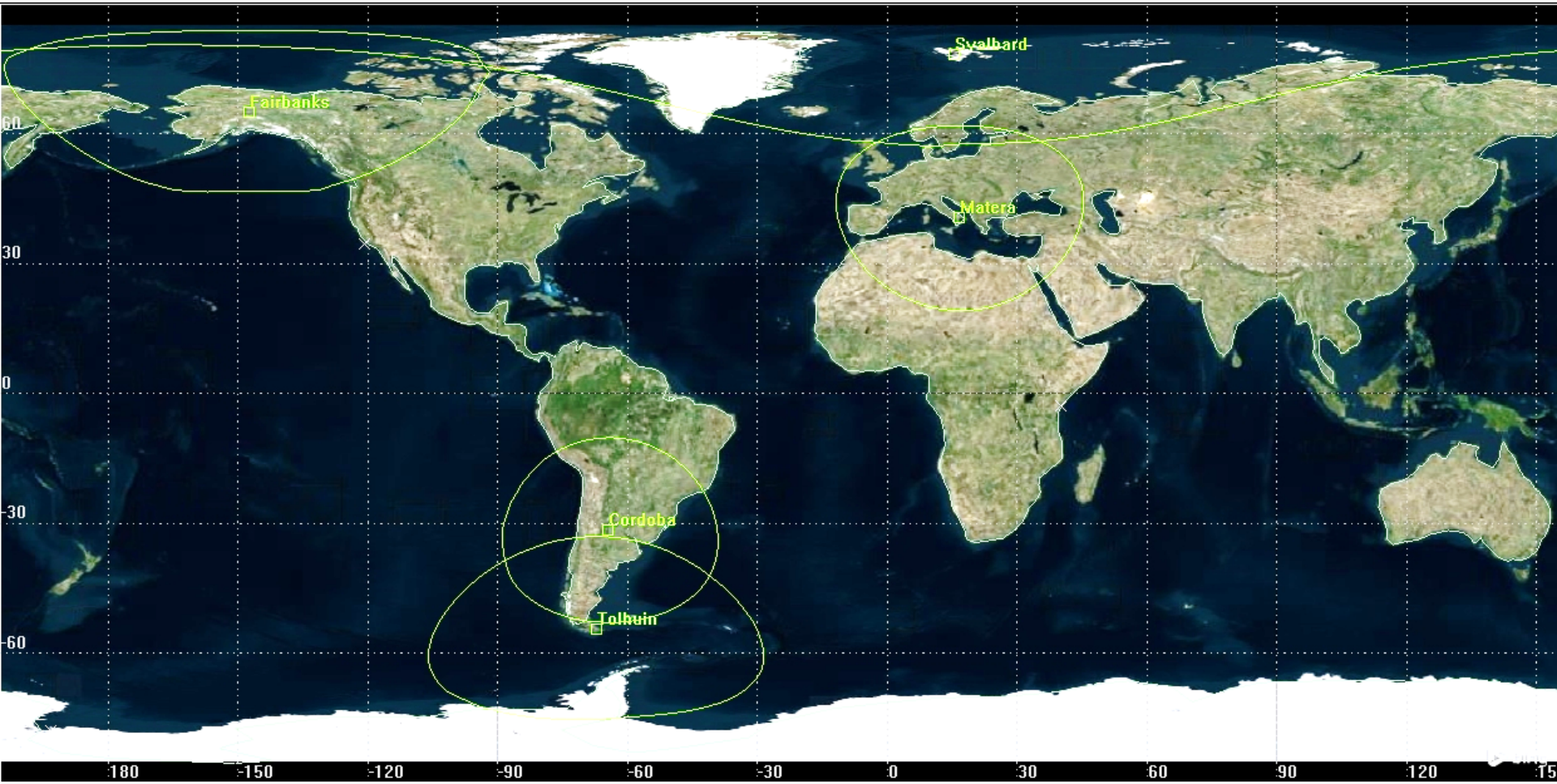
Mission General Features (1/2)

Mission	constellation of two identical satellites (SAOCOM 1A/SAOCOM 1B)
Payload (each satellite)	polarimetric L band SAR-1,275 GHz
Launch	✓ SAOCOM 1A: end of first quarter, 2018 ✓ SAOCOM 1B: begining of 2019
Mission lifetime	5 years
Orbit	sun synchronous nearly circular frozen polar
Commissioning	6-9 months
Altitude	620 km
Inclination	97.89°
AN local time	06:12 am
Orbit period	97.2 minutes
Revisit	**16 days** (1 satellite)/**8 days** (constellation)

Mission General Features (2/2)

Looking direction	right (nominal)/left (capability)
↳ right looking	✓ continuous acquisitions of **10 minutes** when the satellite is in visibility of ETC ✓ **15 minutes** per orbit as an average on a daily basis ✓ **20 minutes** of non continuous acquisitions in an orbit
↳ left looking	up to **5 minutes**
acquisition modes	real time / stored
coverage	world wide
σ° (measurement range)	-35 dB to 5 dB
GS capacity of L1 product processing	✓ 100 images/day (at ETC) ✓ 30-40 images/day (external receiving station units)

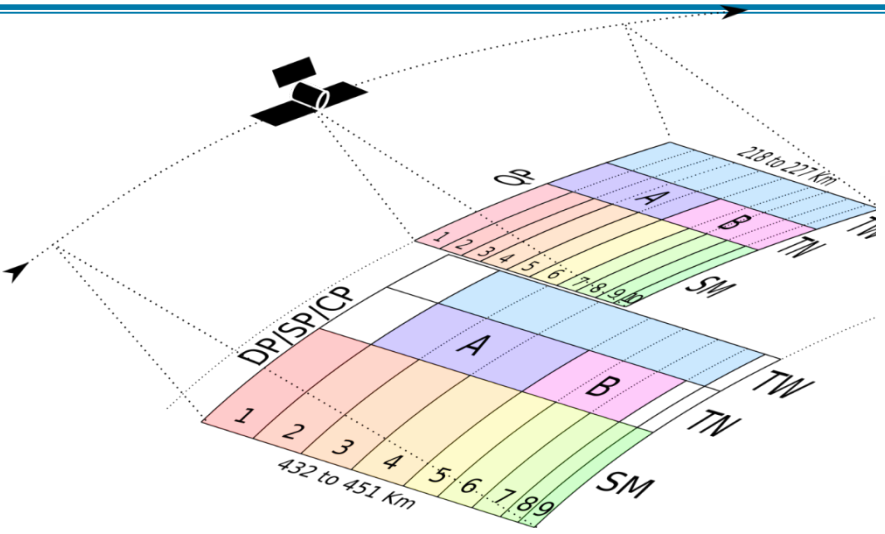
Possibilities of Downloading Science Data @ X band



Nominal Modes Features

- Acquisition modes:
  - ✓ StripMap
  - ✓ TOPSAR Narrow
  - ✓ TOPSAR Wide
  - ✓ Compact Polarization mode (as technological)
- Polarization modes: single, dual, quadpol)
- Swath width: 20 km - 350 km
- Spatial resolution: 10 m – 100 m
- Total incidence angle range: 20°-- 50°

Standard Product Sizes and Relative Positions



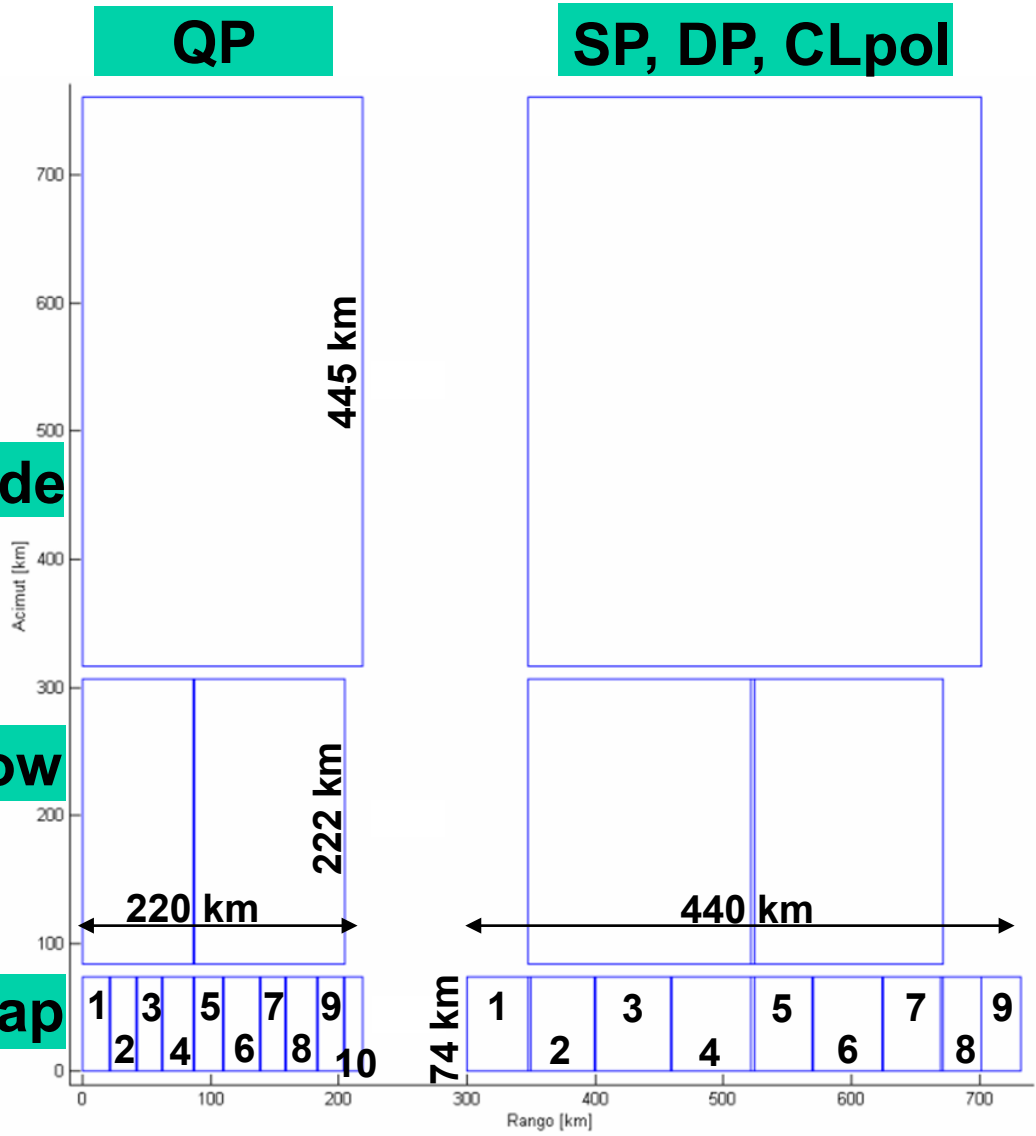
TOPSAR Wide

- TOPSAR Wide: twice longer than TOPSAR Narrow

TOPSAR Narrow

- TOPSAR Narrow: three times longer than StripMap

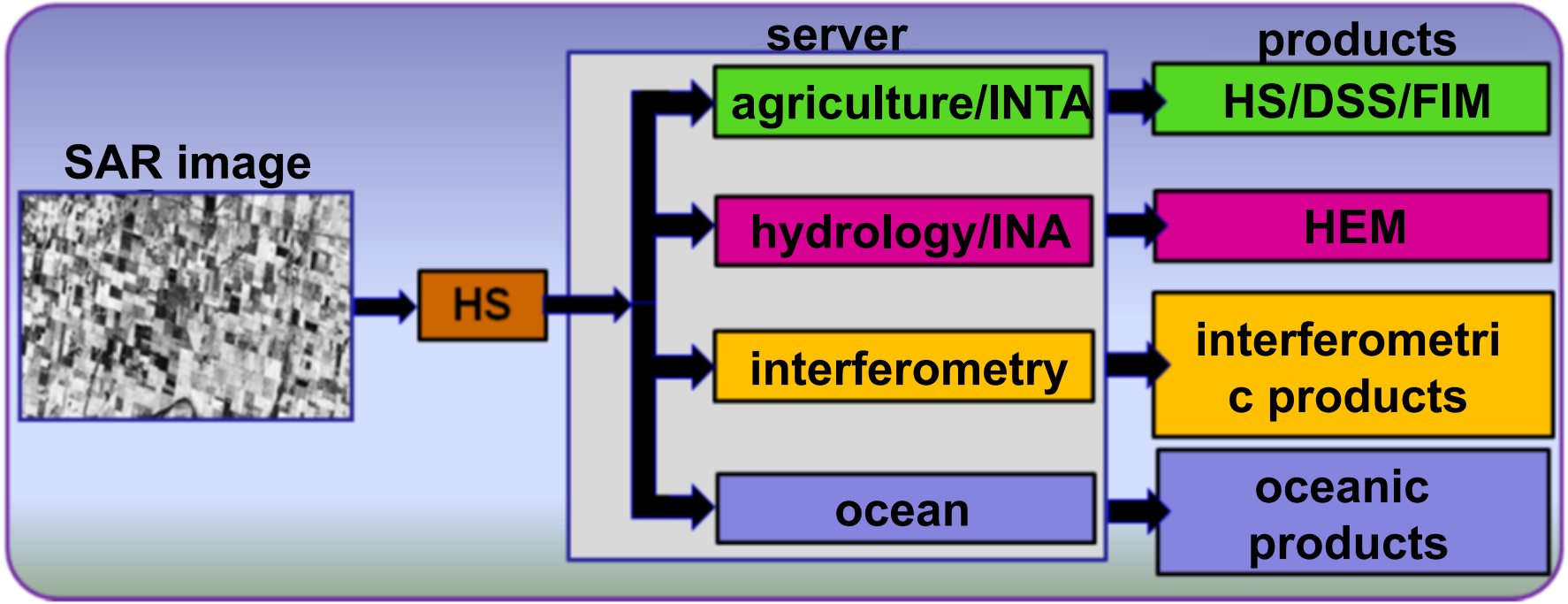
StripMap



Products Processing Levels

- ✓ **RAW** data products (data stream),
- ✓ **Level 0** products (Annotated RAW data-AR) [XML & HDF5]
- ✓ **Level 1** products
  - **Level 1A**: Single Look Complex-SLC (internal & external calibration data are included)
  - **Level 1B**: Detected Image-DI ((geo-referenced amplitude images)
  - **Level 1C**: Ground Ellipsoid Corrected-GEC (geocoded amplitude images)
  - **Level 1D**: Geocoded Terrain Corrected-GTC (in a standard processing, the DEM of 30 m is added to the previous case - it corresponds to the free download DEMs available from the USGS)
- ✓ **Higher** level products
  - on **Main Driver** basis
  - other

Higher Level Products (1/2)



- on **Main Driver** basis:
  - Surface Soil Moisture Maps
  - Agriculture case:
    - ✓ evolution of dry weight of grains by treatment type (e.g. different irrigation volumes)
    - ✓ soil moisture profile (up to 2 m in depth)
    - ✓ estimation of different yield scenarios
    - ✓ fusarium progression estimation and status evaluation

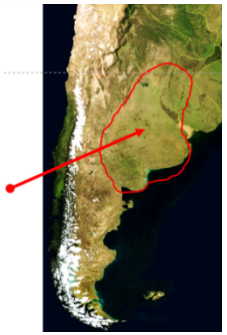
Higher Level Products(2/2)

- on **Main Driver** basis (cont.\):
  - Hydrology case:
    - ✓ Flood guidance
    - ✓ Deterministic and probabilistic hydrologic forecast
  - Interferometry case:
    - ✓ Corregistered image pair
    - ✓ Interferometric phase and coherence
    - ✓ Other derived under request (i.e. subsidence maps, DEMs *a doc*
- **Other** Higher Level products:
  - Ocean case:
    - ✓ Object detection
    - ✓ Oil spill maps

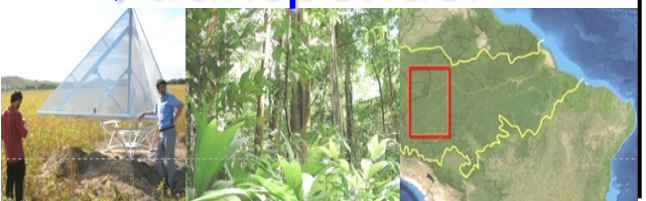
SAOCOM Mission Scenario

Baseline Mission
(fixed acquisitions and planned)

- Soil moisture in the Pampa's



- SAR calibration:
  - forest
  - corner reflectors distributed in different points
  - transponder

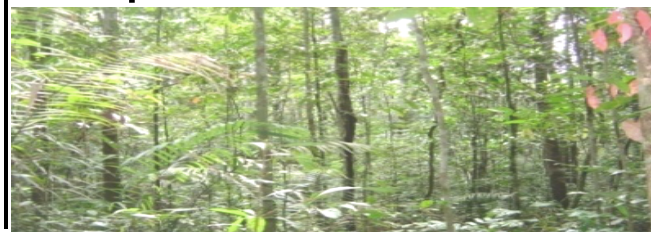


Foreground Mission
(variable acquisitions)

- user requests

Background Mission
(fixed acquisitions and planned to have available useful data base)

- In Argentina:
  - Applications involved in the National Space Plan
- In Latin-America and the rest of the world:
  - biomass
  - polar zones



Thank you for your attention

caruso@conae.gov.ar

lfrulla@conae.gov.ar