ESA Upcoming Missions and Connection to CCI

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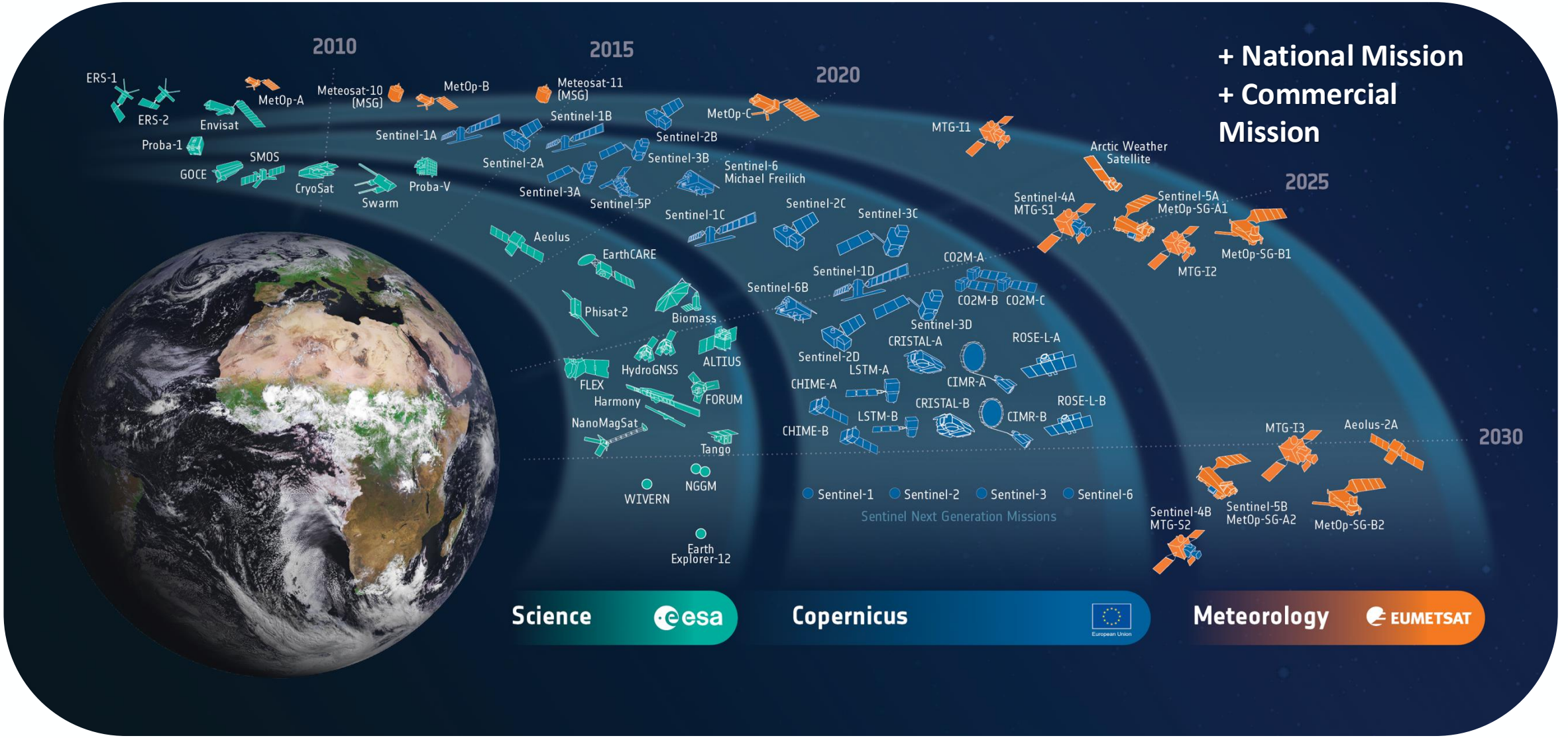
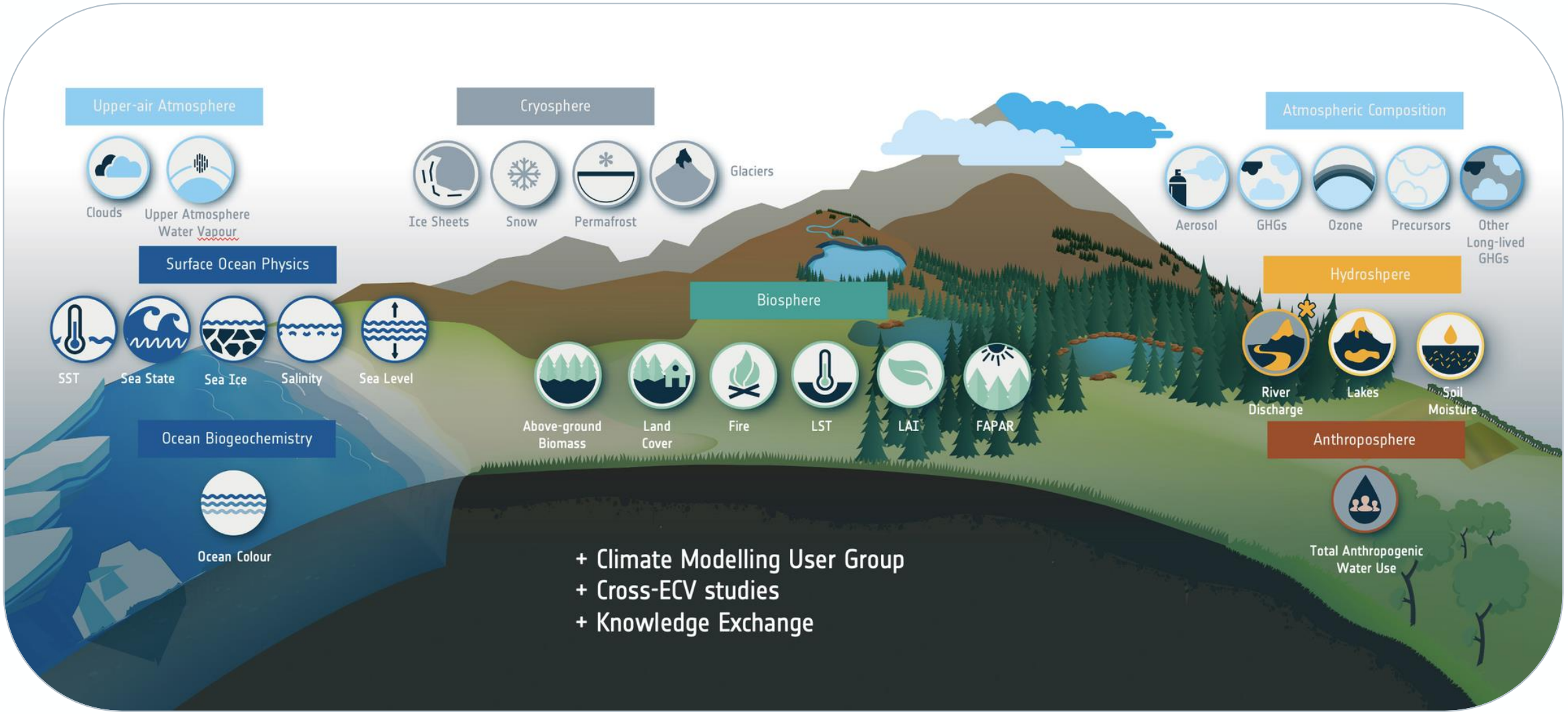
ESA UNCLASSIFIED – For ESA Official Use Only

ESA's Earth Observation Missions



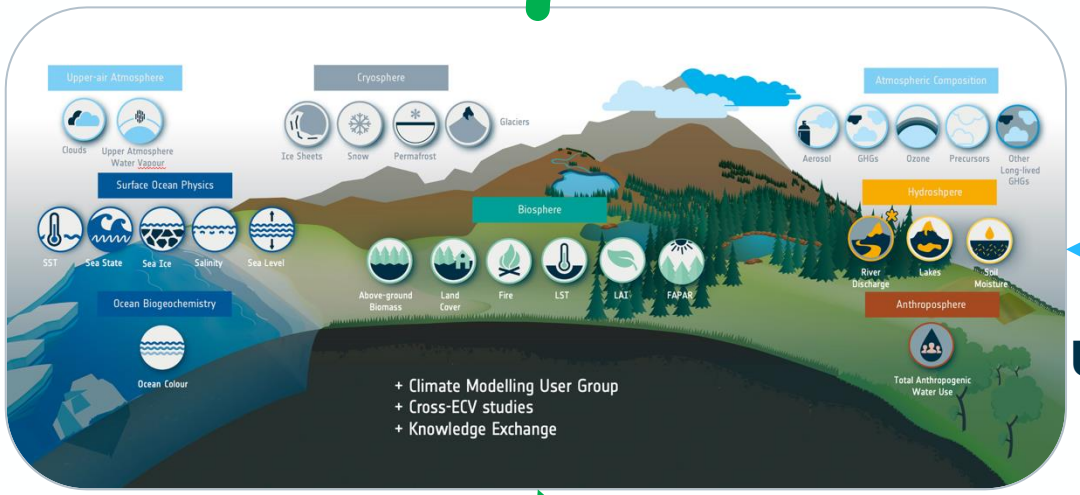
ESA CCI ECVs in Nutshell



Making the connection between ECVs to Missions

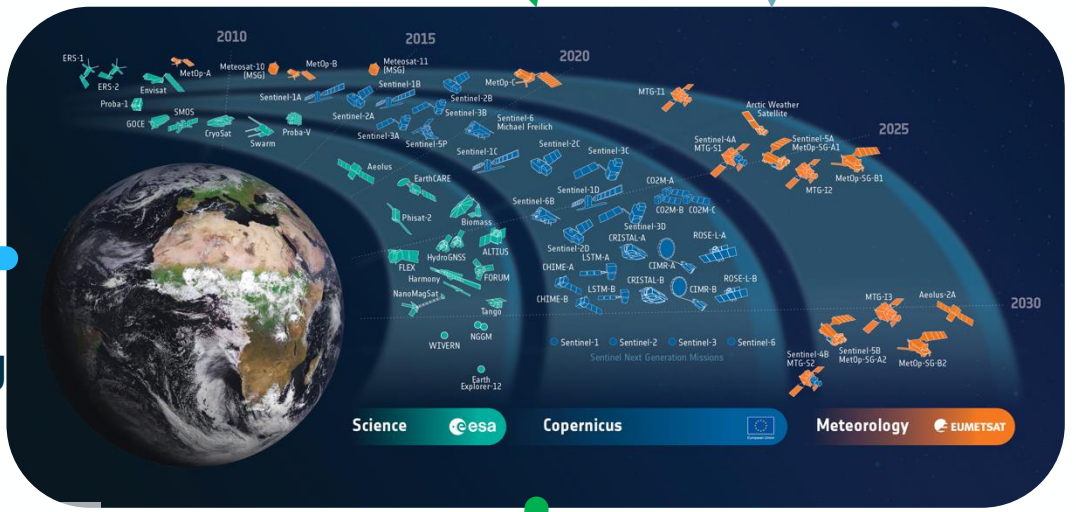
Long-term Stability and Accuracy
Gapless Multi-decadal Coverage
Global spatial coverage
Full traceability of uncertainties
Open science and accessibility

Expert Advice through Mission/Science Advisory Groups (MAG/SAG) (missionadvice.esa.int)



Long-term Datasets

Process Understanding



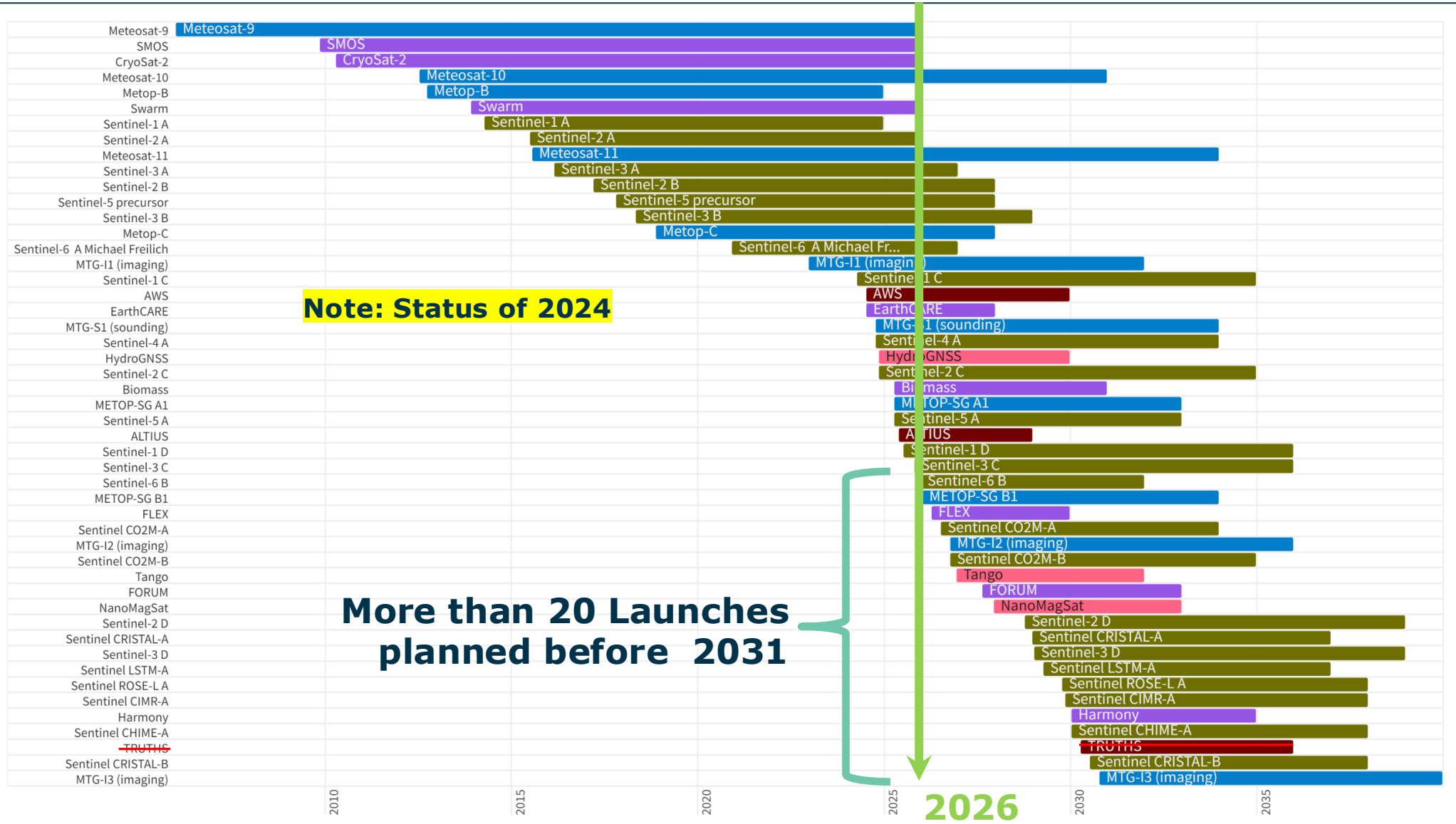
Product Specifications
"Observability"
Scientific Readiness
System Feasibility
Programmatic Constraints

Process

Campaigns

Long-term Datasets

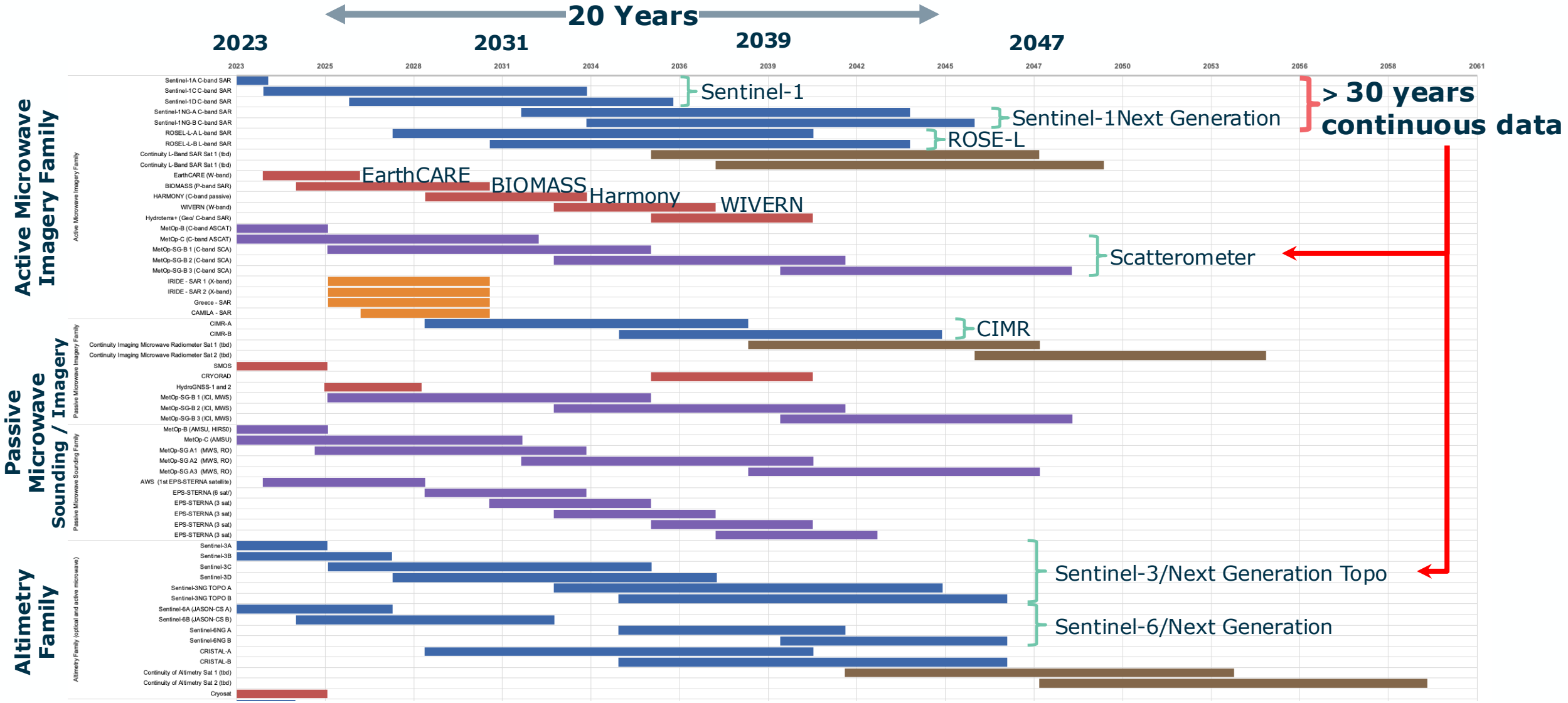
ESA EO Mission Timeline: Lauches before 2031

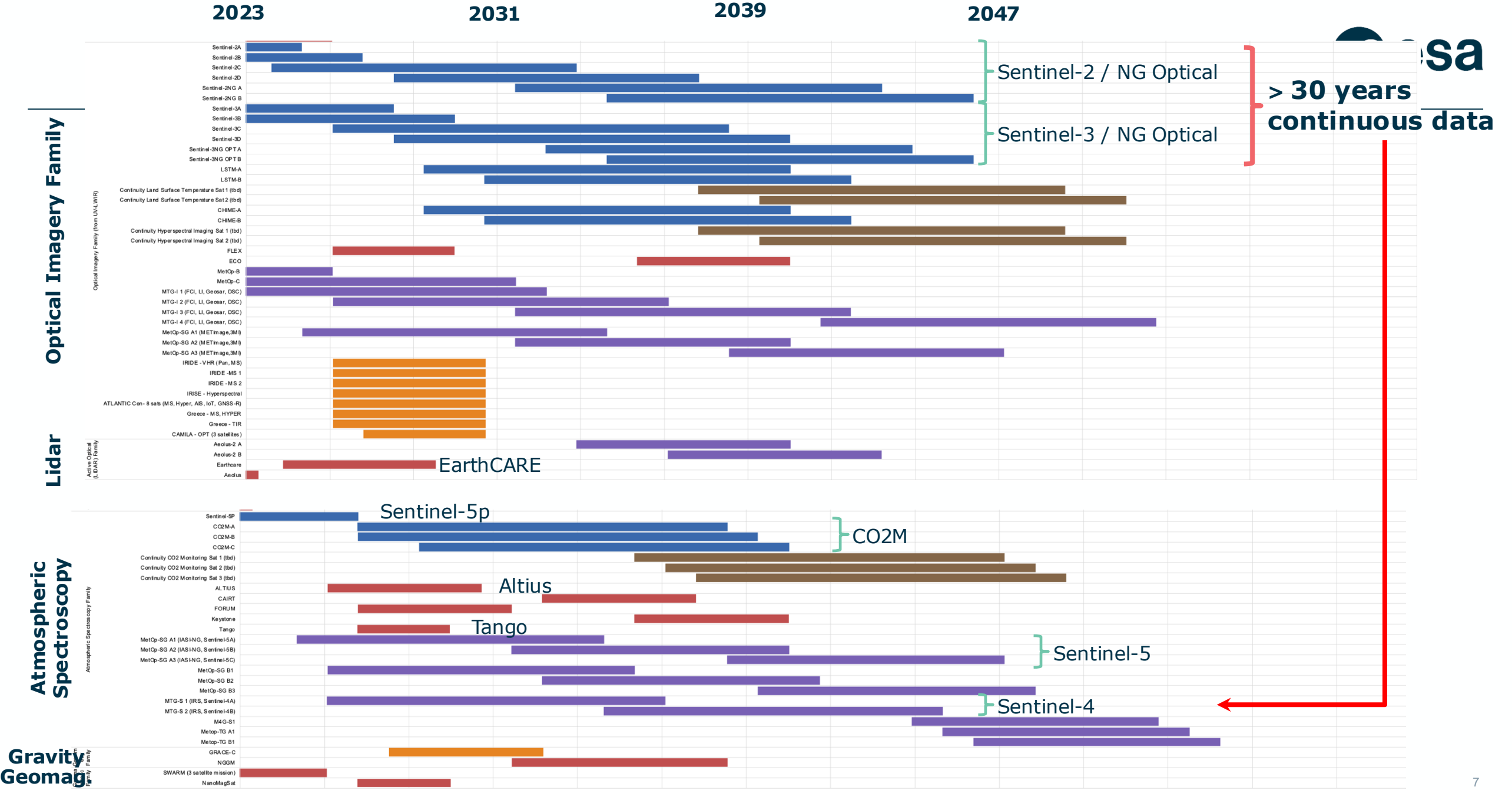


Note: Status of 2024

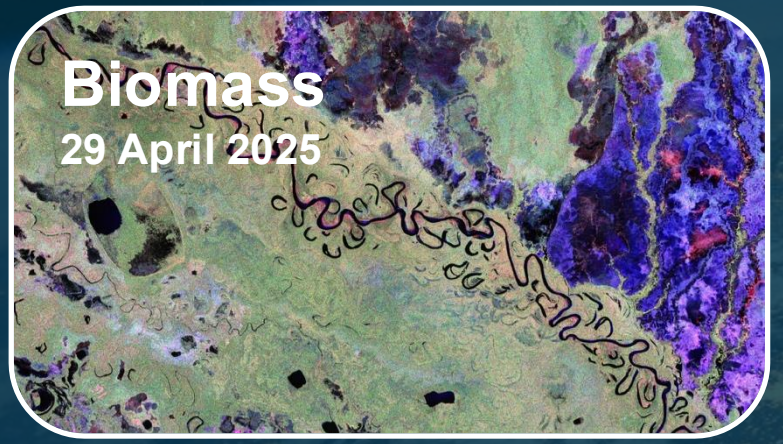
More than 20 Launches planned before 2031

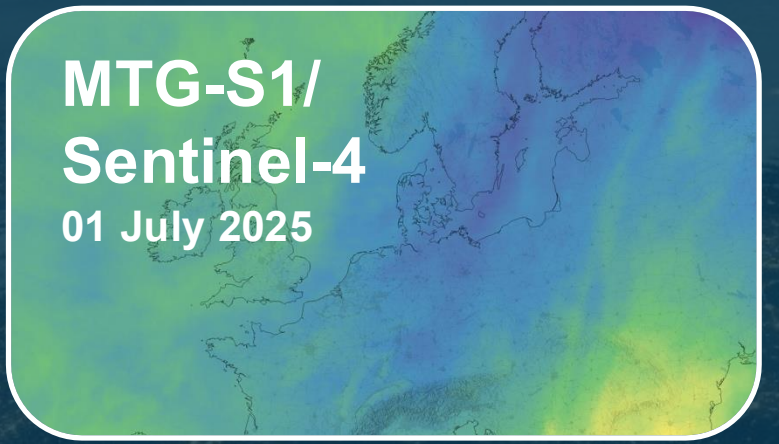
ESA Mission Timeline: Long-term time series

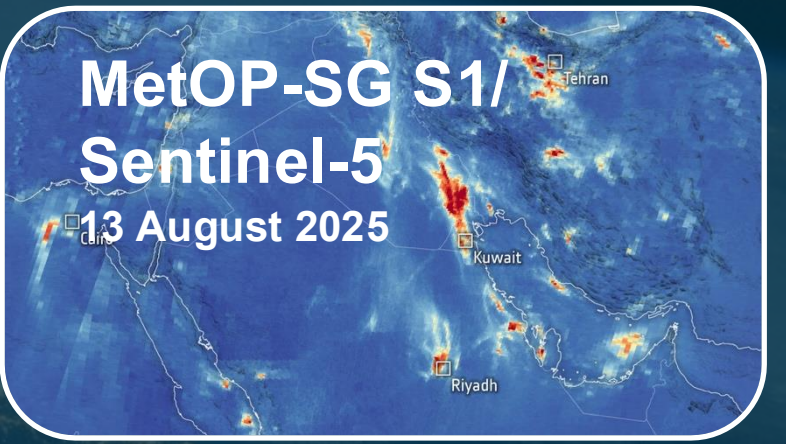


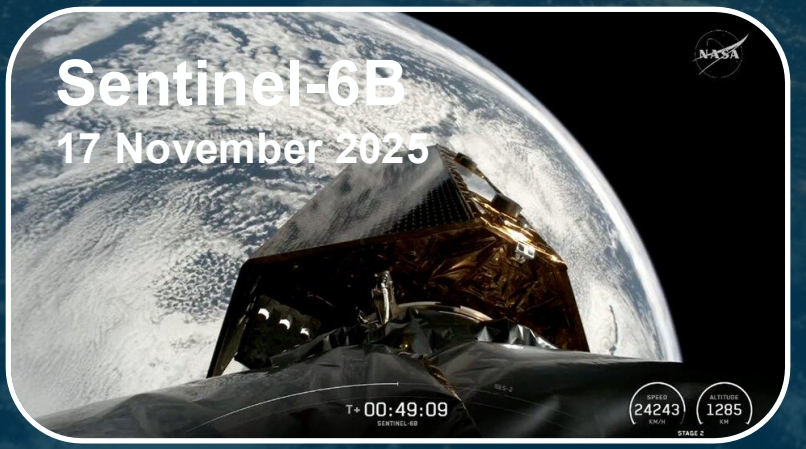

2023
2031
2039
2047
Optical Imagery Family
Lidar
Atmospheric Spectroscopy
Gravity Geomag
Sentinel-2 / NG Optical
Sentinel-3 / NG Optical
> 30 years continuous data
EarthCARE
Sentinel-5p
CO2M
Altius
Tango
Sentinel-5
Sentinel-4

ESA Earth Observation Missions Launched 2025



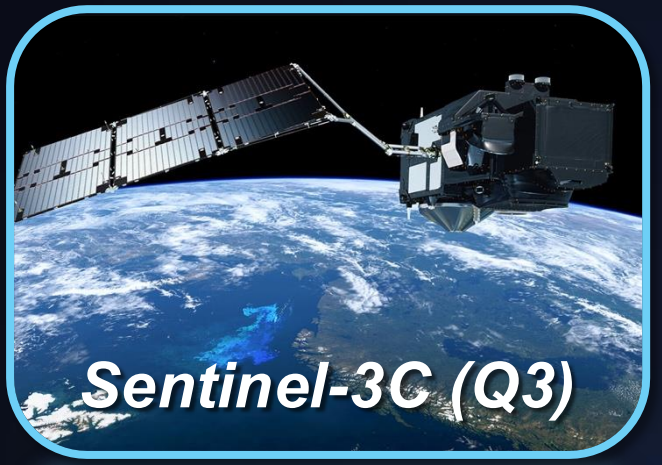


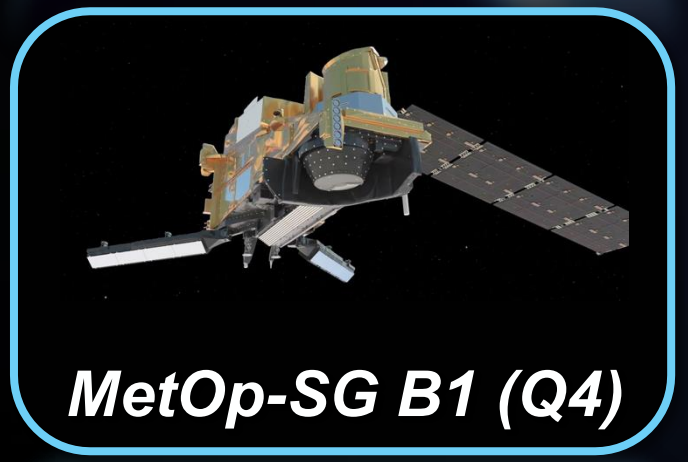




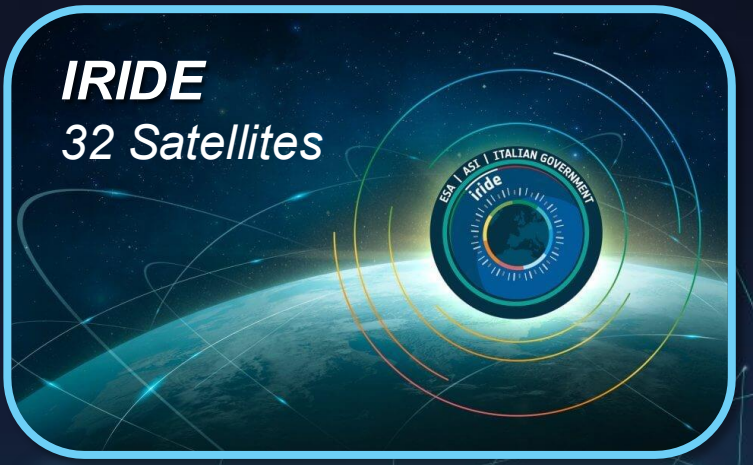
ESA Earth Observation Missions Launches 2026

Four planned launch campaigns





National missions



Earth Explorers

Pioneering Scientific and Technical Excellence

cryosat
ICE
2010-present

goce
GRAVITY FIELD
2009-2013

smos
WATER
2009-present

swarm
MAGNETIC FIELD
2013-present

2018-2023
aeolus
WIND

2024-present
earthcare
CLOUD AND AEROSOL

biomass
FOREST CARBON
2025

flex
PHOTOSYNTHESIS
2026

forum
THERMAL RADIATION
2028

harmony
SURFACE DYNAMICS
2029

WIVERN
2031/32

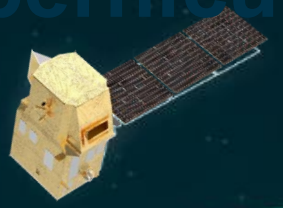
CryoRad ECO
Hydroterra+ Keystone
EE12
2036

Expanding Copernicus Capabilities

European Union

Copernicus Europe's eyes on Earth

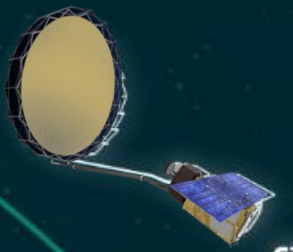
esa



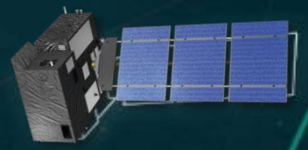
CHIME
Copernicus Hyperspectral Imaging Mission for the Environment
QAR: 2028

ROSE-L
L-band Radar Observing System
QAR: 2028

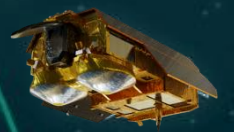
LSTM
Land Surface Temperature Monitoring
QAR: 2029



CIMR
Copernicus Imaging Microwave Radiometer
QAR: 2028



CO2M
Copernicus Anthropogenic Carbon Dioxide Monitoring
2027



CRISTAL
Copernicus Polar Ice and Snow Topography Altimeter
2027

soil properties
crop health
biodiversity
water quality

geohazards
polar ice
forest management
food security
maritime surveillance

sea-ice concentration/extent
global ocean and cryosphere
soil moisture and vegetation

sustainable agriculture
water resources management
drought
urban heat islands

carbon dioxide and methane from human activity

Food Security and Water Management

Monitoring Land and Natural Resources

Combatting Climate Change

Safeguarding the Arctic

polar oceanography
coastal and inland waters

sea-ice thickness
ice sheets and glaciers
snow

PROGRAMME OF THE EUROPEAN UNION

Copernicus Sentinel Expansion Missions

Copernicus Europe's eyes on Earth

Summary

- ESA's past, present and future Earth Observation missions provide key contribution of the ECVs
- Satellite missions provide:
    - long-term continuous datasets (i.e., Copernicus Sentinel and Meteo Missions)
    - information to better characterise and understand Earth and Climate Science processes (e.g., Earth Explorer Missions)
- Intercalibration between instruments and independent validation are priority tasks to ensure consistent long-term datasets
- Full traceability of the instrument performance and transparency of the product generation are key to ensure ECV acceptable datasets
- ESA's EO satellite portfolio covers 85 missions, of with 21 operational, 56 in development or preparation and eight heritage missions
- In the coming three years 14 (+ 6 InCubed) ESA Earth Observation satellites are planned to be launched across all programmes (Research, Copernicus, Meteo, InCubed) + Campaigns