

Introduction to Session B; and seeking a 10-year MARCDAT Vision

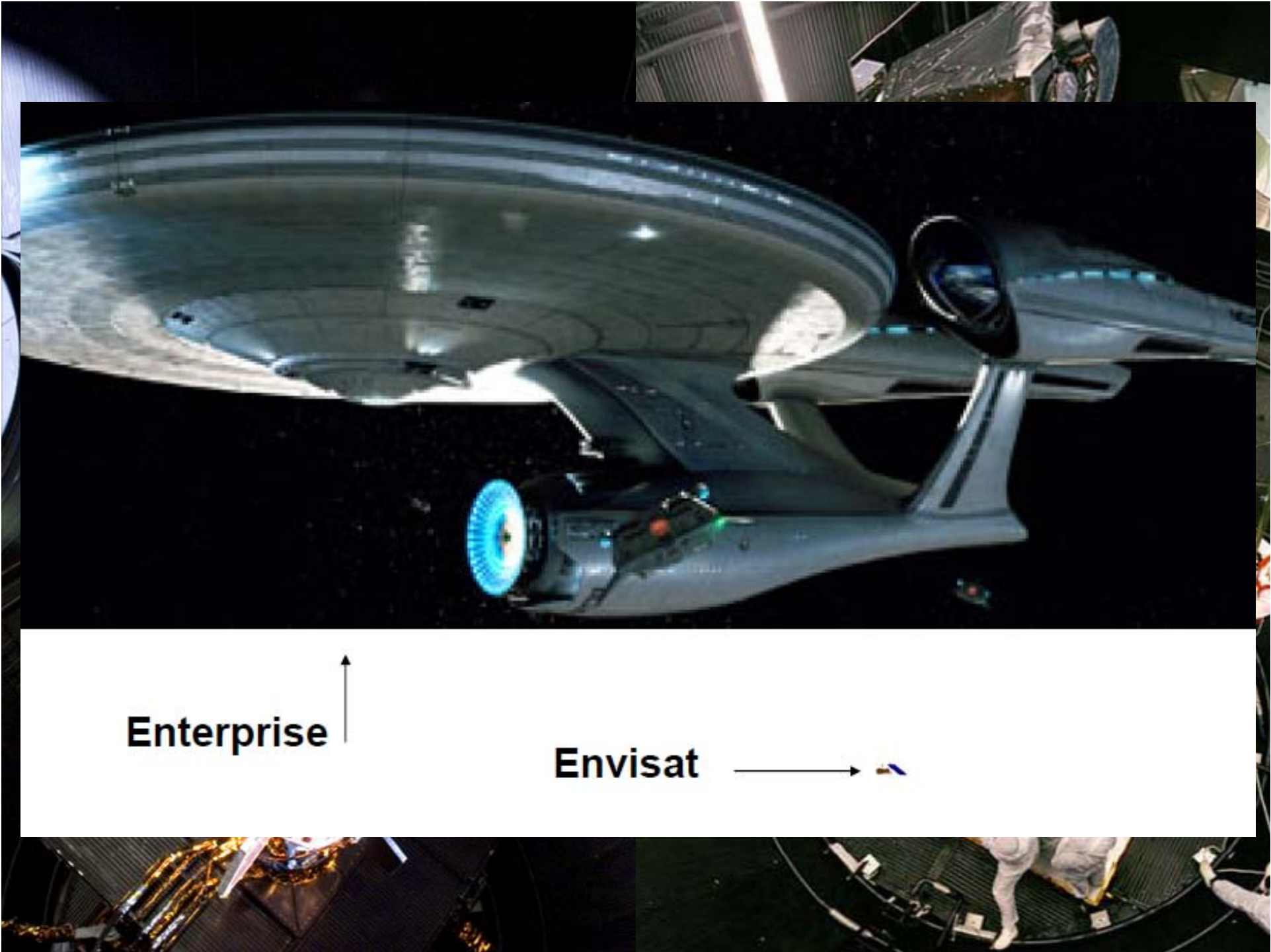
End of workshop objective:

A 10-year action plan for improved integration and
accessibility of climatological observations



 **esa** observing the earth

European Space Agency



Enterprise



Envisat



GOCE: ESA's Gravity Mission

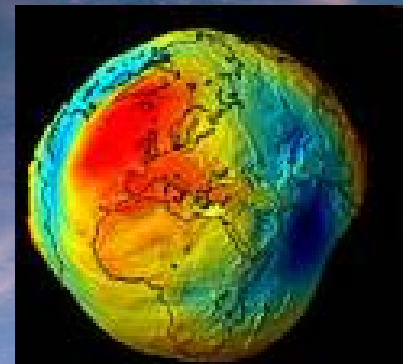
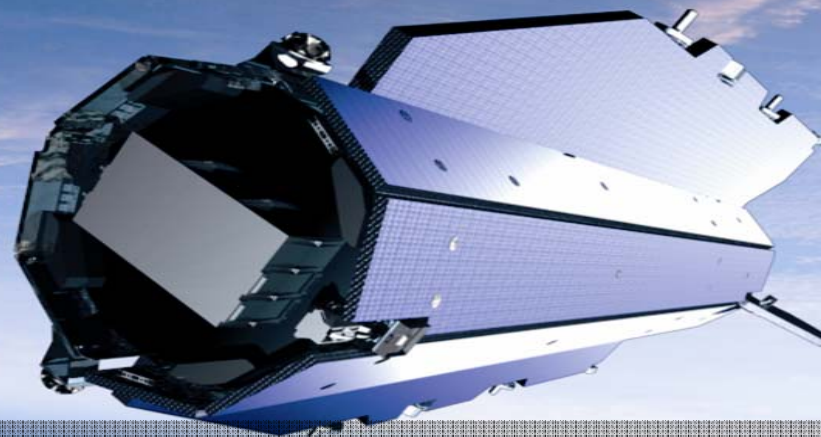
www.esa.int/livingplanet/goce



The Gravity field and steady-state Ocean Circulation Explorer (GOCE)



Launched 2nd March 2009!!



Its objectives are to improve understanding of:

- global ocean circulation and transfer of heat
- physics of the Earth's interior (lithosphere & mantle)
- sea level records, topographic processes, evolution of ice sheets and sea level change



SMOS: Soil Moisture and Ocean Salinity Mission

www.esa.int/smos



Launched 2nd Nov 2009!!

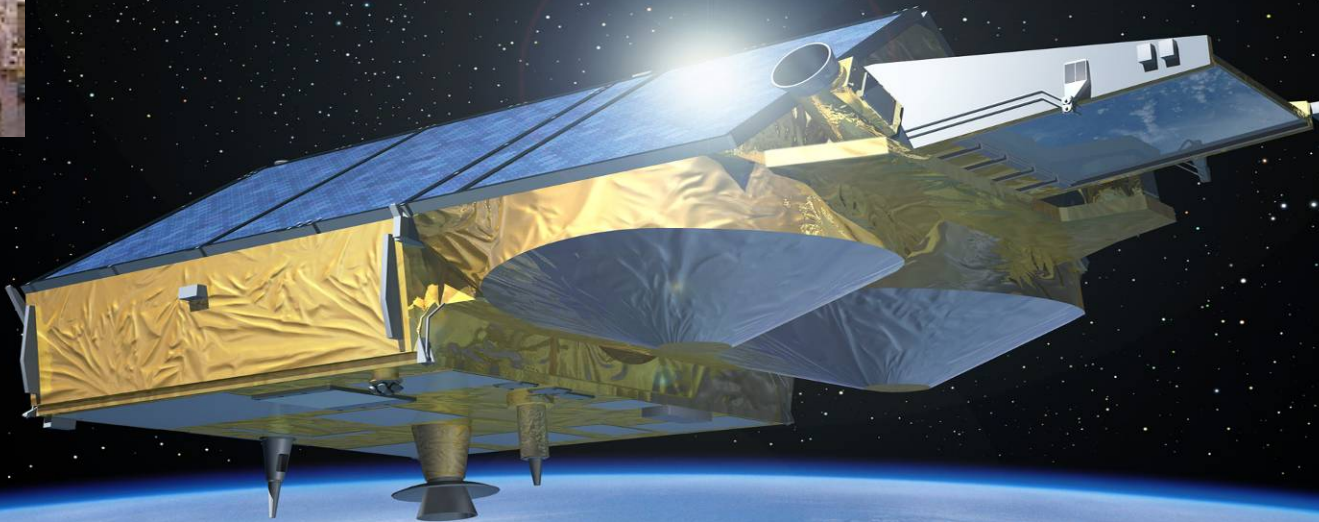
Its objectives are:

- to provide global maps of soil moisture and ocean salinity for hydrological studies
- to advance our understanding of the freshwater cycle
- to improve climate, weather and extreme-event forecasting
- Instrument: Microwave Imaging Radiometer with Aperture Synthesis (MIRAS)

CryoSat2: ESA's Ice Mission



Launched 8th
April 2010



Its objectives are to improve our understanding of:

- thickness and mass fluctuations of polar land and marine ice
- to quantify rates of thinning/thickening due to climate variations
- Instrument: Ku band SIRAL (SAR Interferometric Radar Altimeter).

www.esa.int/livingplanet/cryosat

GMES Sentinel-3: 2013

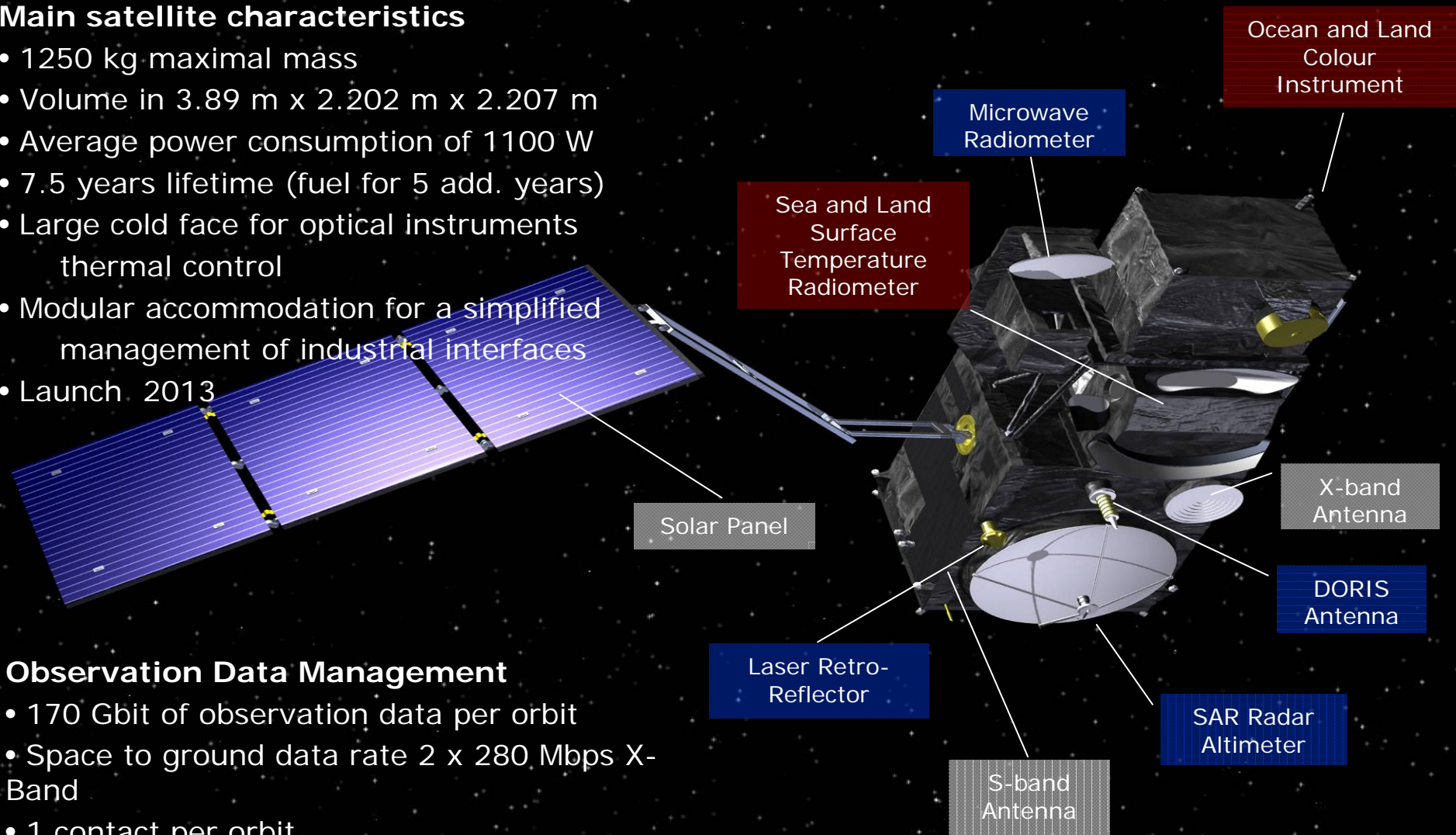


Main satellite characteristics

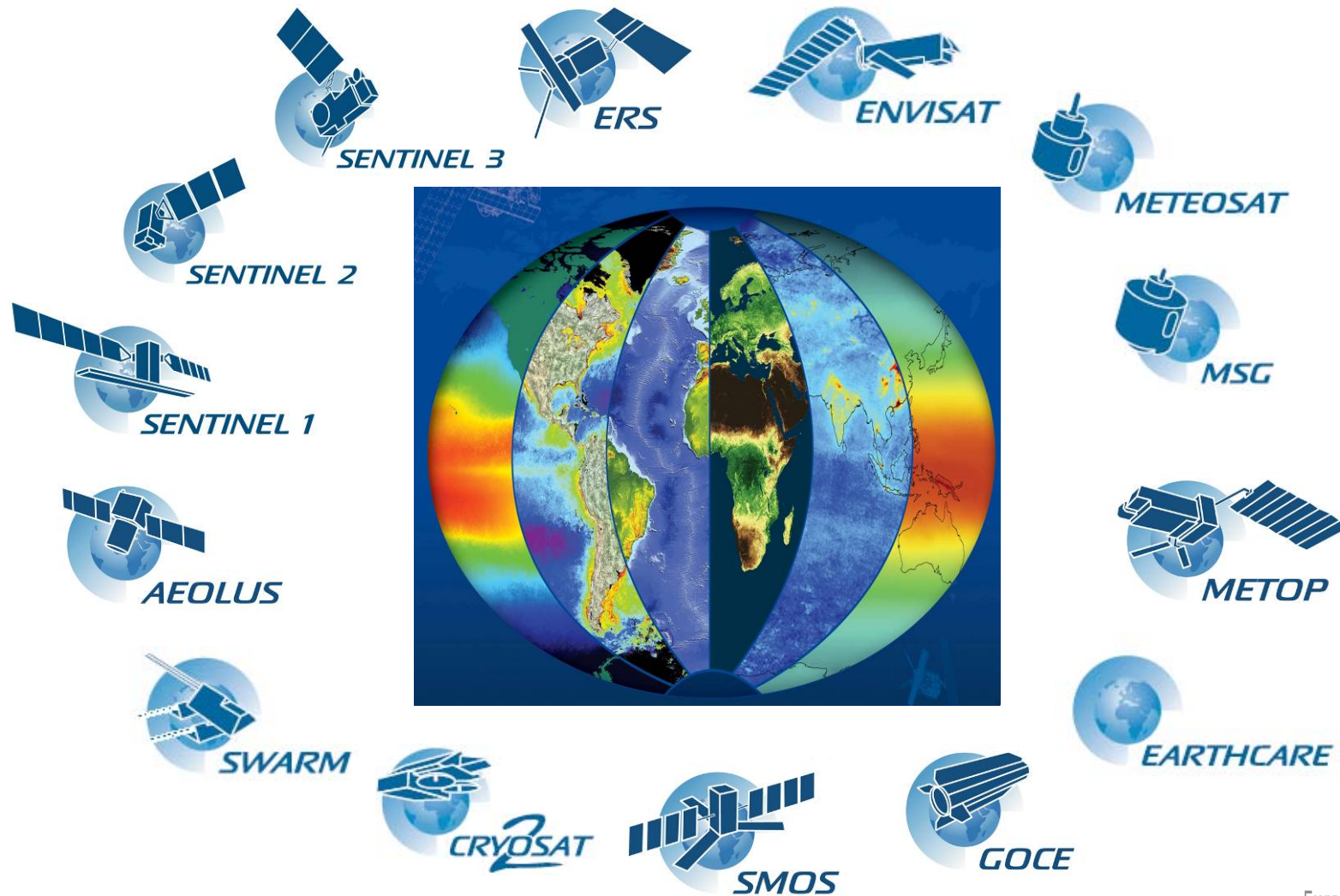
- 1250 kg maximal mass
- Volume in 3.89 m x 2.202 m x 2.207 m
- Average power consumption of 1100 W
- 7.5 years lifetime (fuel for 5 add. years)
- Large cold face for optical instruments thermal control
- Modular accommodation for a simplified management of industrial interfaces
- Launch 2013

Observation Data Management

- 170 Gbit of observation data per orbit
- Space to ground data rate 2 x 280 Mbps X-Band
- 1 contact per orbit
- 3h timeliness



ESA's Earth Observation Toolkit



→ UNDERSTANDING CLIMATE CHANGE

FROM SPACE

ESA'S CLIMATE CHANGE INITIATIVE

Where will space derived ECV's help climate modellers?



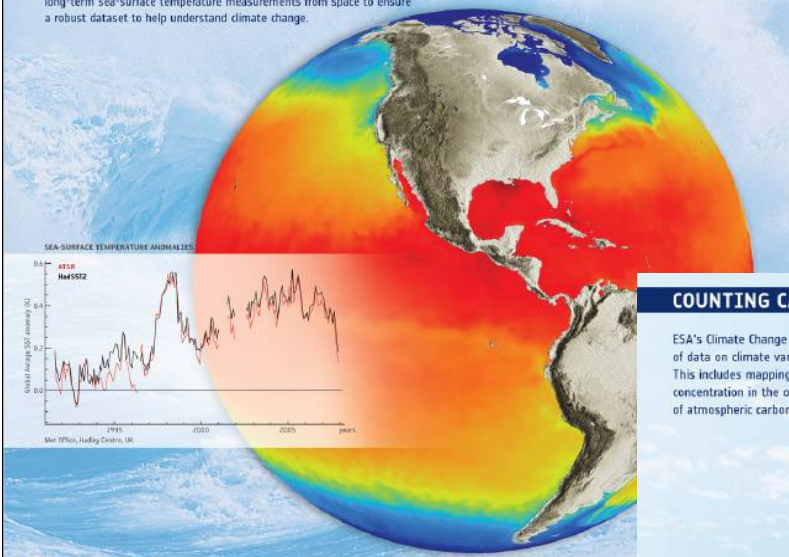
ANSWERS FROM THE OCEAN

Long-term tracking of sea-surface temperature provides a reliable indication of global temperature rises. The Climate Change Initiative will capitalise on ESA's experience in gathering, collating and archiving long-term sea-surface temperature measurements from space to ensure a robust dataset to help understand climate change.

Uncertainty in pre-1993
The lead-time of
(2007) Science

AN OCEAN OF CHANGE

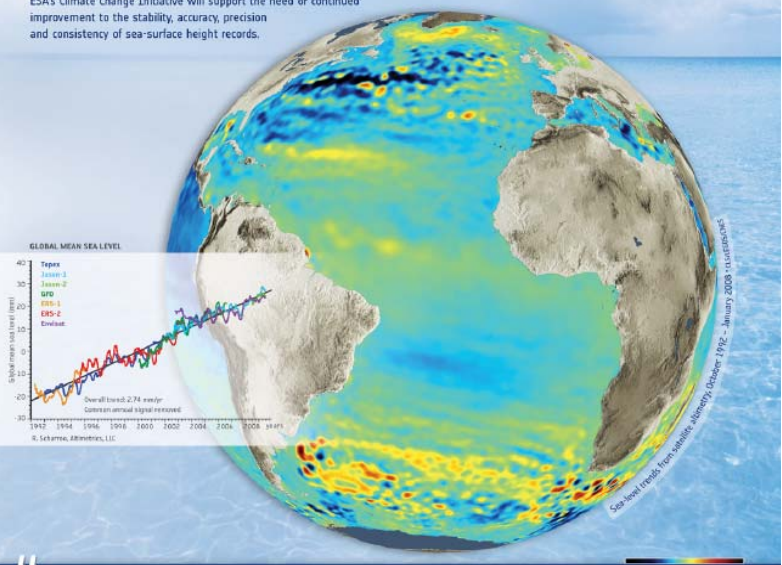
Change in sea-surface height is considered to be a primary indicator of global climate change. Building on the most accurate and best calibrated long-term observations, possible only from space, ESA's Climate Change Initiative will support the need or continued improvement to the stability, accuracy, precision and consistency of sea-surface height records.



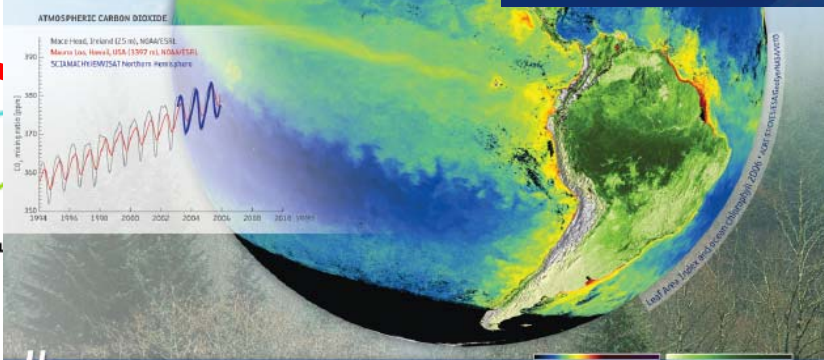
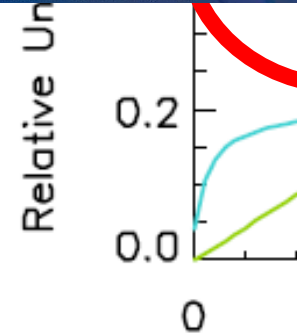
Global ocean heat content has increased since the late 1950s, the period for which adequate observations of sub-surface ocean temperatures have been available." Climate Change 2001: Working Group I: The Scientific Basis - Intergovernmental Panel on Climate Change

COUNTING CARBON

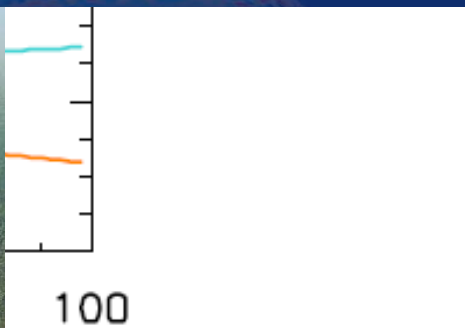
ESA's Climate Change Initiative will ensure the long-term generation of data on climate variables for more accurate carbon modelling. This includes mapping the amount of vegetation on land and chlorophyll concentration in the oceans, as well as measurements of atmospheric carbon dioxide.



Global average sea level has risen since 1993 at an average rate of 2.8 [1.3 to 2.3] mm/yr and since 1993 at 3.1 [2.4 to 3.8] mm/yr." Climate Change 2007: Synthesis Report - Intergovernmental Panel on Climate Change

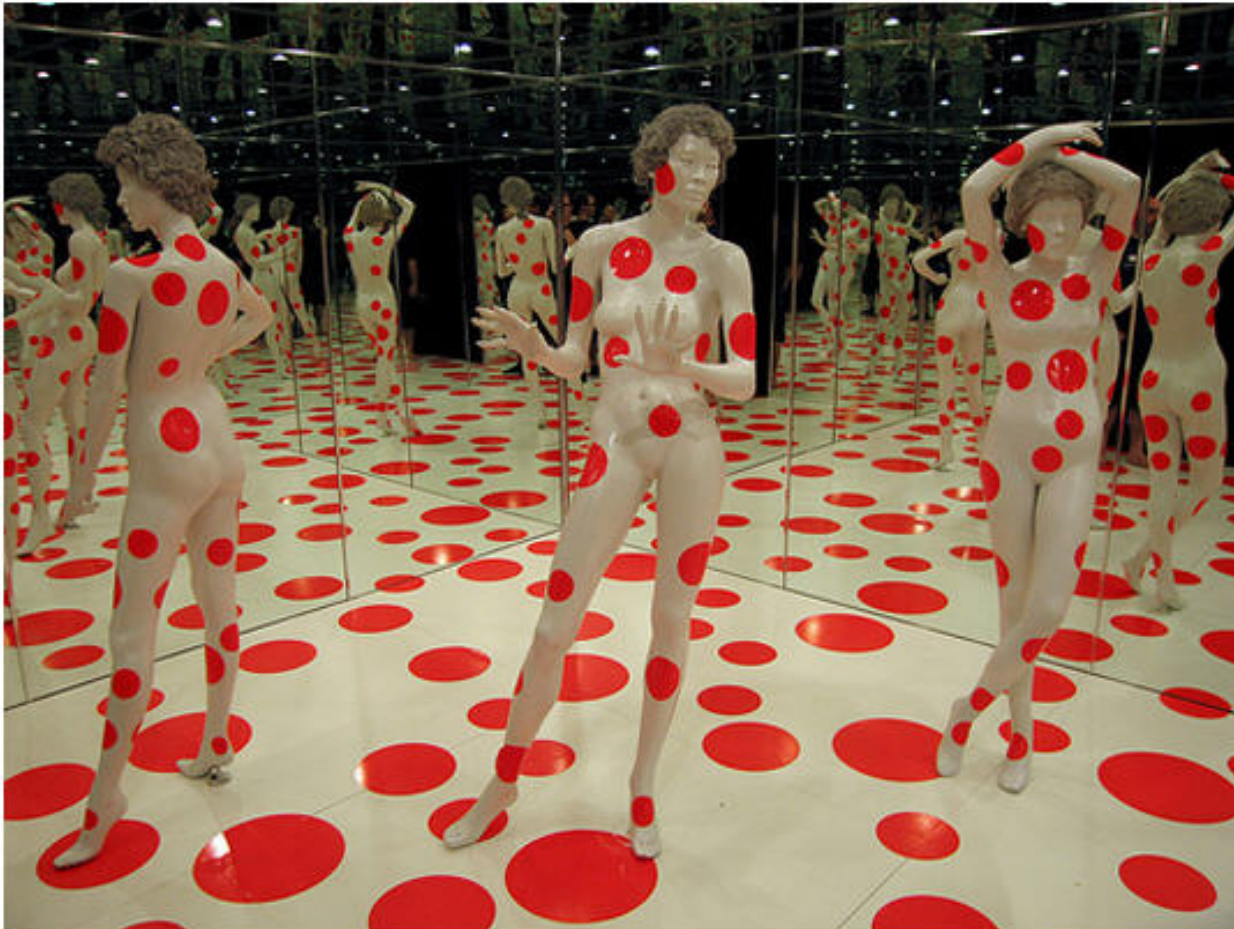


Global increases in CO₂ concentrations are due primarily to fossil fuel use, with land-use change providing another significant but smaller contribution." Climate Change 2007: Synthesis Report - Intergovernmental Panel on Climate Change



- **Theme-I:**
 - **Improving integration and promoting joint analysis** of remotely sensed and *in situ* data, in the context of the [GCOS](#) and [CEOS](#) Essential Climate Variable (ECV) framework
- **Theme-II:**
 - **Improving the data management, accessibility, traceability, homogenization, and analysis of marine surface variables** as part of the development of long-term global surface data sets—with reference to cross-cutting issues in land-based research
- **Theme-III:**
 - Initiatives seeking to capitalize on available **advances in resolving data homogeneities and uncertainties, and in quality control**—by making bias-adjusted and better characterized data (and metadata) available directly to researchers
- **Outcome:**
- **Recommendations on required activities in a 10-year timeframe leading to an improved framework for the integration and accessibility of climatological observations**

Uncertainty of uncertainty...



Issues to think on...

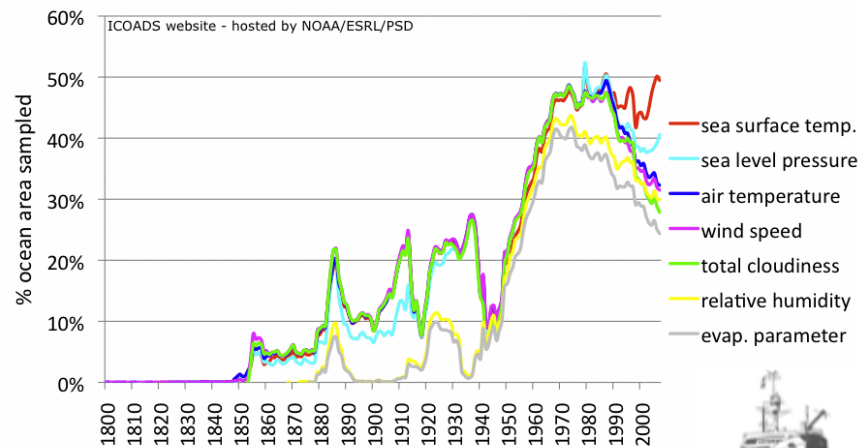
- Sustainability and funding: people power!
- Get the data out!!! (access, interoperability, applications)
- Openness, traceability, repeatability...
- Scientific and practical cooperation and data federation of data and resources
- Data standards, nomenclature, symbology...
- Better documentation and support for users
- Synergy of in situ and EO data: looking backwards AND forwards
- Enhance inter-comparisons and production of standard data products and services (Validation “co-location” services, MDB’s, etc)
- Improved uncertainty: techniques and estimates with data
- Provide clear user requirements for future measurements
- Data recovery: in situ early records from logbooks and satellite data – where is SEASAT? Early AVHRR? Early ERS data?
- New variables: Ocean colour, salinity, winds waves and sea state...
- ...



Approach



- Presentations and discussions form the substance of MARCDAT-III
- Rapporteurs will prepare notes on key aspects arising
- Co-location and review of these at the end of the meeting to provide recommendations and actions
- From this, develop and agree a 10 year vision
- Its **our** meeting and we need to develop and communicate the vision!



European Space Agency

