- Status of Envisat / MERIS
- GMES Sentinel-3
- CoastColour

Peter Regner

European Space Agency

15th IOCCG Committee Meeting, 18-20 January 2010

Sentinel–3: Mission overview and status

esa

Ocean and global land mission

Credit: Sentinel & GS development teams

J.Huart

GMES dedicated missions: Sentinels

Sentinel 1 – SAR imaging
All weather, day/night applications, interferometry

2012

Sentinel 2 – Multispectral imaging
Land applications: urban, forest, agriculture,..
Continuity of Landsat, SPOT

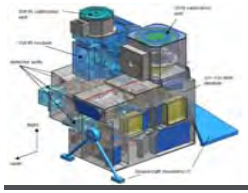
2013

Sentinel 3 – Ocean and global land monitoring
Wide-swath ocean color, vegetation, sea/land surface temperature, altimetry

2013

Sentinel 4 – Geostationary atmospheric
Atmospheric composition monitoring, trans-boundary pollution

2017+



Sentinel 5 precursor – Low-orbit atmospheric
Atmospheric composition monitoring

2014

GMES
We care for a safer world

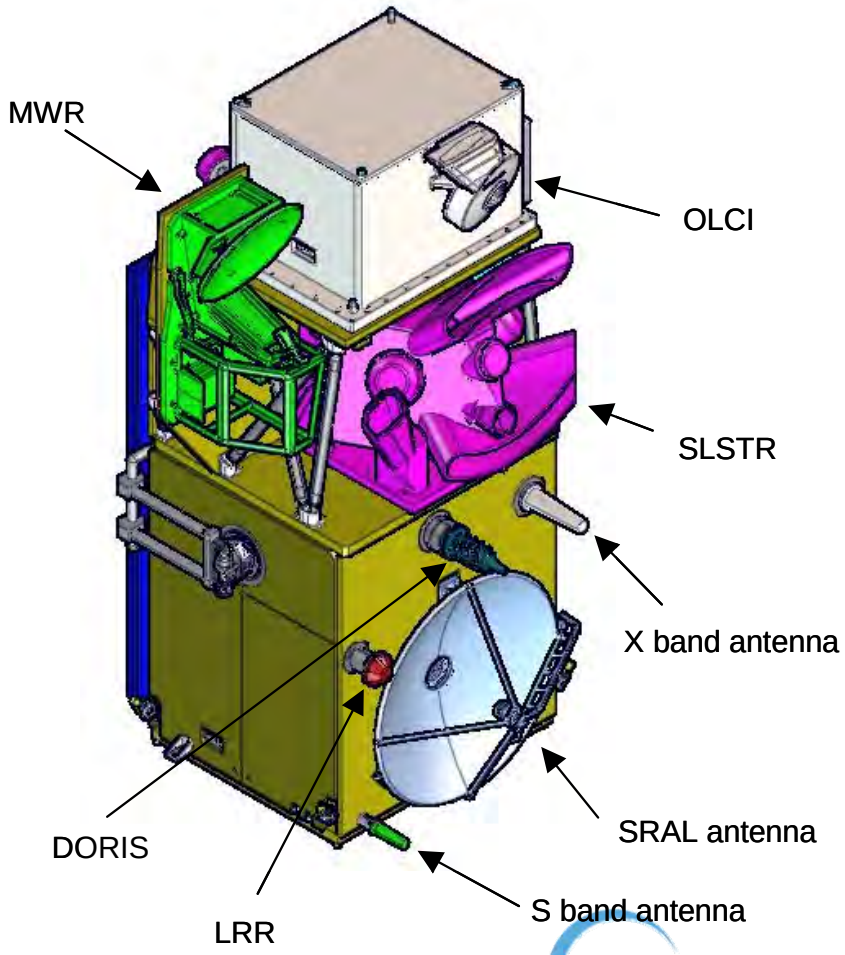
Sentinel–3 overview

Sentinel-3 will provide an operational service for the collection of EO data for global sea and land applications over 15 to 20 years

- **OLCI Ocean and Land Color Instrument**
  at least at the level of quality of the MERIS
- **SLSTR Sea & Land Surface Temperature Rad.**
  at least at the level of quality of the AATSR
- **Sea surface topography payload**
  Ku-/C-band Synthetic Aperture Radar Altimeter
  at least at the level of quality of the Envisat RA

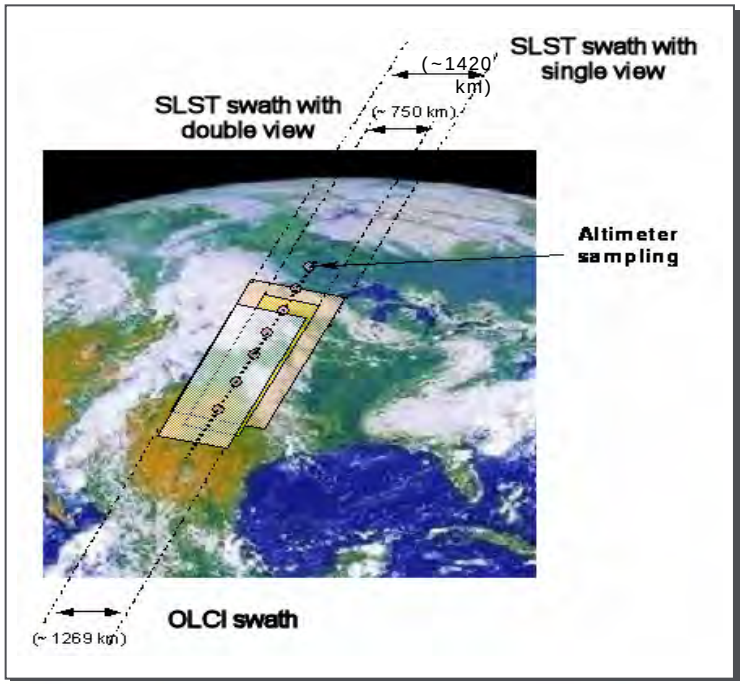
Operational mission

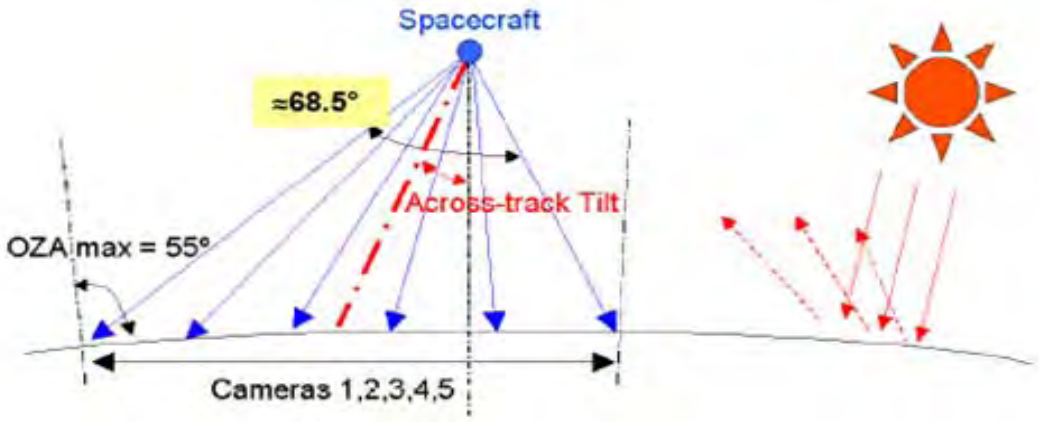
- **High inclination (98.65°), Sun-synchronous LEO**
- **Average altitude: 814.5 km over geoid**
- **Repeat cycle: 27 days (14+7/27 orbits/day)**
- **Equatorial crossing time: 10:00 am**
- **Full performance achieved with 2 satellites in orbit**
- **7 years design life time, consumables for 12 years**



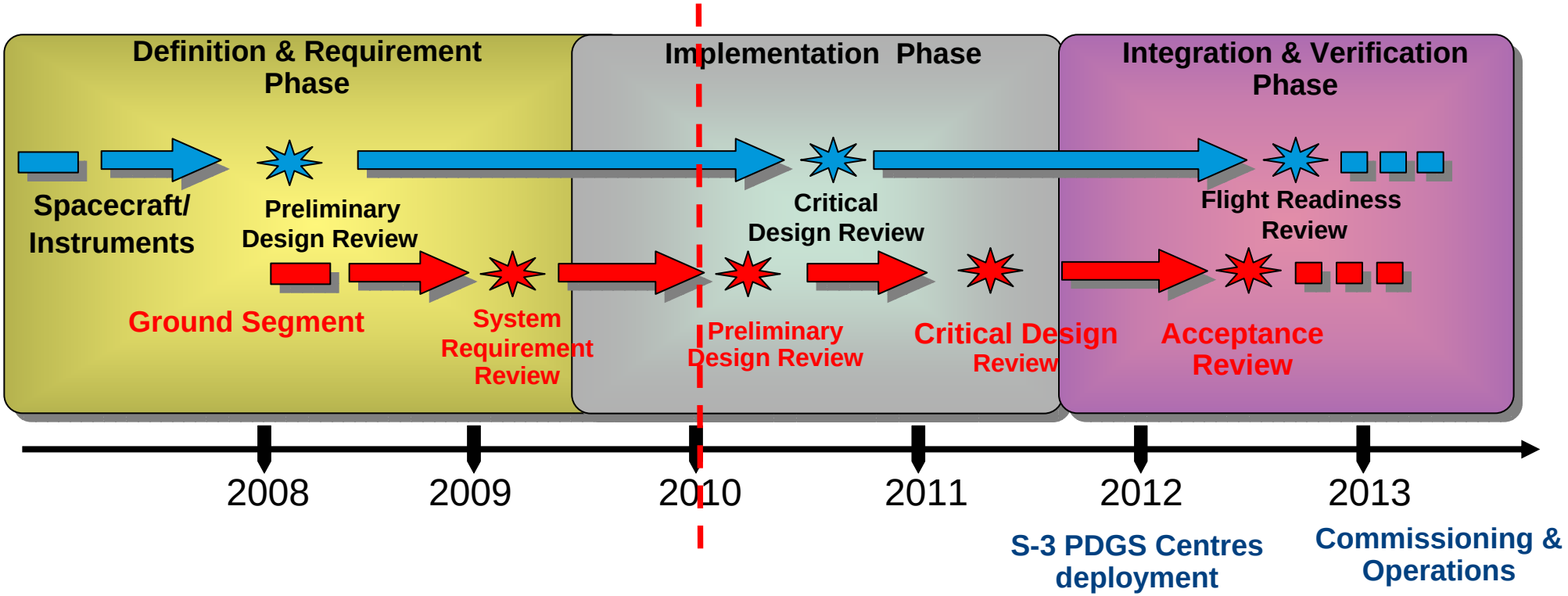
OLCI Overview

- Pushbroom imaging spectrometer similar to MERIS
- 5 fan-shaped cameras arranged cross-track, tilted by ~12° (west)
- 21 spectral bands
  15 MERIS plus 400, 673.75, 764.375, 767.5, 940, 1020nm
- Radiometric accuracy: absolute: < 2%, rel: 0.1%
- FOV 68.6° , broader swath ~1300km
- Spatial resolution 300m at SSP
- 2 spectralon & 1 sun doped diffuser
- 2-day global coverage (2 satellites)
- Overlap with SLSTR
- Improved L2 products





Sentinel-3 Project Logic

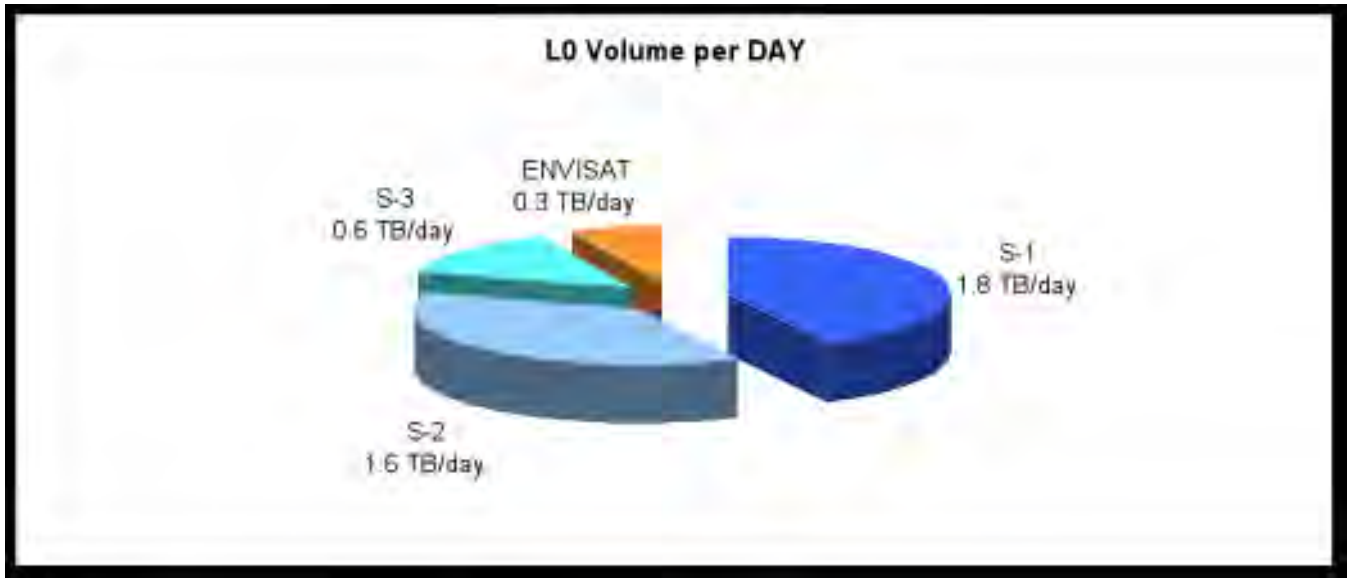


Satellite/Instrument issues:

- risk of system mass over-shoot; study mass reduction options; ensure compatibility with VEGA, Rockot launcher
- consolidation of the system energy balance and the instruments power consumption/thermal control
- start of the manufactoring of the first set of spacecraft and instrument hardware.

Sentinels Payload Data Ground Segments: Drivers

- **Sentinel Data Policy: free and open access to Sentinel data to all users**
- **High data rates & on-ground volumes to be managed efficiently**



- **Initial development is organised to support the B-series as a natural upgrade**
- **Sentinel Missions are considered operational:**

  ➔Ground Segment to be developed as an integral component of the GMES multi-mission Payload Data Ground Segment (PDGS)

  ➔Emphasis on high reliability for both near-real-time data provision and access to off-line and historical multi-mission data

Sentinel Data Policy

ESA & EC in charge of the definition of the principles and the implementation scheme

Free and open access to all Sentinel data to all users

Objective

- **Maximising the beneficial use of EO data & corresponding information services in support of climate change initiatives and for the implementation of environmental policies**
- **Continue interntl. trend for free & open data access in line with GEO data sharing principles**

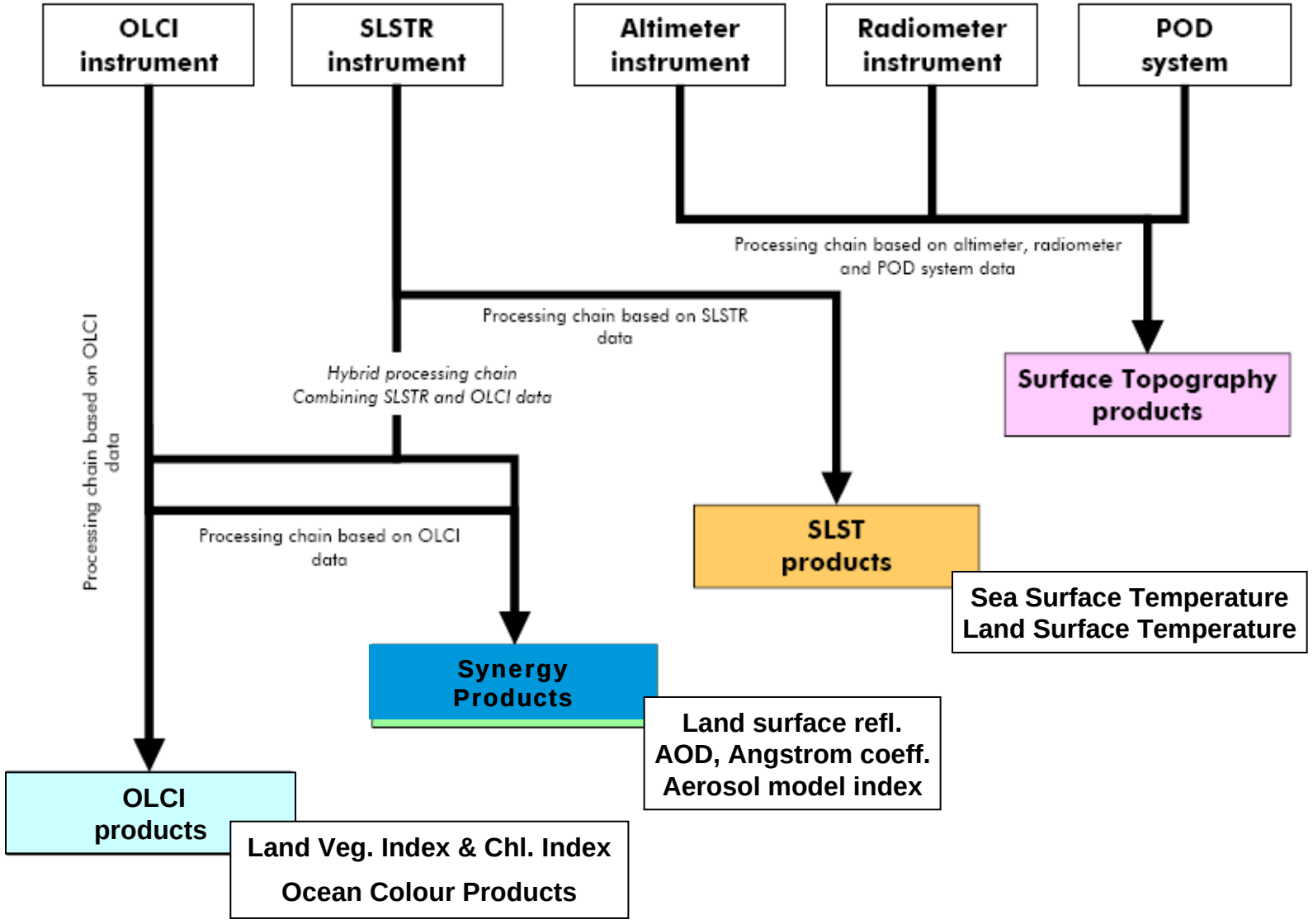
In practice

- **Anybody can access Sentinel data; no difference between public, commercial, scientific use and in between European and non-European users**
- **Applicable to all Sentinels (1-5) and related Ground Segments**
- **Licenses are free of charge**
- **Online access with simple user registration**

Joint ESA/EC principles for the Sentinel Data Policy approved by ESA member states (Sep 2009)

To be approved by EC as part of Regulation of the Europ. Parliament & the Council (end 2010)

Sentinel-3 Data processing Chains

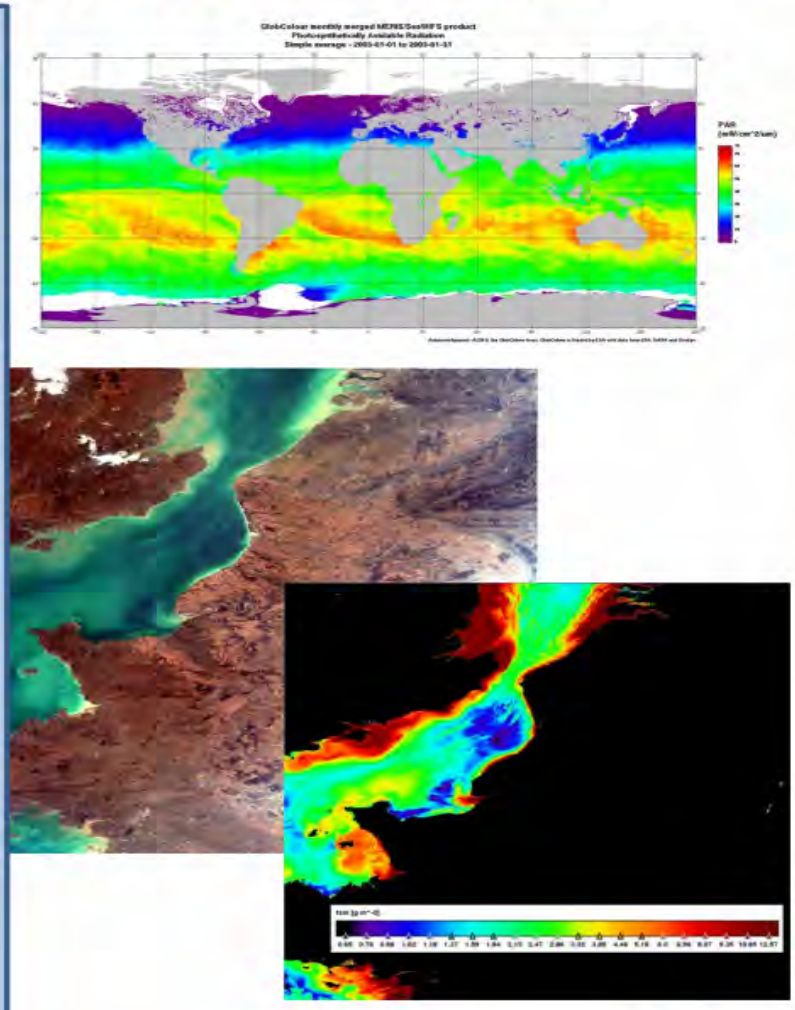


L2 Products: OLCI

List of L2 Products: Marine & Inland Waters

- **OLCI Water- leaving reflectance (16 bands)**
- **OLCI Water Inherent Optical Properties**
  - Total backscattering coefficient
  - Total absorption coefficient
  - Phytoplankton absorption coefficient
  - CDM absorption coefficient
  - Humic material absorption coefficient
- **OLCI Ocean Colour products**
  - Algal pigment concentration
  - Total Suspended Matter concentration
  - Diffuse Attenuation coefficient
  - Heated layer depth
  - Water transparency (Secchi depth)
- **OLCI Atmosphere by-products**
  - Photosynthetically Active Radiation
  - Aerosol optical depth
  - Aerosol Angstrom exponent
  - Integrated Water vapour column

+ per pixel error characterisation



S-3 PDGS Development milestones

Level0/Level1

- **Oct 2009** CDR S-3 Ground Processor Prototype (GPP) for L0, L1
  CDR System Performance Simulator (SPS)
  Successfully passed ➔ new Specs and ATBDs
- **Apr 2010** GPP/SPS Key Inspection
- **Sep 2010** OSAR ➔ End of implementation phase

Level 2

- **Oct 2009** Phase 1 completed with successful Preliminary Design Review
  ➔ ATBDs, Product Trees, DPMs, IODDs
- **Nov 2009** Phase 2 kicked off
  ➔ Detailed specifications - Prototype implementation - Validation
- **Apr 2010** Critical Design Review
- ESA to produce Sentinel (1-5) Data Product Handbooks (focus on operational users in UN and national organisations)