EarthCARE Data Innovation and Science Cluster (DISC)

Vasileios Tzallas and the EarthCARE Team

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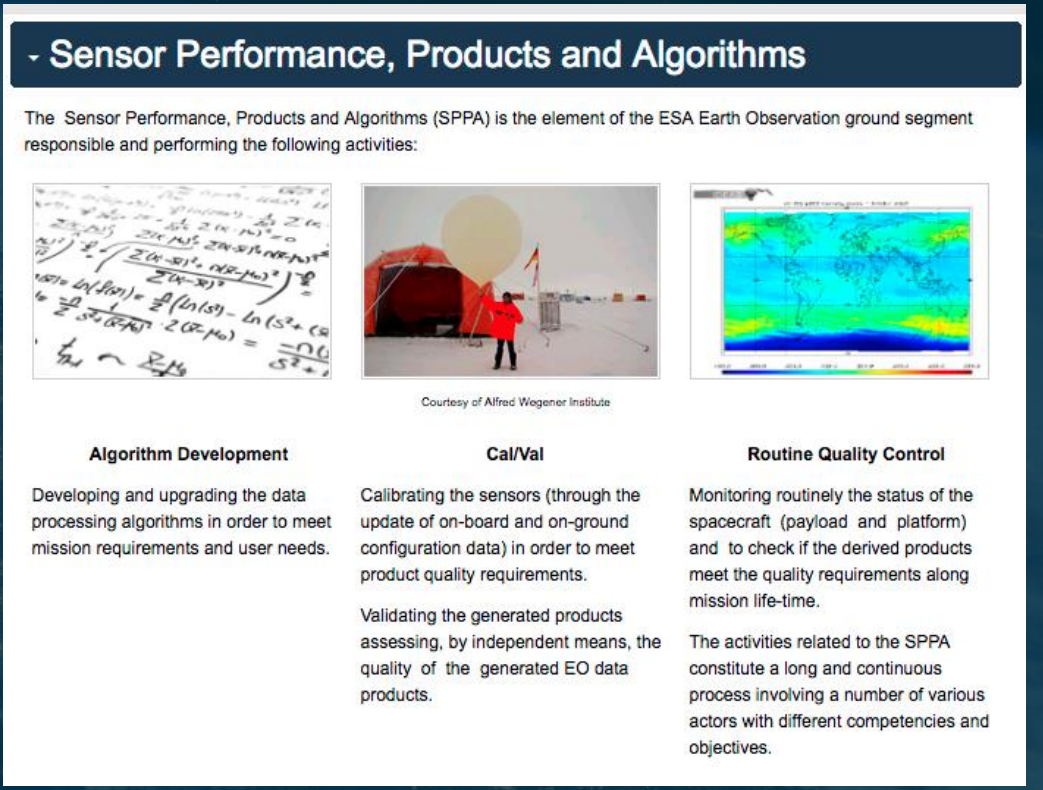
Introduction

Sensor Performance, Products and Algorithms (SPPA) activities at ESA/ESRIN

The overall functions of the ***Sensor Performance, Products and Algorithms*** *(SPPA)* section is to **assure that the users are provided with best possible product quality**, in line with the **MRD**

During the **exploitation phase** of a mission, **SPPA is therefore responsible for**:

- Processor **(algorithms)** maintenance and evolution
- On- and Off-line **performance assessment** and on-demand **QC**
- System **calibration and** Product **validation**
- Assuring the **end-to-end sensor dataset performance** by:
  - ✓ Generation of **ICT**s (instrument control tables)
  - ✓ Harmonizing and establishing **standardized Cal/Val procedures**
  - ✓ Supporting data consolidation and reprocessing activities (**data curation**)
  - ✓ Organizing **workshops** and **meetings**



DISCs for Earth Explorers (Swarm, Aeolus, FLEX)

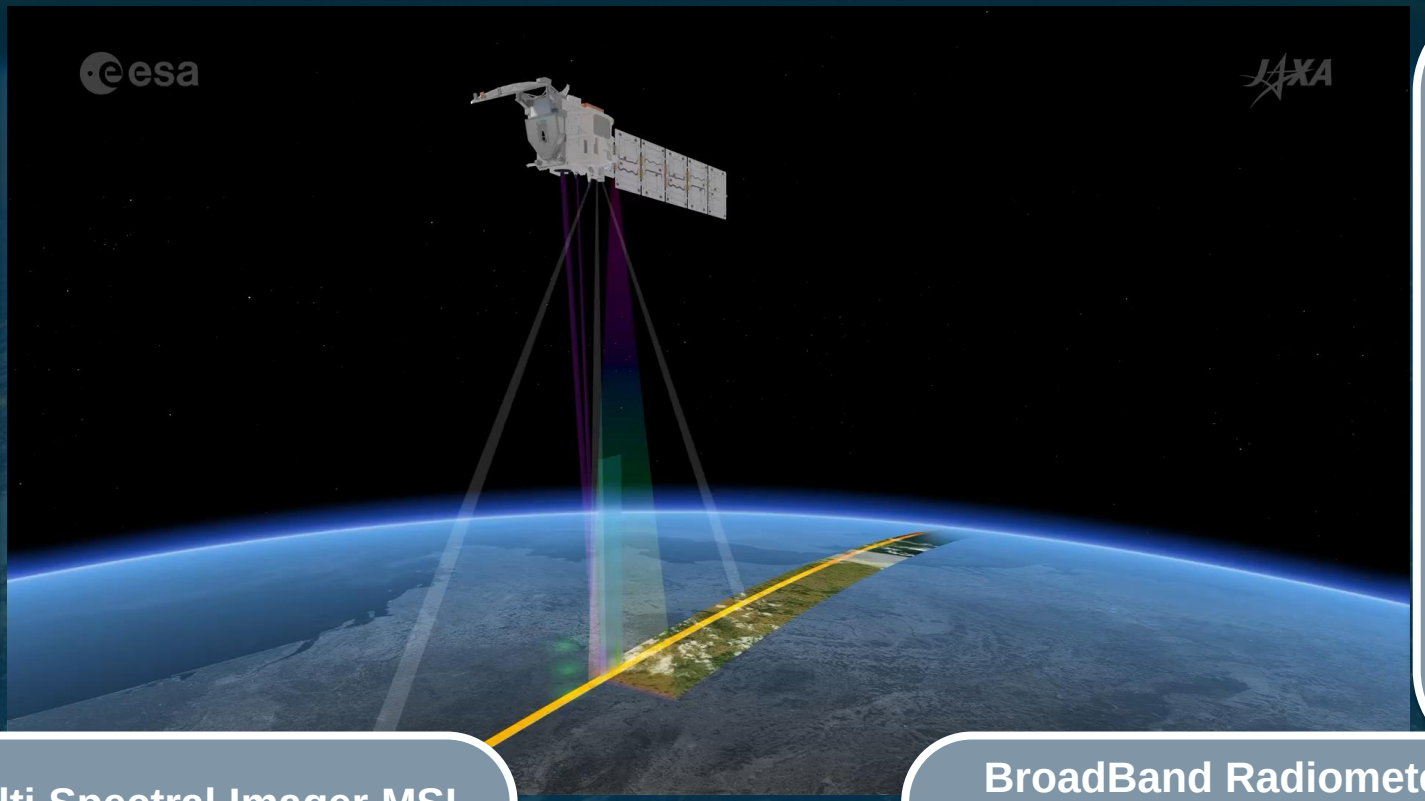
EarthCARE
Data Innovation and Science Cluster (DISC)

EarthCARE Mission

Cloud Profiling Radar CPR (JAXA)

High Power 94GHz Doppler Radar

- *Cloud profiles, rain estimates, particle vertical velocity*



Atmospheric LIDAR ATLID (Airbus TLS)

High spectral resolution 355nm LIDAR

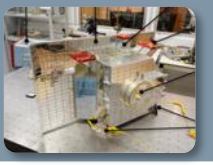
- *Vertical profiles of aerosol and (thin) clouds*

Multi Spectral Imager MSI (SSTL)

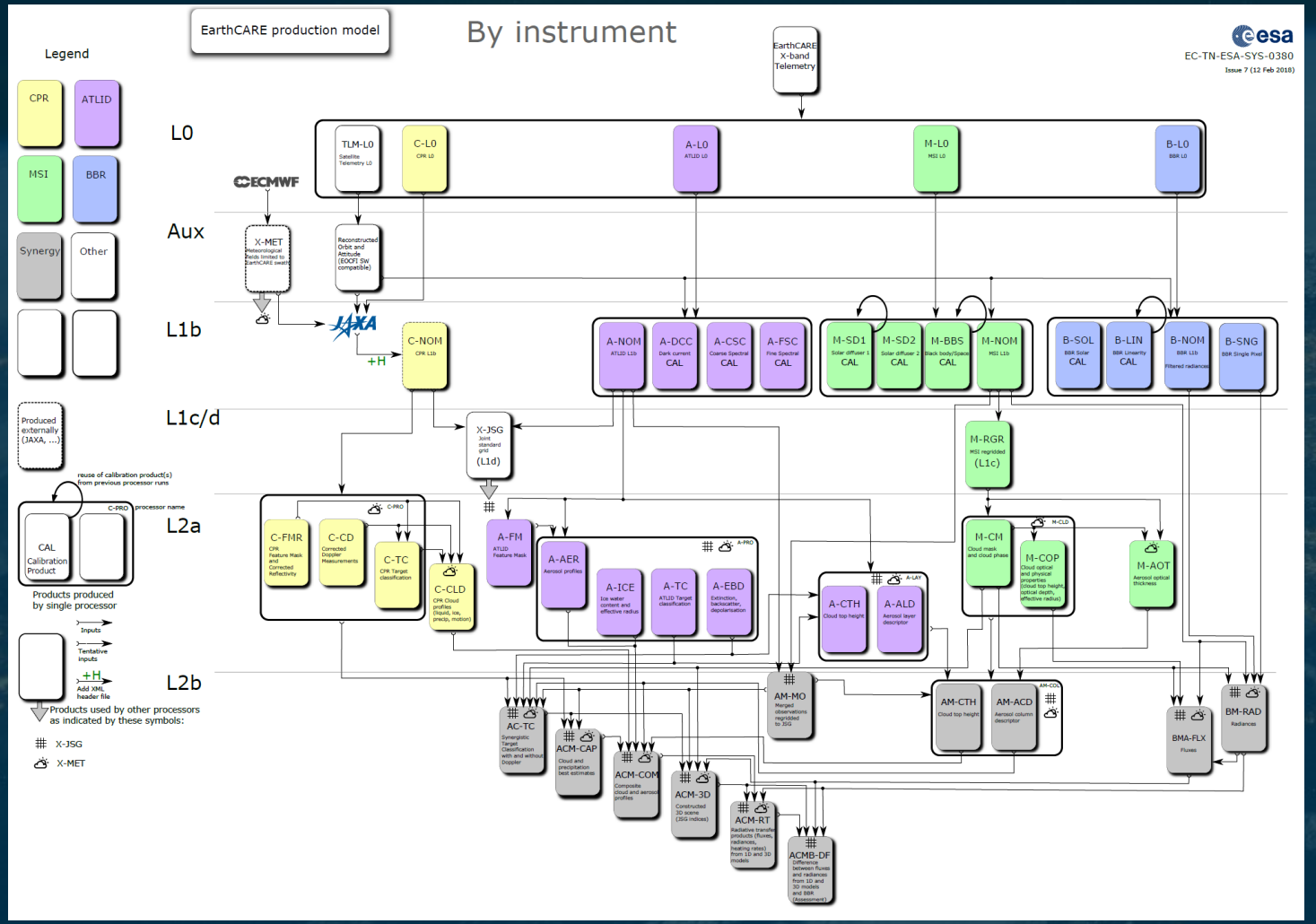
- *Context information*
- *Creating 3D cloud-aerosol scenes*
- *VIS, Near IR, SWIR Camera (VNS)*
- *Thermal IR Camera (TIR)*
- *4 solar and 3 TIR channels*

BroadBand Radiometer BBR (TAS-UK)

- *Measurements of reflected solar and emitted thermal radiation*



The ESA EarthCARE Production Model

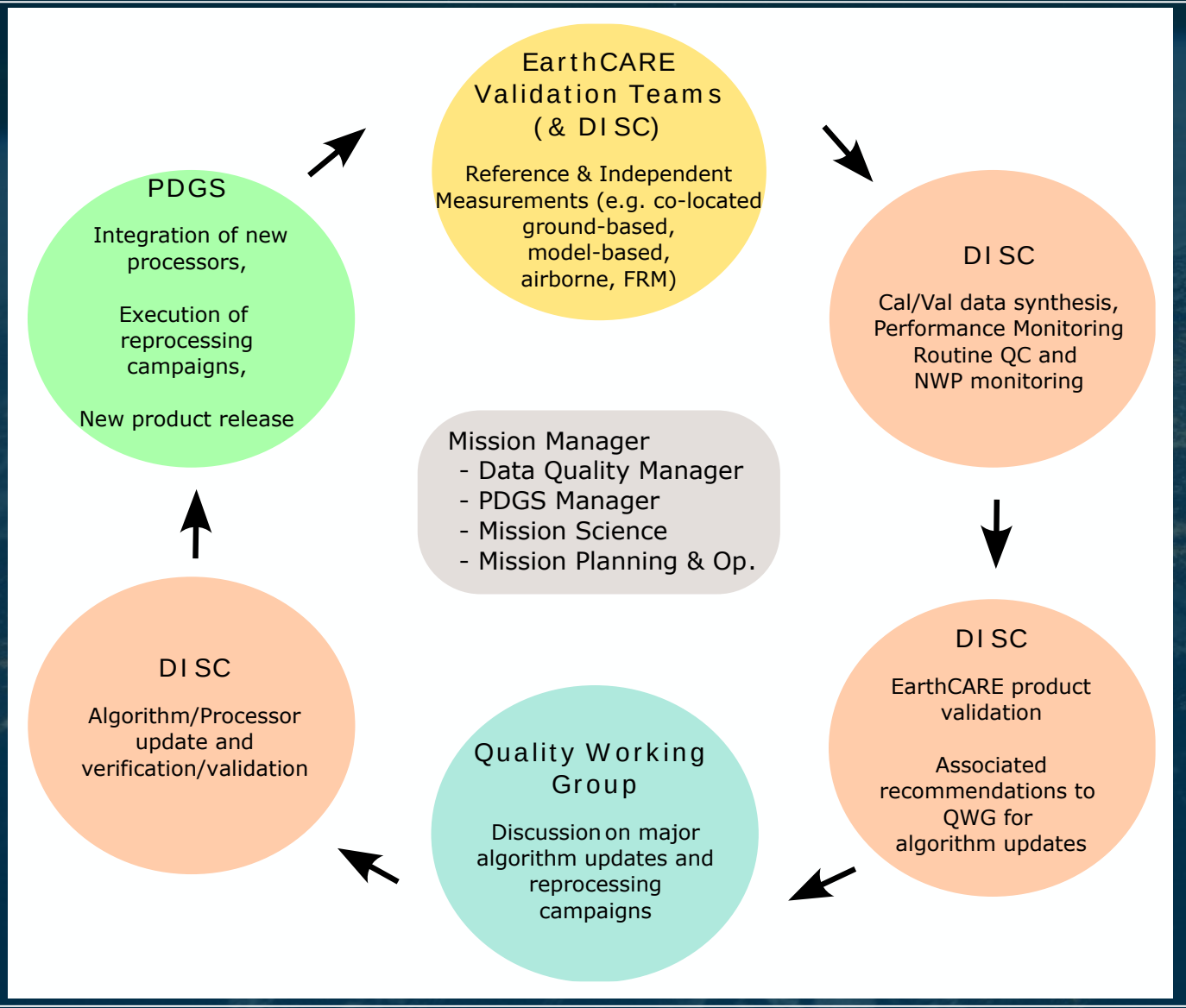


https://amt.copernicus.org/articles/special_issue1156.html

4 instruments – 20 processors – 45 data products !

P6.10	Overview of the EarthCARE Cloud, Aerosol and Radiation science products.	Gerd-jan Van Zadelhoff KNMI

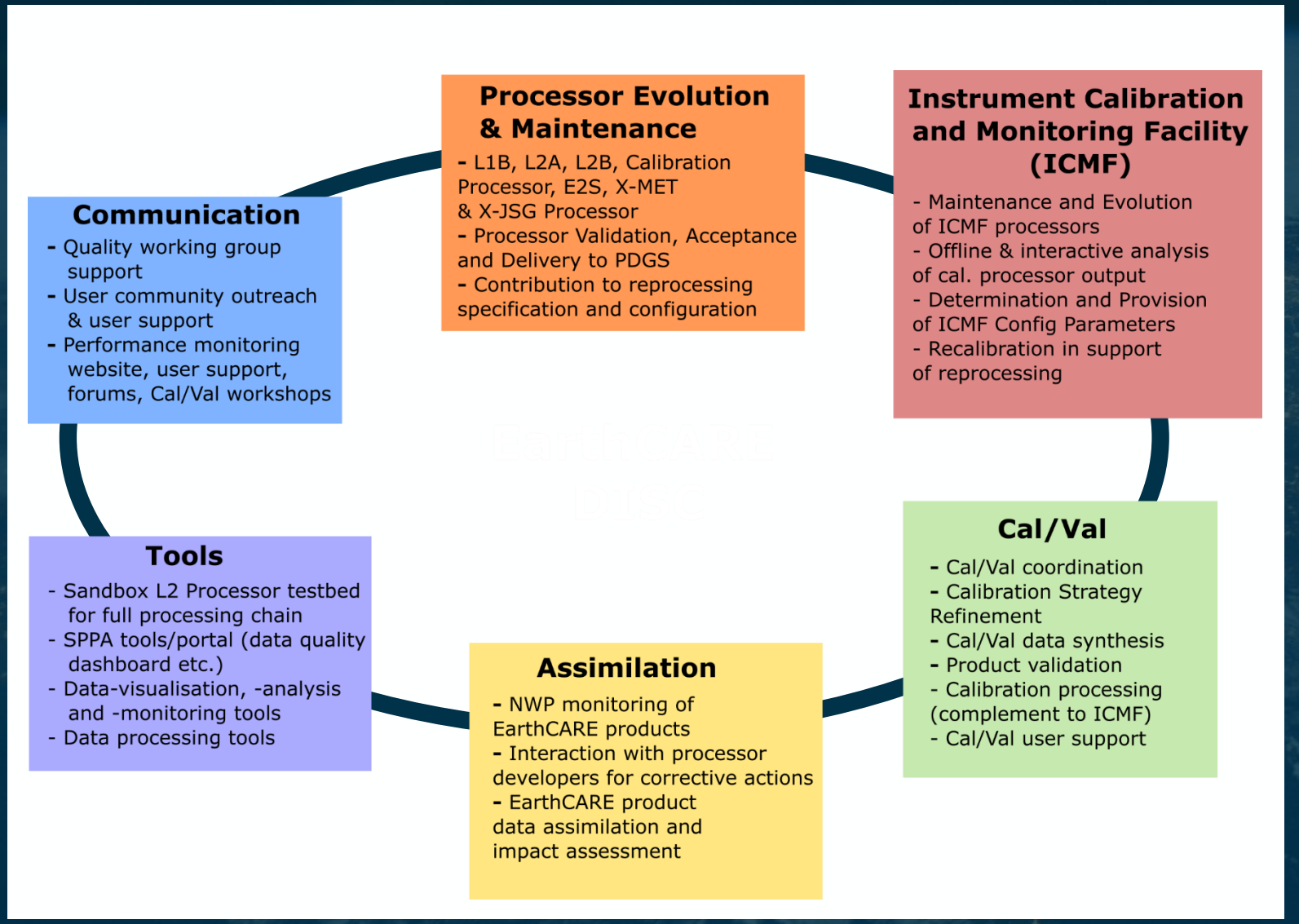
EarthCARE Processor Evolution Cycle



- Monitoring, verification and QC activities within the DISC
- External inputs contribute to DISC data quality work (e.g. ECVT)
- Product improvements are driven by the integration of external and internal feedback in the cycle
- The QWG provides recommendations on major algorithm updates and reprocessing campaigns
- New processor integration into PDGS

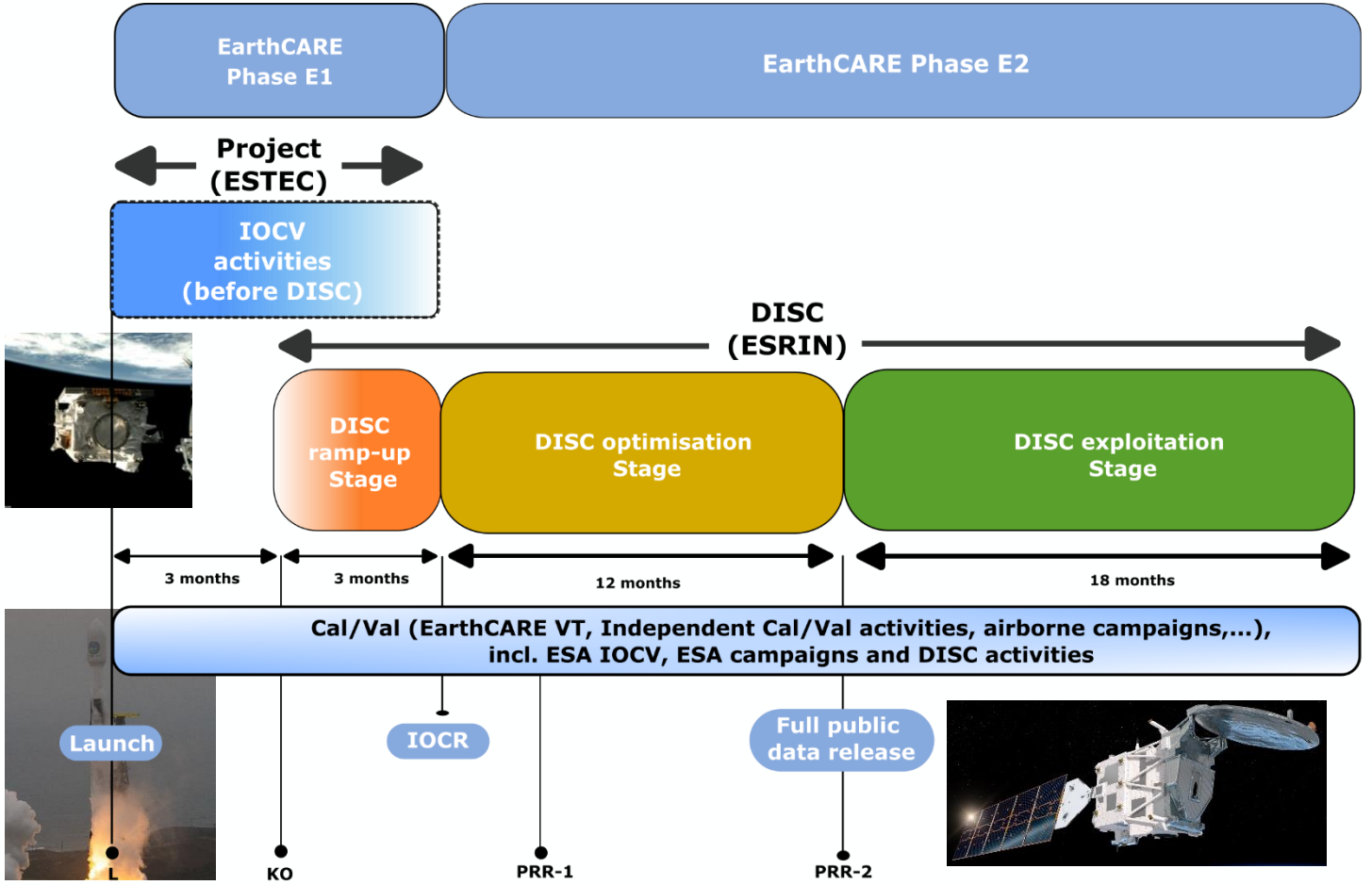
1.4.2	15:27 15:39	**Latest Developments in EarthCARE's Processors and Products** Timon Hummel (ESA)

EarthCARE DISC Overview



- Continuous improvement of the EarthCARE products over the mission lifetime
- Algorithm and processor evolutions
- Data Quality Monitoring
- Cal/Val Synthesis
- EarthCARE product assimilation in NWP models
- Support and Interaction with User Community

EarthCARE DISC Timeline



1.4.3	15:39 15:51	EarthCARE Campaigns & Cal/Val Jonas von Bismarck (ESA)

Summary and Outlook

- EarthCARE DISC groups in a single cluster product, sensor and processor experts
- DISC is the central element in the product evolution cycle. It combines ground processor evolution with sensor performance monitoring, internal Cal/Val and synthesis from external Validation Teams and community outreach and interaction
- Advanced DISC procurement status – close to finalising and signing
- Kick-off at L+3 months (~ early September 2024)
- Full set of activities to start after In-Orbit Commissioning Review (IOCR) at L+6 months