

EUMETSAT Doppler Wind LIDAR (DWL), an operational follow-on to Aeolus

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- Background – DWL Capability & EUMETSAT
- Mission Objectives
- Impact & Socio Economic Benefits
- Drivers, Main Mission Parameters & Requirements
- DWL System Reference Architecture



- Doppler Wind LIDAR (DWL) capability strongly requested by EUMETSAT community in 2003 during post-EPS user consultations, not selected due to technology maturity;
- EUMETSAT Council identified DWL as a possible contribution to its response to the WMO Integrated Global Observing System (WIGOS) Vision 2040, subject to confirmation of *positive impact* of Aeolus data on NWP, *affordability* and *Socio Economic Benefit* impact;
- 2018, ESA successfully launched Aeolus fully demonstrating the Doppler Wind LIDAR concept and identifying its challenges;
- In 2019, EUMETSAT & ESA agreed on defining a joint study roadmap to prepare for affordable operational programmes and initiated system studies;
- ESA initiated pre-development activities in 2020 & will propose Aeolus-2 at its 2022 Council at ministerial level as a cooperation with EUMETSAT.





- Primary objective ➔ Unchanged from Aeolus':

Wind profiles measurement along the Line-Of-Sight direction throughout the troposphere and the lower stratosphere with a vertical resolution and accuracy meeting Numerical Weather Prediction (NWP) requirements;

- Secondary objectives *
 - Aerosol profiling capability improvement;
 - Piggyback of a Radio Occultation instrument requested by EUMETSAT;

** Feasibility under assessment by ESA*

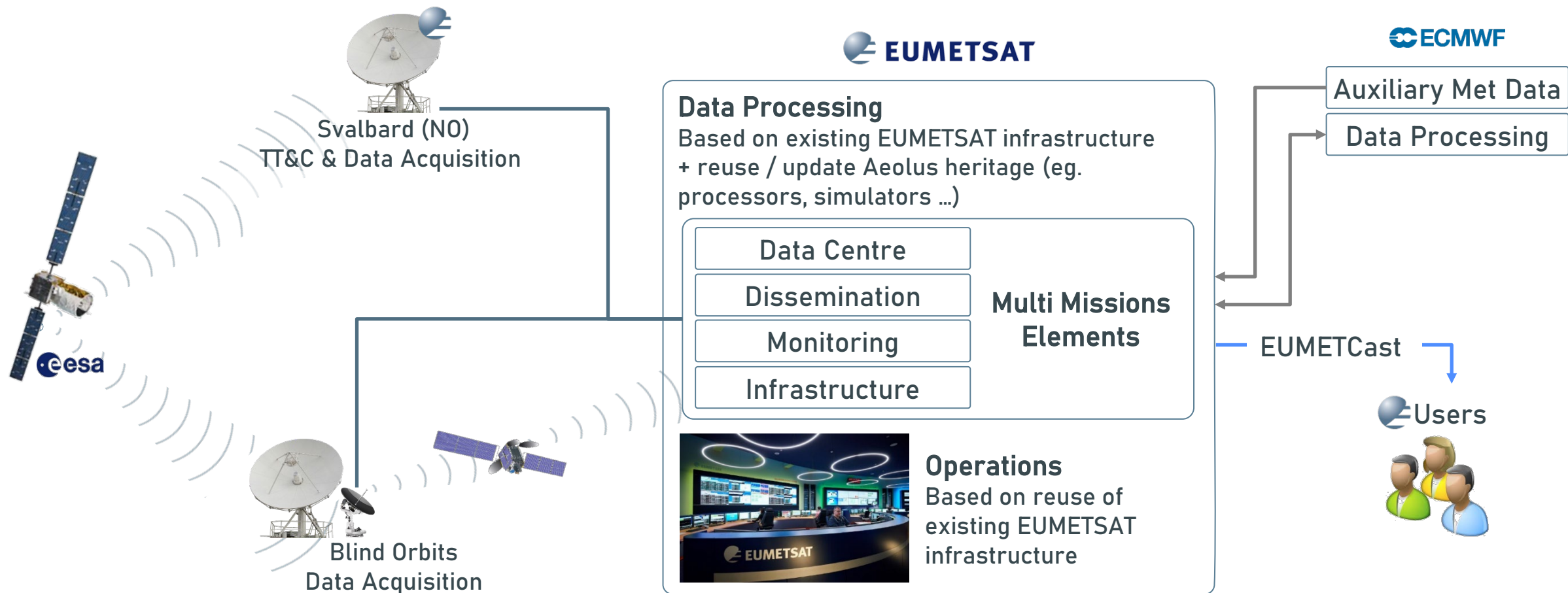
- **Positive impact demonstrated** by major global NWP centres (eg. ECMWF, Météo France, DWL, MetOffice ...) assimilating Aeolus data operationally & reporting significant impact;
- DWL operational benchmarks with different prediction systems ongoing :
 - Independent Observing System Simulation Experiment (OSSE) - NOAA & KNMI,
 - DWL aerosol capabilities OSSE by Météo France,
 - Ensemble Data Assimilation (EDA) analysis by ECMWF.
- **Socio Economic Benefits**
 -  Value Of Information (VOI) study ongoing with London Economics (UK),
 -  Social Economic Benefits study ongoing with methodology similar to EPS-SG's (2014) & WB/WMO study on the Value of Surface-based Meteorological Observation Data).



- **Affordability at the core by**
 - **Limiting evolutions of a complex instrument** to those required to increase spacecraft's lifetime & capitalising on the Aeolus' development & operations lessons learned,
⇒ *Objective is to make Aeolus an operational mission, not to improve it,*
 - **Maximise reuse**, especially of existing EUMETSAT ground segment assets,
- **Mission Parameters**
 - **Mission duration: Min. 10 years,**
 - **Spacecraft lifetime: Min. 5 years** (vs. 3 years for Aeolus),
 - **2 identical spacecraft** required (operated sequentially with overlap),
 - **First launch: End 2030,**
- **First draft End User's Requirement Document** prepared summer 2021 by EUMETSAT & ESA on bases of the Aeolus Science Advisory Group proposal for a follow-on mission;



DWL System Reference Architecture





Thank you!
Questions welcome.