

Aeolus Mission status

November 2021

Tommaso Parrinello
on behalf of Aeolus Team

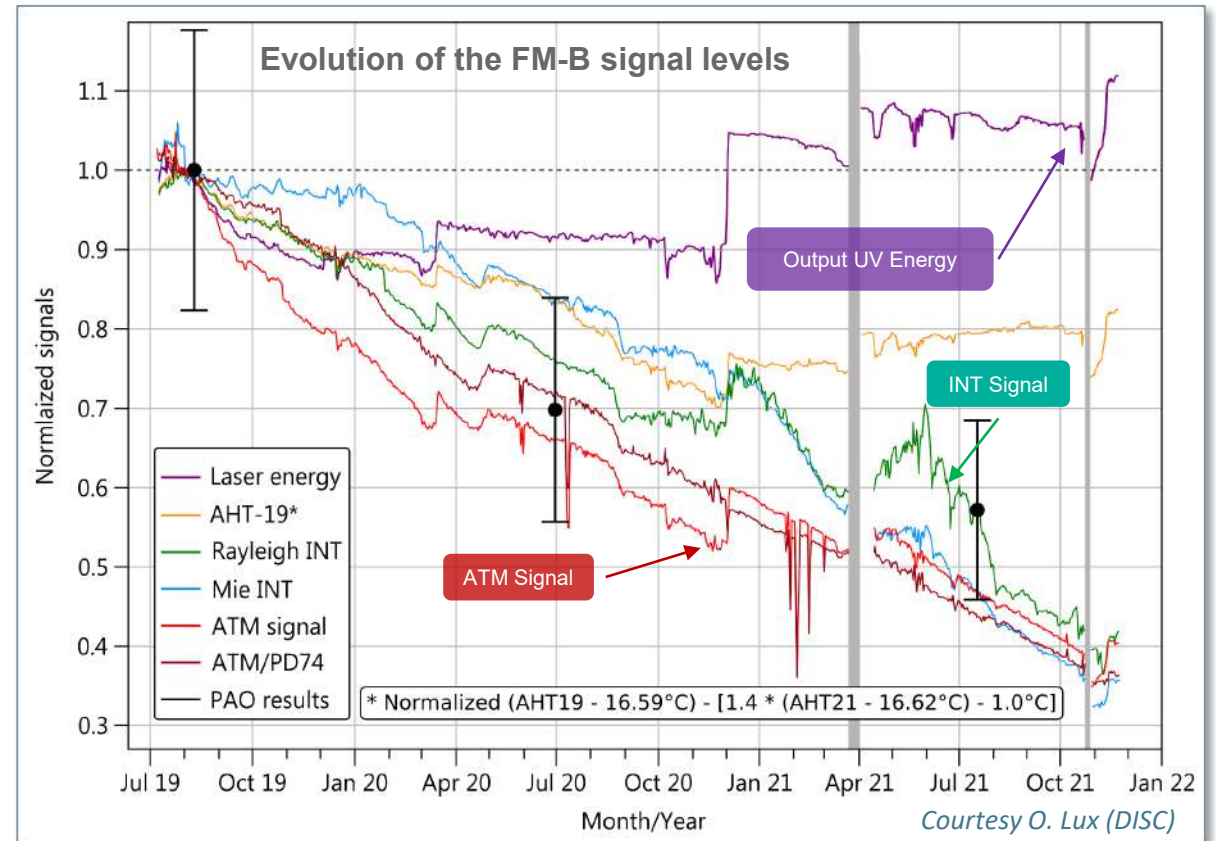
3rd Aeolus NWP impact L2b and product quality working meeting
1-3 December 2021

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OVERVIEW SPACE SEGMENT

- The **platform** is performing well and any sign of degradation, are within the specifications.
- FM-B switched down in October but was recovered rapidly.
- The **roadmap to recover** the missing energy has now brought the transmitted UV output energy to 80+mJ. The higher transmitted energy is having a positive direct effect on the random error (close to summer values)
- A workshop in Jan-Feb 2022 will review the next operational steps: switch to FM-A and/or Orbit Lowering
- An **independent campaign**, ran with the cosmic ray Pierre Auger Observatory, has confirmed that the ALADIN laser beam has reduced its energy by $50\% \pm 20\%$ between 2019 and 2021, pointing to severe Laser Induced Contamination (LIC) in the emitted optical path.
- The **decrease** of the ATM and INT signals would reflect the decrease of the real emitted energy
- The **Tropical Campaign** was successful. Dedicated workshop is planned for February 15th-17th 2022

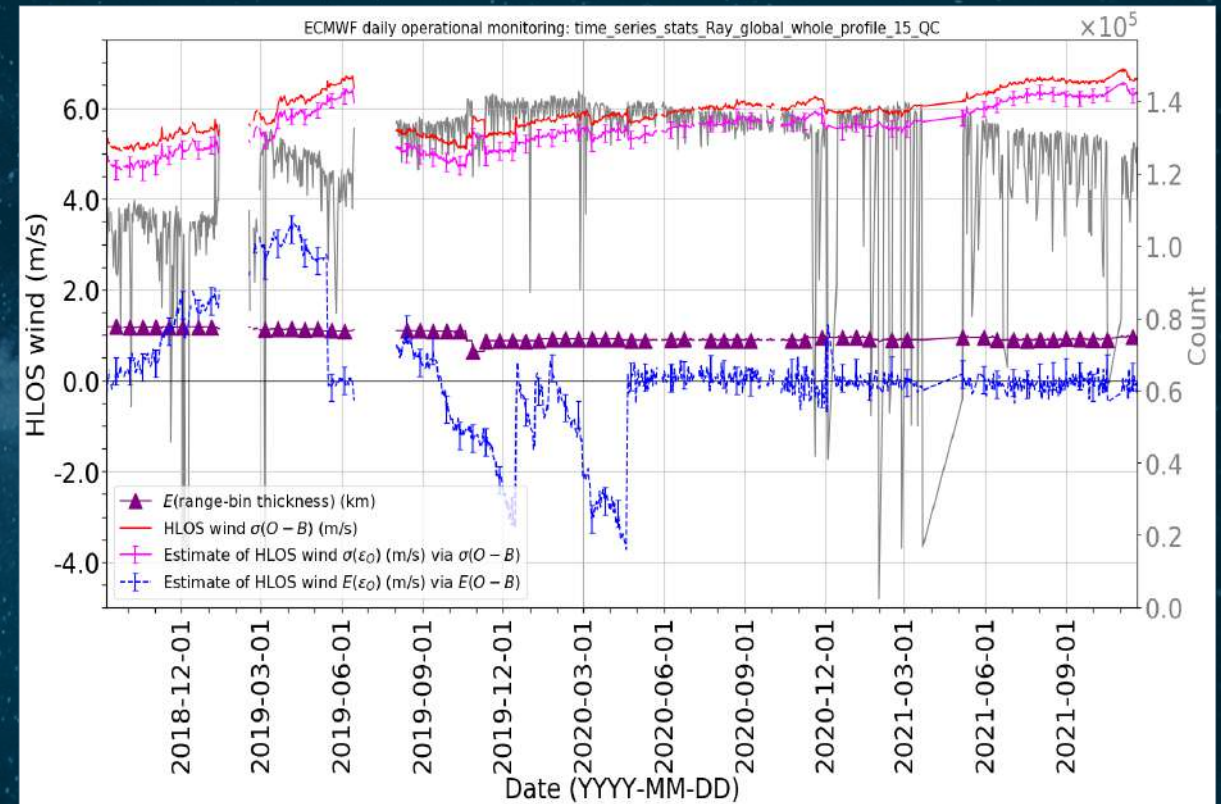


Mission has reached its
designed end of lifetime in space



Quality is constantly monitored and improved (random and systematic errors) allowing also for quick reaction to performance issues

- Random errors are primarily affected by lower UV transmitted and emitted energy. Biases under control and improved significantly
- **Baseline B13 wind data** ready to be deployed on the 6th December 2021
- The reprocessing strategy is quite stable:
 - **2nd reprocessing** campaign (Full FM-B, B11) released in October 2021
 - **3rd Reprocessing Campaign** (FM-A, B13) on going
- New P/N settings (P=38, N=15) to be scheduled on Monday 13/12/2021, will reduce noise
- L2A data recently made available to public users also on VirES



Courtesy M. Rennie (DISC)₃

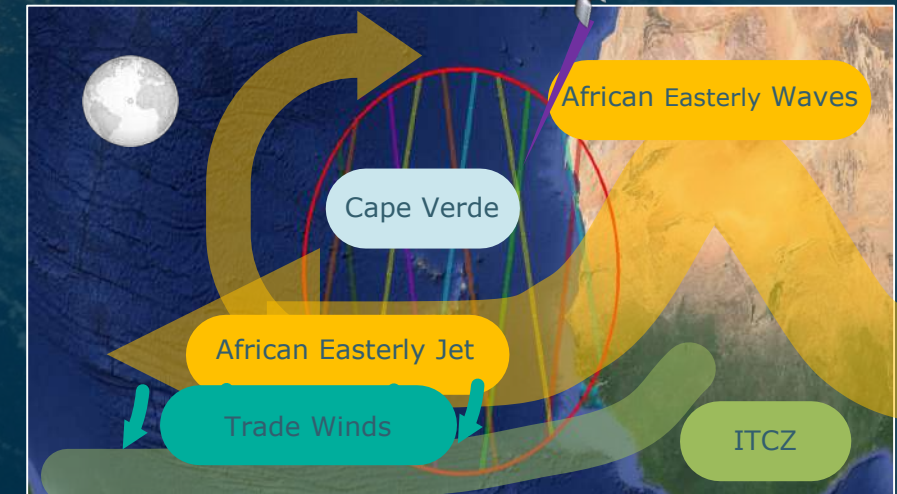
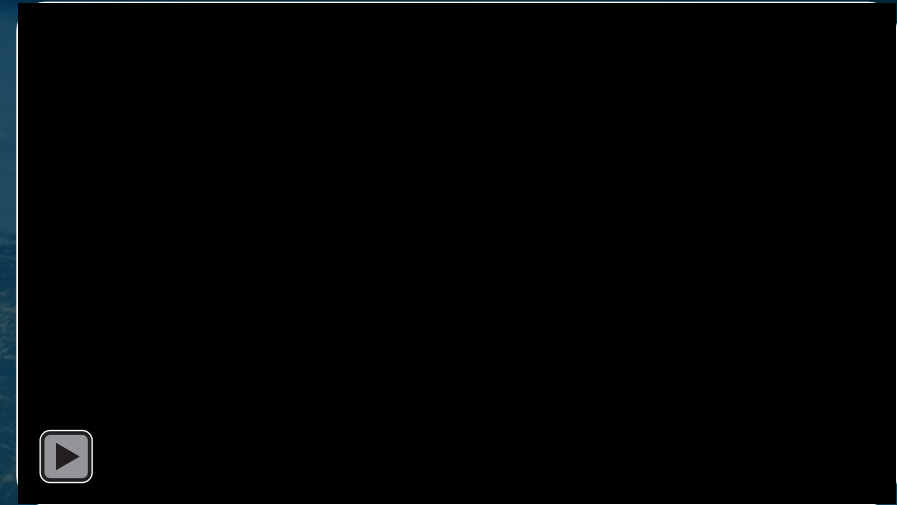
STRATEGIC MISSION GOALS [2021-2022]

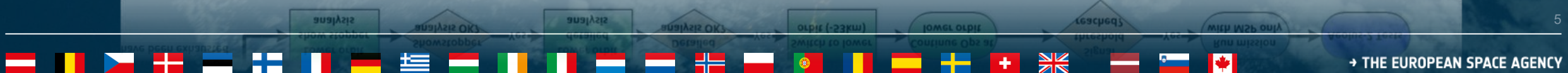
Goal #1: Support the Tropical Campaign in summer 2021 with best possible performance with Laser B to support both the validation and the science aspect of the campaign

Goal #2: Achieve the designed end of life-time (Nov 2021) with best possible performance on both channels RAY and MIE to complete the prime mission objectives

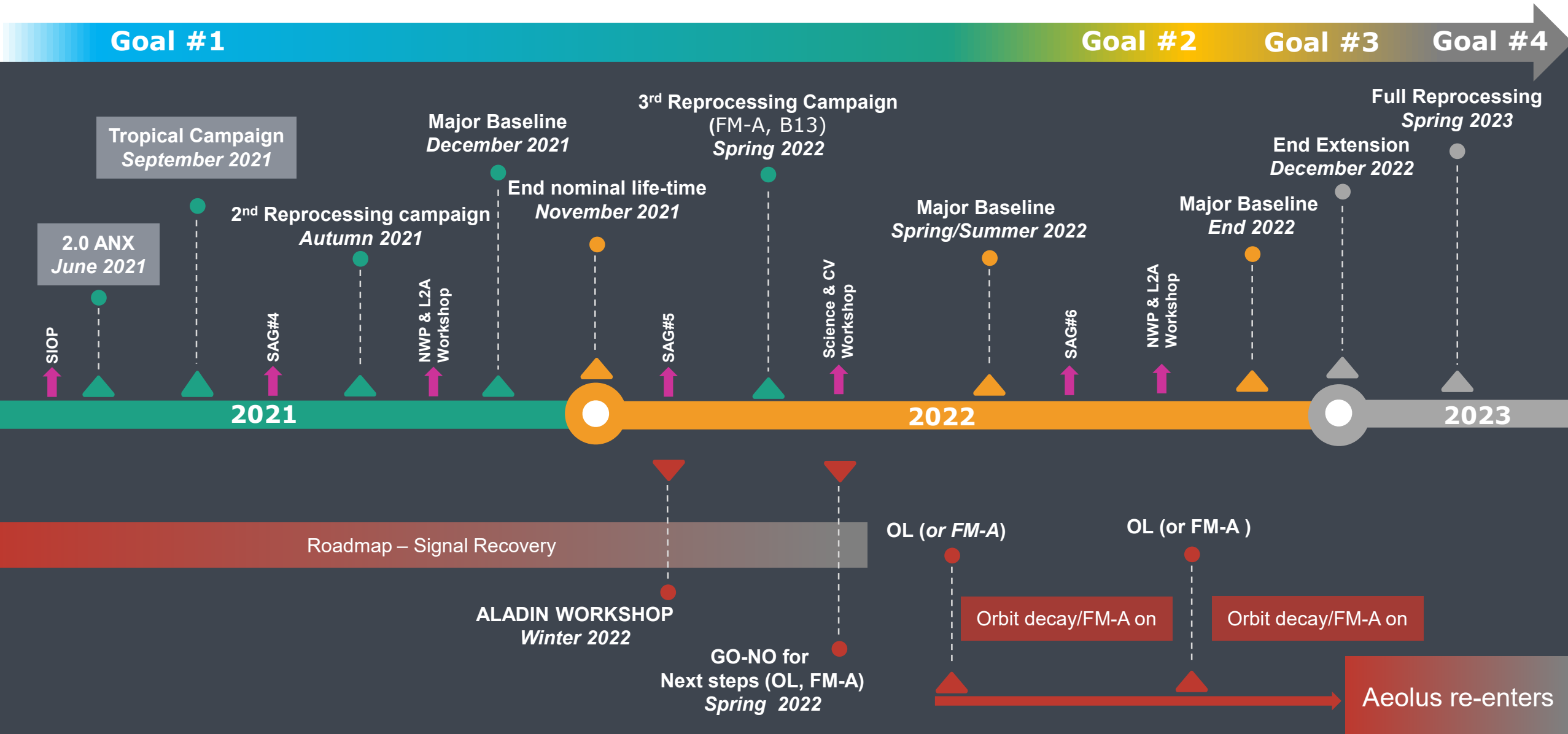
Goal #3: Achieve within the extended life-time (2022) the best possible performance on both channels or at least on one (e.g. MIE)

Goal #4: Perform technological and science demonstration to support the Aeolus Follow on





Mission Timeline [2021-2023]



- The overall performance of the mission is good. Aeolus has been providing global measurements of horizontal wind profiles for 3 years (>3.5B shots). Main wind bias variations have been corrected. Improvement of Random Error to meet Mission Requirement remains challenging. **Aeolus has achieved its 3 years designed lifetime in space**
- ALADIN has achieved the highest energy output level 80+mJ since ever. A roadmap to recover the energy and stabilise the performance is under implementation and it is driving the **four main goals** until end of 2022.
- Validation campaign with PAO demonstrated that the transmitted energy has decreased by 50% between 2019 and 2021. The ATM large diminishing energy is an effect of that.
- The beneficial impact of Aeolus winds has now been proven in most of the global NWP models and contribution to atmospheric dynamics (e.g. stratospheric circulation, gravity waves, improved air quality modelling, etc.) has started to emerge in literature.
- Tropical Campaign successfully held in July – September 2021. Dedicated workshop in Feb 2022.
- Overall the achievement of Aeolus, as a scientific and technological demonstrator, is very good and making it a worldwide acknowledged **pathfinder** of future operational DWL missions

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- ALADIN has achieved the high accuracy required to recover the energy and stabilise the performance is until end of 2022.
- Validation campaign with PA and 2021. The ATM large dim by 50% between 2019 and 2021.
- The beneficial impact of Aeolus on atmospheric dynamics (e.g. models and contribution to atmospheric dynamics (e.g. quality modelling, etc.) has started to emerge in literature
- Tropical Campaign successfully completed in Feb 2022.
- Overall the achievement of Aeolus, as a scientific and technological demonstrator, is very good and making it a worldwide acknowledged **pathfinder** of future operational DWL missions

