

# Aeolus Calibration Monitoring Facility (ACMF)

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## Abstract

The Aeolus Calibration Monitoring Facility (ACMF) is a ground segment software part of the Aeolus Payload Data Ground Segment (PDGS). The ACMF is a component that will interface with other components of the PDGS: the Aeolus Processing Facility (APF), the Aeolus PDGS Surveillance Facility (APSF) and the Mission Management and Planning Facility (MMPF). It will generate and archive: calibration and auxiliary data files needed by the APF for data processing; on-board parameter settings derived from characterisation; and product quality reports. It will be used for Near Real Time (NRT) and reprocessing. Finally, it will provide an environment for long-term and interactive analysis to monitor data quality. This paper describes the main features of the software and the updates needed to support the new Aeolus operation scenario.

## ACMF within the ADM-Aeolus PDGS

The PDGS components to which the ACMF will interface are the APF, the APSF and the MMPF (see figure 1).

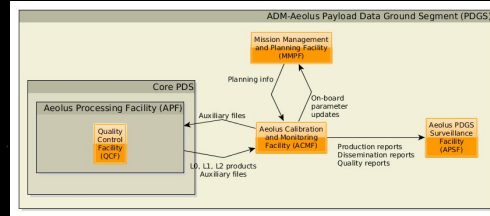


Figure 1. The ACMF within the ADM-Aeolus PDGS.

The APF will provide the ACMF with data products for calibration and for product quality assessment. In addition it will provide the ADFs produced outside the ACMF (e.g. L1B zero wind calibration). The ACMF provides the APF with required ADFs.

The ACMF provides several inputs to the APSF to support the PDGS monitoring, in particular dissemination reports, production reports, and quality reports.

The ACMF provides the MMPF with on-board parameter settings derived from in-flight characterization. The MMPF is in charge of generating and providing the payload operation planning information as per the mission rules defined for Aeolus, in line with the High-Level Operations Plan (HLOP).

## ACMF Overview

The ACMF is a sophisticated software that will generate all required auxiliary data for Aeolus processing, deliver all auxiliary data for processing performed in the APF, both operational and reprocessing, generate and deliver payload on-board settings resulting from in-flight characterization and monitor the quality of all Aeolus data products (systematically and interactively).

The software ensure the Quality Control (QC) of satellite data by checking whether the performances of instrument on satellite and the quality of the satellite processed data are in agreement with what is "expected" or "nominal", and taking actions to maintain or improve performance and quality of data. See figure 3 for the QC cycle.

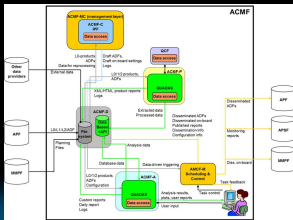


Figure 2. Overview of the ACMF components.

The software is implemented as an optimal mix of automated tasks and user intervention, it gives full insight into data quality status and ACMF status while being easily maintainable.

The ACMF main components interacting together are shown in figure 2. The ACMF facility will use 2 computers: a server platform that hosts the operational part of the ACMF, being the ACMF-P, ACMF-D, ACMF-M, QCF and ACMF-C, and an analysis workstation that hosts the ACMF-A.

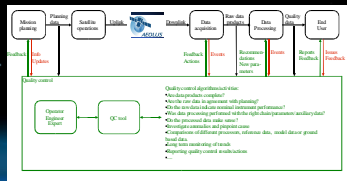


Figure 3. Quality control cycle.

## ACMF Component Description

The configuration management component, ACMF-M, acts as the conductor. It disseminates calibration and processor configuration Auxiliary Data Files (ADF), ensures consistency and maintains traceability. It is done in real time and will allow regeneration of ADF for reprocessing purpose also. In addition, it ensures that the configuration of the ACMF-C, P, D and A components is consistent within the ACMF, and within the PDS. It configures and manages inputs and outputs of the ACMF-C calibration processor through a management layer. The ACMF-M controls the execution and monitoring of all tasks through a task scheduler. In order to distinguish data at different stage of consolidation, a concept of a data version is handled.

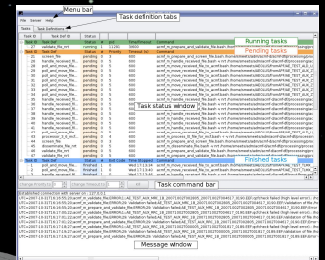


Figure 4. Task control GUI client.

The calibration component, ACMF-C, implements the ADM-AEOLUS calibration algorithms as a series of processors that comply to the ESA required generic standards and ADM specific interfaces, and as such generates calibration auxiliary data files and on-board instrument and platform settings. The ACMF orchestrate the L1B processor and the implemented calibration algorithms, taking as inputs, for every different processor, products and auxiliary data provided from external entities and internal production chains.

The product screening component, ACMF-P, performs systematic product inspection integrated into the quality control environment, outside the core PDS. For this component maximal reuse of QUADAS code is made. QUADAS is an application built on IDL and additional C-functions, that provides user interface functionality, plot functionality, reporting functionality and analysis functionality.

The data storage component, ACMF-D, stores extracted quality and performance parameters, auxiliary data and configuration information. The database part of the ACMF-D will reuse the QUADAS functionality and CODA technology, allowing to read data from ADM-AEOLUS data products, as well as related data files through an Application Programming Interface (API).

The data analysis component, ACMF-A, performs interactive and systematic analysis on product screening and calibration outputs and on individual products. It will allow anomaly investigation, advanced validation of ADFs, long term monitoring and supervision of routine Quality Control ADFs.

The QCF component is a module integrated into the core PDS and the ACMF performing first level screening of products immediately after production by the relevant processing facilities. It performs common file type checks, but will also be used for dedicated checks on ADFs within the ACMF.

## Development Status

Version 2 of the software was delivered in 2009. During the last years, the Aladin instrument anomalies were solved.

As output of the instrument investigation important changes were implemented both at Flight Segment level (new instrument operations from burst to continuous mode) and at Ground Segment level (updated algorithms version, updated PDGS architecture). A new ACMF software version is currently under development in order to incorporate all the needed changes.

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