

# Atomic Clock Ensemble in Space

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The Atomic Clock Ensemble in Space (ACES) mission is developing high performance clocks and links for space to test Einstein's theory of general relativity. From the International Space Station, the ACES payload will distribute a clock signal with fractional frequency instability and inaccuracy of  $1 \times 10^{-16}$  establishing a worldwide network to compare clocks in space and on ground. ACES will provide an absolute measurement of Einstein's gravitational redshift, it will search for time variations of fundamental constants, contribute to tests of topological dark matter models, and perform Standard Model Extension tests. The network of ground clocks participating to the ACES mission will additionally be used to compare clocks over different continents and measure geopotential differences at the clock locations.

After some technical delays, the ACES flight model is now approaching its completion. System tests involving the laser-cooled Cs clock PHARAO, the active H-maser SHM and the on-board frequency comparator (FCDP) have measured the performance of the clock signal delivered by ACES. The ACES microwave link MWL is currently under test. The single-photon avalanche detector of the ACES optical link ELT has been tested and will now be integrated in the ACES payload.

The ACES mission concept, its scientific objectives, and the recent test results will be presented together with the major milestones that will lead us to the ACES launch.

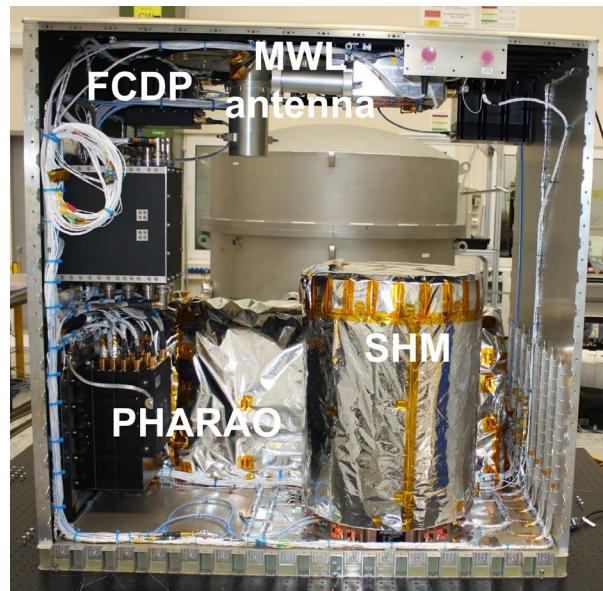


Fig. 1: Flight model of the ACES payload before system tests.

## References

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