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Lessons Learned in Space Systems: Achievements, Challenges, Best Practices, Standards. (5)

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SOLAR ORBITER AOCS FINE POINTING MODE IMPROVEMENT IN FLIGHT : CHALLENGES AND ACHIEVEMENTS

Abstract

ESA Solar Orbiter was launched from Cape Canaveral in collaboration with NASA on the 10th of February 2020 to start its journey around the Sun, with the commissioning phase ending in April 2020. After commissioning, a tighter pointing requirement goal was set by ESA in order to further improve the performance in Fine Pointing Mode, in preparation of the upcoming start of Science Phase. The first part of this paper outlines the end-to-end process which allowed - in just six months – to update the Fine Pointing Mode design, re-tune the controller with refined assumptions taken from flight data and robust methods, and execute full validation of the new AOCS software on the Avionics Test Bench at Airbus Defence and Space. The second part of the paper describes the upload in flight of the new software and the analysis of the on-orbit pointing performance, which showed a significant improvement with respect to the previous one, thus contributing to the success of the Mission's scientific goals.