

SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (4)

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PREPARING ROSETTA RE-ACTIVATION

Abstract

The International Rosetta Mission was launched on 2nd March 2004 on its 10 year journey to comet Churyumov-Gerasimenko. Rosetta will reach the comet in 2014, orbit it for about 1.5 years at altitudes as low as a few kilometres and deliver the lander Philae onto its surface. Rosetta entered hibernation in June 2011, a necessary step due to the large heliocentric distances reached by the solar-powered spacecraft, which prevented full operation of the on-board electrical systems. Rosetta has by now flown through the aphelion phase of its orbit (5.29 AU in October 2012) returning to the Sun distance of 4.5 AU in January 2014, when it can be reactivated. This period of about 2.5 years without contact with the spacecraft has been used by the mission controllers at ESOC to prepare the ground segment and the operations teams for the new and challenging operations starting when the spacecraft will enter its main scientific phase at the comet. The whole mission ground segment has been upgraded to guarantee its operability and maintainability in the crucial years of comet operations. All the mission planning and control systems have now been ported to the required status and are undergoing final operational validation. Furthermore, the ground segment has been upgraded to respond to new functional needs stemming from the unique operations planned for the comet phase, requiring an operation concept with more demanding and frequent planning activities than in the past cruising years. For this reason a whole new set of processes, interfaces, and systems has been developed in order to fulfil the mission requirements. The mission planning concept and tools are, as far as possible, based on those already successfully implemented for Mars Express and Venus Express, with the extensions and modifications required by the extremely unpredictable and variable comet environment. The planning process and preliminary timeline for the comet phase are mainly characterised by the need for high flexibility in adapting to the varying conditions and by the capability of conducting late (re-)planning activities. This paper reports on the validation activities carried out during the delta-development phase of the Rosetta ground segment and describes in detail

the activities planned for the re-activation and the comet approach and characterisation, including the critical lander delivery phase.