

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

Author: Mr. Andrea Accomazzo
European Space Agency (ESA), Germany, Andrea.Accomazzo@esa.int

Dr. Paolo Ferri
European Space Agency (ESA), Germany, paolo.ferri@esa.int
Mr. Sylvain Lodiot
European Space Agency (ESA), Germany, Sylvain.Lodiot@esa.int
Mr. Jose-Luis Pellon-Bailon
European Space Agency (ESA), Germany, jose-luis.Pellon.Bailon@esa.int
Ms. Armelle Hubault
Telespazio VEGA Deutschland GmbH, Germany, armelle.hubault@esa.int
Mr. Roberto Porta
Telespazio VEGA Deutschland GmbH, Germany, roberto.porta@esa.int
Mr. Ritchie Kay
LSE Space GmbH, Germany, ritchie.kay@esa.int
Mr. Jakub Urbanek
Telespazio VEGA Deutschland GmbH, Germany, jakub.urbanek@esa.int
Mr. Matthias Eiblmaier
SCISYS Deutschland GmbH, Germany, Matthias.Eiblmaier@esa.int
Mr. Tiago Francisco
Telespazio VEGA Deutschland GmbH, Germany, Tiago.Francisco@esa.int

ROSETTA OPERATIONS AT THE COMET

Abstract

The International Rosetta Mission was launched on 2nd March 2004 on its 10 year journey to rendezvous with comet Churyumov-Gerasimenko. Rosetta has now completed its long hibernation phase and is approaching its final target. The comet orbit insertion is planned for the 6th of August 2014, after which Rosetta will characterise the nucleus and orbit it for about 1.5 years at altitudes as low as a few kilometres and deliver the lander Philae onto its surface. Rosetta had 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. The spacecraft completed the hibernation phase and autonomously re-activated itself as planned on the 20th of January 2014. Contact with ground was promptly re-established and the spacecraft was fully re-activated within a few weeks. A post-hibernation commissioning of the whole payload complement is planned for March and April 2014, just before starting the series of rendezvous manoeuvres that will reduce the distance from the comet from two million to ca. 100 km and the relative speed from 780 to 1 m/s. This approach phase will span from May till early August 2014 and will be characterised by the optical navigation and the continuous targeting with regular manoeuvres. Comet observations will also start during this phase. Starting the 6th of August, formally defined as the Comet Insertion Point, the spacecraft will be flown in a way such that a complete characterisation of the comet attitude, gravity potential, shape and landmarks will be possible. Nucleus images acquired with the on-board cameras from distances ranging from 100 down to 50 km will allow the operations team to develop the models necessary to define a precise orbital plan and execute it in

the weeks thereafter. Once the characterisation is completed it will be possible to go down to distances of ca. 30 km where bound orbits will be flown. These are required to perform a global and detailed mapping of the surface such that an adequate landing site can be selected for Philae, the small probe to be released in November. This paper will report the mission status as achieved after the approach and characterisation phase, the first findings about the comet and its environment from an operations point of view. The paper will also describe in details the operational plans for the imminent landing phase.