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

Author: Dr. Pascale Ehrenfreund
Space Policy Institute, George Washington University, United States, pehren@gwu.edu

Dr. Stephan Ulamec
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, stephan.ulamec@dlr.de
Dr. Antonella Barucci
Observatoire de Paris, France, antonella.barucci@obspm.fr
Dr. Patrick Michel
CNRS, France, michel@oca.eu
Dr. Hermann Böhnhardt
Max-Planck-Institut für Solar System Research, Germany, Boehnhardt@mps.mpg.de
Dr. John Robert Brucato
Italy, jbrucato@arcetri.astro.it
Dr. Elisabetta Dotto
Italy, dotto@mporzio.astro.it
Dr. Ian Franchi
United Kingdom, i.a.franchi@open.ac.uk
Dr. Simon Green
United Kingdom, S.F.Green@open.ac.uk
Dr. Luisa M. Lara
Instituto de Astrofisica de Andalucia, Spain, lara@iaa.csic.es
Dr. Bernard Marty
Centre de Recherches Pétrographiques et Géochimiques (CRPG), France, bmarty@crpg.cnrs-nancy.fr
Dr. Detlef Koschny
European Space Agency (ESA), The Netherlands, Detlef.Koschny@esa.int

MARCOPOLO-R: NEAR EARTH ASTEROID SAMPLE RETURN MISSION IN ESA ASSESSMENT STUDY PHASE

Abstract

Many asteroids are primitive, having escaped high-temperature melting and differentiation. The chemical and physical nature, distribution, formation, and evolution of primitive asteroids are fundamental to our understanding of solar system evolution and planet formation. MarcoPolo-R, a mission whose primary objective is a sample return from a primitive Near-Earth Asteroid (NEA), has been selected for the assessment study phase of ESA M3 missions. The European-led mission takes advantage of several completed industrial studies. MarcoPolo-R will rendezvous with a unique kind of target, the primitive C-type asteroid 2008 EV5, located at 0.878 AU at perihelion and 1.038 AU at aphelion. It is an oblate C-type asteroid with a diameter of 400 50 m, and geometrical albedo of 0.12 0.04. The C-type (carbonaceous) asteroids are among the most pristine and are most likely related to carbonaceous chondrites. The main goal of the MarcoPolo-R mission is to return primitive NEA material for detailed analysis in ground-based laboratories. The mission duration is estimated for 4.5 years.