

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

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

MarcoPolo-R is a sample return mission to a primitive Near-Earth Asteroid (NEA) selected in February 2011 for the Assessment Study Phase in the framework of ESA's Cosmic Vision 2 program. MarcoPolo-R is a European-led mission with a proposed NASA contribution and takes advantage of three completed industrial studies. MarcoPolo-R will rendezvous with a unique kind of target, the primitive binary NEA (175706) 1996 FG3. The MarcoPolo mission will scientifically characterize the binary NEA system at multiple scales, and return a unique pristine sample to Earth unaltered by the atmospheric entry process or terrestrial weathering. The binary target provides enhanced science return: precise measurements of the mutual orbit and rotation state of both components can be used to probe higher-level harmonics of the gravitational potential, and therefore the internal structure. The main goal of the MarcoPolo-R mission is to return unaltered NEA material for detailed analysis in ground-based laboratories which will

allow scientists to study the most primitive materials available to investigate early solar system formation processes.