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Author: Mr. Tiago Loureiro
European Space Agency (ESA), The Netherlands

Ms. Kelly Geelen
ESA - European Space Agency, The Netherlands
Mr. Olivier Bayle
European Space Agency (ESA), The Netherlands
Mr. Diego Dellantonio
European Space Agency (ESA), The Netherlands
Dr. Orson Sutherland
ESA - European Space Agency, The Netherlands
Mr. Christoph Steiger
European Space Agency (ESA), Germany

MARS SAMPLE RETURN – STATUS OF THE EARTH RETURN ORBITER MISSION

Abstract

A joint NASA-ESA Mars Sample Return (MSR) Program is under development to return Mars rock, soil and atmospheric samples to Earth. Returning Martian samples to the Earth would allow the international scientific community to perform analyses with ever more sophisticated instruments, unconstrained by the requirements of spaceflight in terms of sensor miniaturisation, space qualification and instrument development time. A major element of MSR is the ESA provided Earth Return Orbiter, which will detect and capture the samples in Mars orbit and return them to Earth, after serving as a data relay during the complex surface operations of the landed missions. MSR consists of three complementary flight mission elements. The Perseverance Rover is currently preparing and caching samples on the Mars surface. A Sample Retrieval Lander (SRL), which is planned to collect the sample tubes and load them into a Mars Ascent Vehicle (MAV) using an ESA-provided Sample Transfer Arm (STA) for launch into Mars orbit. This paper describes the design, mission and operations concept, development status and plans of the ERO project in the context of MSR.