

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Mars Exploration – missions current and future (3A)

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## KEYNOTE: MARS SAMPLE RETURN MISSION CONCEPT STATUS

**Abstract**

This paper will provide an overview of current options and specific concepts for a potential Mars Sample Return architecture being jointly studied by NASA and ESA. Overall objectives and mission options will be described, including the architecture's constraints and notional timelines from the launch of two separate mission concepts, through Mars surface and orbital operations, to delivery of the samples back to Earth. The paper will highlight architecture-level trade studies, including specific elements and their status. The overall Sample Retrieval Lander (SRL) mission concept, including vehicle options and key will be described, including the Mars Ascent Vehicle (MAV), Sample Fetch Rover (being studied by ESA), Orbiting Sample container (OS), and tube transfer robotics systems. The concept and status of the Earth Return Orbiter (ERO) mission, being studied by ESA, and the Capture/Containment and Return System (CCRS) which would be the payload on the ERO, will be discussed. Key trade studies and the strategy for closing the overall MSR campaign architecture will be discussed, along with specific challenges and approaches for addressing those challenges, including backward planetary protection.

The information provided about possible Mars sample return architectures is for planning and discussion purposes only. NASA and ESA have made no official decision to implement Mars Sample Return.