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HUMAN FLYBY OF MARS IN 2033

Abstract

Landing astronauts on Mars is within our technological grasp and has been imagined since before our space program began. Once every 15 years, the orbits of Earth and Mars offer a unique opportunity for a low energy transfer between the planets and the next such opportunity is in 2033. Using this opportunity for a flyby mission would be a major step in demonstrating the capability of humans to travel tens of millions of miles to Mars and return safely.

A recent Boeing study looked how to accomplish this historic mission using currently planned capabilities as much as possible. Numerous scenarios were conceived and evaluated to develop a wide range of possible elements combinations, aggregation points, and trajectories. This paper present the results of these efforts, including the elements and the scenarios, and also discusses the challenges and benefits of an early flyby mission to Mars. How the flyby mission will interact with current lunar planning will also be examined.

A flyby mission will provide the first human close encounter of Mars and is achievable starting now. By exercising the full potential of SLS and Orion, taking advantage of commercial systems, and building on the systems testing and human research accomplished on ISS, a flyby mission will prove human courage and perseverance in the deep space environment, focus technology development to take the next steps of orbiting and then landing on Mars, and create unparalleled interest in human space exploration and education.