Mars Science Laboratory Entry, Descent and Landing System Overview

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Mars Science Laboratory: Entry, Descent, and Landing System Performance

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Abstract—In 2010, the Mars Science Laboratory (MSL) mission will pioneer the next generation of robotic Entry, Descent, and Landing (EDL) systems, by delivering the largest and most capable rover to date to the surface of Mars. To do so, MSL will fly a guided lifting entry at a lift-to-drag ratio in excess of that ever flown at Mars, deploy the largest parachute ever at Mars, and perform a novel Sky Crane maneuver. Through improved altitude capability, increased latitude coverage, and more accurate payload delivery, MSL is allowing the science community to consider the exploration of previously inaccessible regions of the planet.

The MSL EDL system is a new EDL architecture based on Viking heritage technologies and designed to meet the challenges of landing increasing massive payloads on Mars. In accordance with level-1 requirements, the MSL EDL system is being designed to land an 850 kg rover to altitudes as high as 1 km above the Mars Orbiter Laser Altimeter defined areoid within 10 km of the desired landing site. Accordingly, MSL will enter the largest entry mass, fly the largest 70 degree sphere-cone aeroshell, generate the largest hypersonic lift-to-drag ratio, and deploy the largest Disk-Gap-Band supersonic parachute of any previous mission to Mars. Major EDL events include a hypersonic guided entry, supersonic parachute deploy and inflation, subsonic heatshield jettison, terminal descent sensor acquisition, powered descent initiation, sky crane terminal descent, rover touchdown detection, and descent stage flyaway. Key performance metrics, derived from level-1 requirements and tracked by the EDL design team to indicate performance capability and timeline margins, include altitude and range at parachute deploy, time on radar, and propellant use.

The MSL EDL system, which will continue to develop over the next three years, will enable a notable extension in the advancement of Mars surface science by delivering more science capability than ever before to the surface of Mars. This paper describes the current MSL EDL system performance as predicted by end-to-end EDL simulations, highlights the sensitivity of this baseline performance to several key

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Instead of the familiar airbag landing of the past Mars missions, Mars Science Laboratory used a guided entry and a sky crane touchdown system to land the.AbstractIn , the Mars Science Laboratory (MSL) mission will pioneer the next generation of robotic. Entry, Descent, and Landing (EDL) systems, by delivering the largest and most capable rover to date to the surface of . SUMMARY.Mars Science Laboratory entry, descent, and landing system of navigation and guidance techniques for Mars pinpoint landing: Review and prospect. Article.Mars Science Laboratory entry, descent and landing system verification and validation program The Mars Science Laboratory (MSL) mission will land the next . forebody shock layer at Mach 20, while detailed description.Full-Text Paper (PDF): Mars Science Laboratory Entry, Descent, and Landing System Overview."Mars Science Laboratory Entry, Descent, and Landing System Development Challenges", Journal of Spacecraft and Review of Spacecraft Entry Guidance.In addition to landing more mass than prior missions to Mars, MSL will offer access to Mars Science Laboratory Entry, Descent, and Landing System Overview.Navigation, and Control (GN&C) system, including guided entry with a lifting body (via center of A brief description of the EDL trajectory simulation Keywords: Mars Science Laboratory; Entry, Descent, and Landing; DSENDS Operations. 1.Mars Science Laboratory Entry, Descent, and Landing System Overview. Powell, Richard W. / Chen, Allen / Mendeck, Gavin F. et al. NTRS Purchase Mars Science Laboratory Entry, Descent, and Landing System Overview and Preliminary Flight Performance Results at Univelt, Inc.K subscribers. Subscribe Mars Science Laboratory - Entry, Descent & Landing - Full Animation .. Image: NASA JPL Paper: MSL EDL System Overview.Mars Science Laboratory (MSL) is a robotic space probe mission to Mars launched by NASA on .. The entry-descent-landing (EDL) system differs from those used for other missions in that it does not require an interactive, .. Jump up ^ "Mars Science Laboratory (MSL): Mast Camera (Mastcam): Instrument Description".Adam Diedrich Steltzner (born) is an American NASA engineer who works for the Jet of the Mars Science Laboratory's EDL phase (Entry, Descent and Landing), . He was the landing systems engineer on the cancelled comet mission . Mars Science Laboratory Entry, Descent, and Landing System Overview.for the Mars Science Laboratory entry, descent, and landing system. Chen This paper provides an overview of the system performance.Mars Science Laboratory Entry, Descent and Landing System, Paper , Mars Deployable Decelerators Capability Roadmap Summary, Paper

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