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SWAMP WORKS NASA KENNEDY SPACE CENTER

Mars Molniya Orbit Atmospheric Resource Mining

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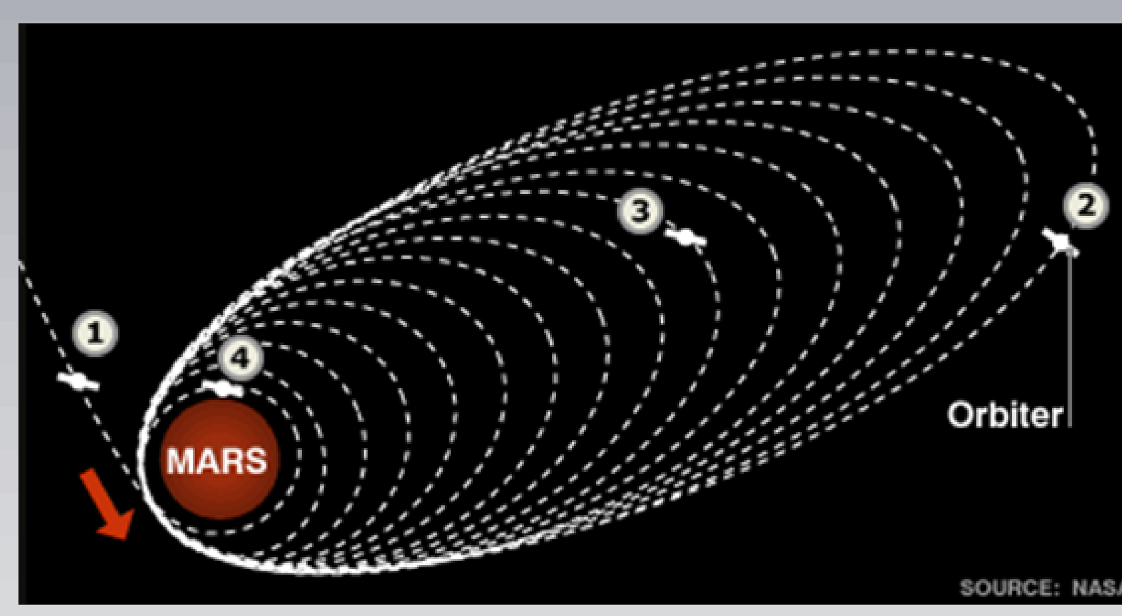
"As Mars missions approach human class entry masses, the required size of supersonic deployable aerodynamic decelerators renders them impractical…initiation of propulsive deceleration must occur earlier in the descent phase…Supersonic Retro Propulsion (SRP) becomes an enabling technology for human class Mars missions."
- NASA EDL Roadmap (TA09), November 2010.

Today's Problem:

When transferred from Earth's surface to Mars, propellant becomes a mass intensive and time consuming aspect of any mission architecture

Mars Science Laboratory (MSL) = 4.5 m aeroshell + 21.5 m diameter parachute = 0.9 t payload

Larger supersonic parachutes are inhibited by scaling challenges



Atmospheric CO_2 Mining

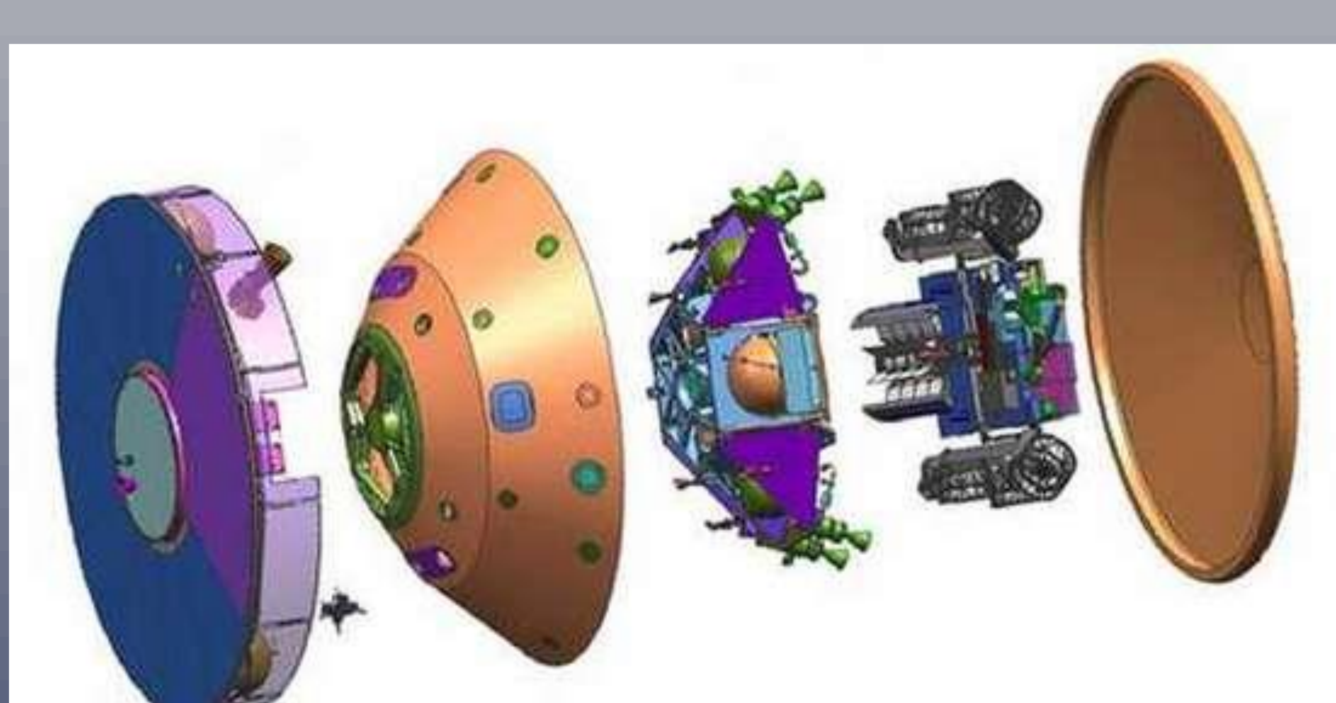
Supersonic Retro Propulsion (SRP) for EDL

The Proposed Solution:

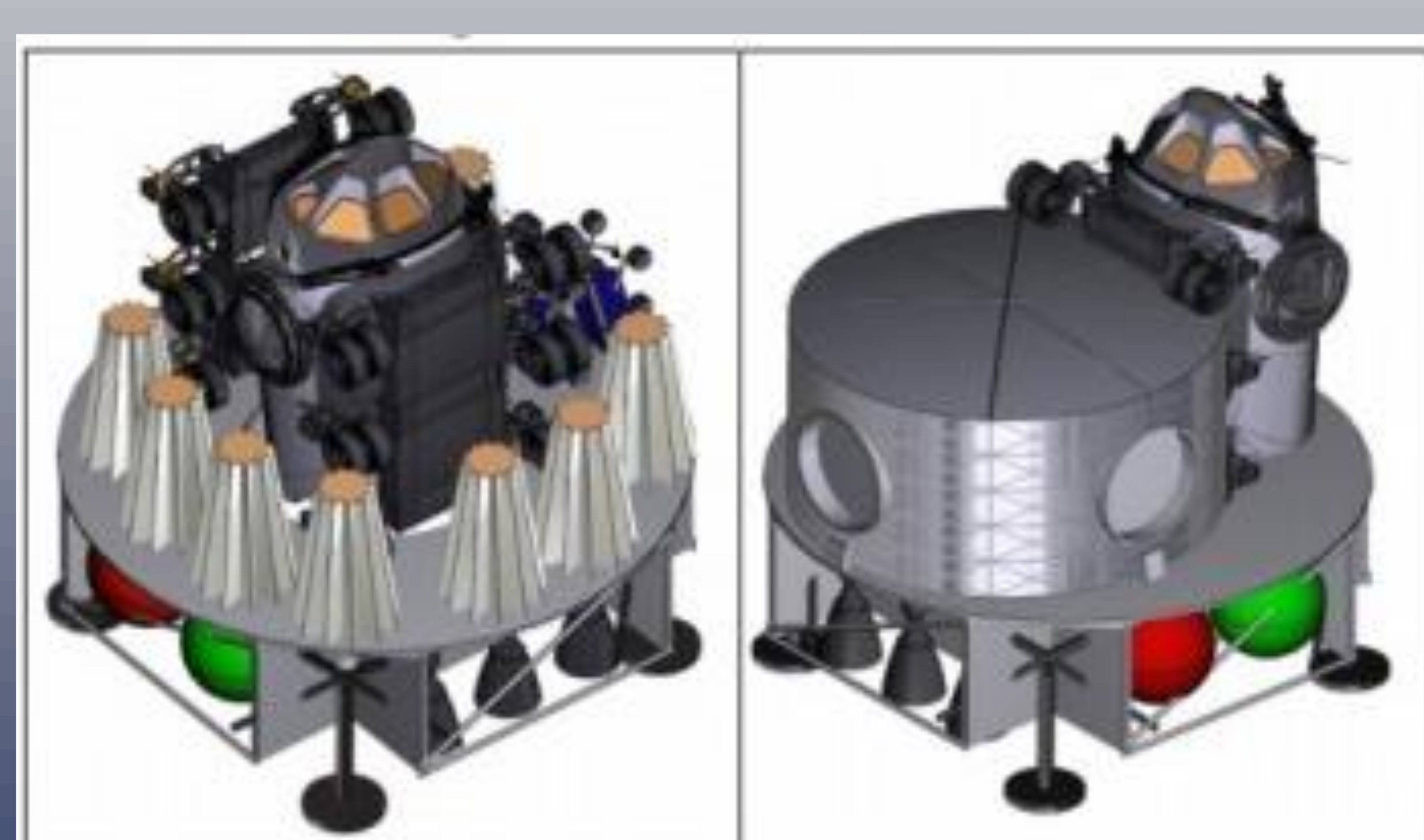
Make the SRP propellant on orbit by capturing and processing the Mars atmosphere (95,5% CO_2) and water (H_2O) from the Mars surface to make abundant propellants (CH_4, O_2) for precision SRP Entry, Descent, Landing and Ascent (EDLA).

Goals beyond MSL:

More landed mass (20-40t)
Higher landing elevation



0.9 t MSL payload on Mars



20t - 40t payloads on Mars