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Spacecraft

SPACECRAFT

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What is the spacecraft?

The spacecraft is the protective "spaceship" that enables the precious cargo (that is, the rover!) to travel between Earth and Mars. It is separate from the [launch vehicle](#) that carries the spacecraft and the rover outside of Earth's atmosphere and gravity pull.

Like NASA's twin Mars rovers that landed on the red planet in early 2004, the Mars Science Laboratory rover will be tucked inside a tightly packaged cruise stage and aeroshell with a heat shield. Unlike the two Mars Exploration Rovers, the Mars Science Laboratory Rover will extend its wheels similar to the way an airplane unfolds its landing gear just before touchdown.

The spacecraft includes the mechanical units that safely carry and maneuver the rover as it enters the Martian atmosphere and lands on Mars.

The spacecraft design for Mars Science Laboratory consists of:

Cruise Stage:

Configuration for travel between Earth & Mars.

Entry, Descent, & Landing System:

Configuration for entry into the Martian atmosphere. Includes the aeroshell and a "sky crane" lander structure.

Rover:

A wheeled vehicle with [science instruments](#) for discoveries on the martian surface.

The spacecraft design for the Mars Science Laboratory mission is based largely on the successful twin Viking landers sent to Mars in the 1970s. The rover design is based on the Mars Exploration Rovers, which landed on Mars in early 2004. The system for entry, descent, and landing is entirely new.

How much does the spacecraft weigh?

The Mars Science Laboratory mission will have a projected total launch mass, including the rockets that lift it away from Earth, of about 3,400 kilograms (7,500 pounds). The mass of each primary part of the spacecraft is as follows:

	Allocated Mass in kg (lbs)	Cumulative Mass in kg (lbs)
Rover	850 kg (1,875 lbs)	850 kg (1,875 lbs)
Descent stage (dry)	829 kg (1,830 lbs)	1,679 kg (3,705 lbs)
Descent Stage Propellant	390 kg (860 lbs)	2,069 kg (4,565 lbs)
Heat Shield	382 kg (842 lbs)	2,451 kg (5,407 lbs)
Cruise Stage (wet)	600 kg (1,323 lbs)	3,051 kg (6,730 lbs)

Backshell

349 kg
(770 lbs)

3,400 kg
(7,500 lbs)

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