Perseverance and the Search for Life on Mars

ars has always been a source of marvel. M It captivated ancient civilizations, it's red hue setting it apart from other points of light in the night sky. Even in recent history, some suggested it was home to alien life, until Mariner 4 got close enough to reveal a lifeless and barren planet. However, in the last few decades the true nature of Mars has begun to emerge. We've discovered a place that has substantially changed over time. An environment where water once shaped the landscape and still sits within icy polar regions and deep underground. And a planet where microbial life may have once existed, and perhaps against all odds still does.

Our greatest tools in this journey of discovery are the Mars rovers, a series of robotic vehicles laden these intrepid explorers is Perseverance. It will build on the impressive legacy of the previous rovers; life, and helping to prepare us for a day in the not too distant future when Martian explorers will leave footprints rather than tire tracks.

This infographic provides a comparison of Mars rovers, explores the arrival of Perseverance on Mars. and details its tools and mission objectives.

Mars Rovers by the Numbers







ONE **Atmospheric Entry** and Deceleration

TOUCHDOWN IN ... ALTITUDE VELOCITY

The aeroshell protects

the rover during its turbulent descent through the Martian atmosphere. During entry the heat shield reaches around 1,300 degrees Celsius.

The heat shield helps to slow descent considerably, but it's not nearly enough. 22 meters in diameter, additional drag.

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Parachute Deploy

ALTITUDE VELOCITY

TOUCHDOWN IN.

TWO

THREE **Heat Shield** Separation TOUCHDOWN IN...

> ALTITUDE VELOCITY The heat shield detaches and the rover is exposed to the for the first time. Key

prepare for landing.

Hmm, you look familiar...

Perseverance is based on the design of Curiosity, and the two rovers look very similar. There are some key differences though; Perseverance has more robust wheels, a longer and stronger robotic arm, and a new sampling and caching system.



Don't chute the messenger!

Included within the pattern on the inside of the rover's parachute was a hidden message. Binary code was used to spell out the phrase Dare Mighty Things, a motto used by NASA's Jet Propulsion Laboratory, along with GPS coordinates for the lab's location in California.









FIVE Backshell A special camera

quickly scans the that it's approaching a for a safe landing.

FOUR

Rader Lock and



The parachute has further reduced the rate of descent, but it's still not enough. Perseverance must the journey with the assistance of rockets.

Mission Objectives





discover environments that could have once supported microbial life eeking Biosignatures

Exploring the Martian landscape to

ooking for Habitability.

Studying suitable environments in search of evidence of ancient Martian lifeforms.



Caching Samples

Collecting rock and soil, to be stored until a future mission can collect them for analysis on Earth.



reparing for Humans Testing oxygen production in

Mars' hostile atmosphere, to help inform future human missions.

Mission Technology



requity Helicopter A small autonomous helicopter that will attempt the first powered flight on another planet.



A camera that can capture high-res images and video of the Martian surface and atmosphere.



A tool that will measure things like evels in the Martian atmosphere



oxygen on Mars, in preparation for future human missions.



An X-ray spectrometer that will of Martian rocks at a tiny scale.

A tool that uses radar waves to discover geological features underneath the surface of Mars.

A suite of cameras, spectrometers and a laser to detect minerals and potential biosignatures.

A collection of tools to identify the composition of rocks and soils, down to an atomic and molecular level.

SIX **Rover Separation**

TOUCHDOWN IN...

ALTITUDE VELOCITY

Perseverance is lowered to the surface on a set of cables. Once on the ground, it cuts the cords, allowing the descent stage to fly away and crash-land at a safe distance.







Sources: NASA, JPL and Wikipedia. Infographic by James Round. See more at www.jamesrounddesign.com