Mars Rover 2022

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Abstract

Mars Rover 2022 is a Martian rover intended to launch in 2022. Its main goal is to further human Mars Colonization. This mission intends to answer three questions.

* Where would the ideal Martian outpost be located?
* What else on Mars could be used for in-situ-resource-utilization?
* What are the chemical characteristics of Martian Polar ice caps?

Additionally, Mars Rover 2022 contains panoramic cameras and a near-infrared (IR) spectrometer, a SuperCam, and an alpha particle X-ray spectrometer. This will allow it to discern the chemical makeup of Mars’ south pole, its destination (NASA, n.d.d). NASA and other space agencies, as well as humanity as a whole, are the stakeholders. Once reaching Mars after its launch in 2022, Mars Rover 2022 will be operable for 14 years (NASA, n.d.b). One major constraint is time. The rover must be completed before 2022 because it is when the Earth and Mars are closest. It will land in the same location as the Mars Polar Lander because of its proximity to the southern pole (NASA Jet Propulsion Laboratory, 1998).

Mars Rover 2022

**Introduction:**

Mars is the fourth planet from the sun and a prime candidate for colonization (NASA, n.d.c). However, before that happens, an ideal location must be found for a base. Mars Rover 2022 intends to achieve that goal. It hopes to answer several questions about Mars. The rover will carry several devices, such as panoramic cameras and a near-infrared (IR) spectrometer, a SuperCam, and an alpha particle X-ray spectrometer. Stakeholders include space agencies and humanity as a whole. It will launch in 2022. Once it reaches Mars, it will continue performing experiments for about 14 years (NASA, n.d.b). Mars Rover 2022 is constrained by its timeline. It will land in the same location as the Mars Polar Lander (NASA Jet Propulsion Laboratory, 1998).

**Needs and Goals:**

Mars Rover 2022 is a rover designed to scout out the optimal locations for a future Mars base, all the while studying Martian geology. Its importance lies in its weighty subject; humans should try to get a self-sufficient Mars outpost as soon as possible. If something were to happen on Earth, such as a meteor collision or full-out nuclear war, the human species needs another outpost. Humans residing on another celestial body is akin to having a backup hard drive for a computer (Rober, 2014). Therefore, it is of severe importance that Mars Rover 2022 be sent. It will scout out ideal locations for Mars bases, considering factors such as in-situ-resource-utilization, scientific interests, ease of travel, and habitability. The Mars Rover 2022 mission hopes to answer several questions.

* Where would the ideal Martian outpost be located?
* What else on Mars could be used for in-situ-resource-utilization?
* What are the chemical characteristics of Martian Polar ice caps?

Each of these is important for setting up a successful Mars outpost. Where would the ideal Martian outpost be located? An outpost cannot just be placed anywhere. What else on Mars could be used for in-situ-resource-utilization? Mars Rover 2022 will use chemical analysis to determine where the best resources are for in-situ-resource-utilization. What are the chemical characteristics of Martian polar ice caps? One main point of interest is the Martian polar ice caps because they will provide easy access to water at all times (University of Arizona, n.d.). These questions align with NASA’s Mars Exploration Program (MEP). Goals include “characterize the geology of Mars,” and “prepare for human exploration” (NASA, n.d.c).

**Mission Subject:**

The Mars Rover 2022 will have panoramic cameras and a near-infrared (IR) spectrometer, a SuperCam, and an alpha particle X-ray spectrometer. These will run in conjunction to determine the chemical makeup of samples to determine the possibility of in-situ-resource-utilization. Panoramic cameras and the near-infrared spectrometer will spot points of interest (Radboud University, n.d.). A SuperCam will run on Mars Rover 2022 as well. It contains laser-induced breakdown spectroscopy (LIBS), Raman spectroscopy, and a telescope (NASA, n.d.d). Along with the alpha particle X-ray spectrometer, these instruments will determine the chemical makeup of samples on Mars. With chemical data, the Mars Rover 2022 will provide hints as to what kind of in-situ resources could be used.

**Stakeholders:**

Stakeholders include NASA, the ESA, and other space agencies, and humankind as a whole. NASA and other space agencies would use this mission to help in future endeavors. Practices and machinery used on this mission will prove that the concepts work. Also, humanity is a stakeholder for this mission because of its topic. If humanity were to venture out to Mars, all on Earth would benefit. This mission provides another step towards achieving a Mars outpost and possible colonization. If something were to happen to Earth, there would still be humans on Mars to survive (Rober, 2014). Therefore, further steps must be taken towards a permanent Mars outpost. Mars Rover 2022 intends to be the next step towards that goal.

**Operational Concepts:**

To be able to launch in 2022, the rover construction will begin as soon as possible. Soon after the construction, in 2022, the launch will proceed. About nine months after the launch, Mars Rover 2022 will perform a maneuver to fall into Mars’ orbit. From there, it will aerobrake to slow itself for decent. This rover will land in the same location as the Mars Polar Lander because of the location’s proximity to the south pole, and its smooth surface (NASA Jet Propulsion Laboratory, 1998). Once on Mars, the rover will continue to characterize chemistry in the southern regions of Mars for about 14 years. This is because similar to the Curiosity rover, Mars 2022 will use a Multi-Mission Radioisotope Thermoelectric Generator (MMRTG), which has an operational lifespan of about 14 years. This will be important because the MMRTG provides heating against the cold Martian southern ice cap, as well as a stable power source that will work, even in Martian dust storms (NASA, n.d.b).

**Constraints:**

The main constraints are the timeline and operation time. Because the launch is scheduled for 2022, the construction must be done in a short amount of time. This will put a strain on the construction and may lead to errors. Next, Mars Rover 2022, is only operable for 14 years because of its battery (NASA, n.d.b). This will allow it to traverse the Martian south pole, but not the Martian north pole. It is not viable to experiment on both the north and the south poles.

**Landing Site:**

The Mars 2022 rover will land in the south pole of Mars. A previous mission, Phoenix, studied Mars’ north pole (NASA, n.d.a). This rover will study the south pole for possible outpost sites. It will aim for a spot near the south pole, where water is abundant. This location is chosen because it aligns with Mars Rover 2022’s mission goals to discern if the poles are best suited for a Martian colony. More specifically, Mars Rover 2022 will aim for the same spot as the Mars Polar Lander because of its location right on the edge of the southern ice cap (NASA Jet Propulsion Laboratory, 1998).

**Scope Summary Page:**

This mission will be the next step in branching out towards the rest of the cosmos. Doing so would ensure human survival for generations to come. In case something catastrophic happens on Earth, a Martian colony will continue (Rober, 2014). This mission will help humans get to that dream. The goal of Mars Rover 2022 is to further human progress towards Martian colonization. The objectives are to scout out possible compounds on the Martian southern pole for in-situ-resource-utilization, determine the feasibility of Mars’ south pole as an outpost. For Mars Rover 2022 to be successful, it must characterize the chemistry of Mars’ south pole for at least one year. Its mission is to determine the chemistry of the Martian southern pole.

**Conclusion:**

In conclusion, Mars Rover 2022 hopes to answer three questions.

* Where would the ideal Martian outpost be located?
* What else on Mars could be used for in-situ-resource-utilization?
* What are the chemical characteristics of Martian Polar ice caps?

It will use panoramic cameras and a near-infrared (IR) spectrometer, a SuperCam, and an alpha particle X-ray spectrometer to allow it to characterize the Martian southern pole (NASA, n.d.d). Stakeholders will be NASA and other space agencies, as well as future human generations. This mission will launch in 2022. Nine months later, upon arrival, it will continue to rove the Martian surface for 14 years (NASA Jet Propulsion Laboratory, 1998). It will land in the same location as Mars Polar Lander because of its proximity to the southern pole. Its goals are to take the next step towards human Mars colonization through its objectives, which are to perform chemistry experiments in Mars’ south pole and to determine if it is a suitable place for a Mars colony. Colonizing Mars will be undoubtedly hard, but even so, it is worth the undeniable benefits.