Research Assessment #8

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Subject: Astrobiology: *The Viking Project*

Source:

1.) *Soffen, Gerald A. "The Viking Project." Journal of Geophysical Research 82.28 (1977): 3959-970. Web.*

Analysis:

It is with no doubt that we all know that NASA is best known for landing the first men on the moon during the 60s and the 70s. However, during this time period NASA achieved something else. The space agency took up the new challenge of understanding a planet that is 140 million miles from us and operated the Viking Project that revolutionized our understanding of Mars.

The Viking Project was definitely a sophisticated and highly complex mission. It was one of the first attempts to land two spacecrafts on the surface of Mars. In order to achieve success, NASA carefully picked a group of engineers and scientists to work this task out. On top of that, the Jet Propulsion Laboratory and a countless number of field centers helped out as much as they could with this mission. One unique characteristic that Gerald A. Soffen attributed with the project was how high spirited everyone was. It would be wrong to not think that the spirit contributed to success of this mission.

The Viking Mission set out to find the specifics about the Red Planet. Scientists wanted to figure out the chemistry and physical component about the Martian surface, the components of the atmosphere, the events leading up to the current state of the atmosphere, the inner structure of Mars, the history of life on Mars, and the Martian climate. All the things that scientists were looking for essentially leads to a much bigger question; is Mars habitable for life ? Looking at all these things, we can safely assume that the importance of the Viking Project is extremely great. One element that scientists at NASA are really interested in is nitrogen because it indicates a high potential of biological activity.

After almost a one year journey, the Viking Spacecraft had reached Mars. After careful analysis of the Martian terrain, NASA finally decided on the landing sites for Viking 1 and Viking 2. Biologists specifically wanted one of the spacecrafts to land in an area where it was high in water content because that would be the best region to analyze the environment for any biological activity. Astrobiologists chose to study damp regions because water is the building blocks of life. The landing procedure for Viking 1 and Viking 2 was perfectly calculated to ensure the safety of the spacecraft. This started with finding the landing site as I mentioned before. If the terrain happens to be rough then the spacecraft will definitely meet its death. NASA had initially picked a landing site for one the Viking but later realized that the terrain was unsuitable for a safe landing and thus, made a last minute change. After this the spacecraft was ready for the separation and landing process. The system for this was completely automated because the round trip time a signal took from Mars to Earth was approximately 40 minutes. As the spacecraft is descending, it faces another challenge with the Martian

atmosphere. In order to have a gentle landing, there had to be three sequential braking systems. After the separation, the rockets fired . This allowed the spacecraft to cruise for a little while. As soon as the spacecraft reached an altitude of 6 km, the parachutes opened up. As the craft was getting close to 1.5 km, three retro engines are activated. All of these steps were crucial in the safe landing of this vehicle.

One problem that NASA scientists had realized was the fact that the landing could contaminate the surface of MARS. To solve this problem, NASA went to work right away. For example, the retro rocket utilized purified hydrazine as it propellent. This gets its energy from the exergonic breakdown process of of Ammonia into Hydrogen. NASA did face many other problems with this project but eventually figure out a sufficient solution.

The Viking landers used many technological process to deeply investigate Mars. The information obtained from this provided a deeper understanding of Mars. For instance, orbital imaging showed us that Mars had a very heterogeneous terrain. Scientists also found a chain of volcanoes. The meteorite craters show an unique terrain. Another instrument was the Mars Atmospheric Water Detector. The amount of water vapor was dense in the areas where the ice was melting from the atmosphere. One the biggest accomplishment is the fact that 2.5 % of nitrogen was discovered on Mars. Apart from these, NASA figured out a lot from other instrumental data sets.

In conclusion, we can all agree that the Viking Mission was one of success. The Viking Project was really one of the first times that NASA had focused on Mars. After this mission, NASA sent a countless number of rovers to Mars, one being Curiosity. With this mission, the world started understand this red extraterrestrial world and now

NASA has made the study of Mars central to the missions coming up in a few years. Hundreds of years ago, we never would thought about sending a spacecraft to a distance planet. Now we are starting to get ready to send astronauts to the Red Planet.