Reannen Brewer
Jennifer Noon
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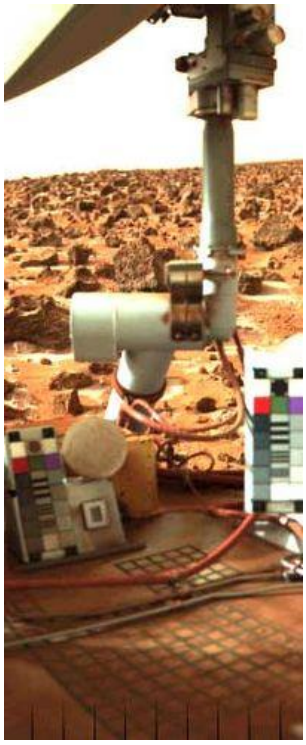
Elementary Astronomy (PS) - PHYS 1040 - 001

Life On Mars

Mars, fourth planet from the sun covered in a dry desert landscape. Mars should really be called Earth's twin because of the similarities in the landscape and composition of the atmosphere. With such similarities could life on Mars exist or is it just another biologically dead planet? Could such exploration of Mars' surface prove that life really does exist outside of Earth? NASA sure thinks so that is why they have been focused on exploring the little planet since 1964. From the first flyby of Mars to the Mars Exploration Rovers Mars has been a hot topic for research ever since its discovery.

The first mission to Mars was a flyby performed by the Mariner 4 which was launched on November 28th, 1964. The Mariner was created to study the inner Solar System which included Mercury, Venus and Mars. The Mariner 3 which was launched in 1962 never reached Mars which is why NASA designed two flybys the Mariner 3 & 4 just in case one could not reach the red planet. The Mariner 4 brought back the first close up photographs of Mars. Which spurred interest even more, the spacecraft was only predicted to last only 8 months but in reality it lasted a near three years before succumbing to battery failure. (Viotti) Many Mariner missions all the way up to Mariner 9 were launched to photograph the inner planets with Mars as the focus for many of them.

The first mission to land on the surface of Mars was the Viking 1 & 2 Landers. Both of these spacecrafts were launched in the fall of 1975 and landed on the surface of Mars in the summer and fall of 1976. This mission found a place in history because it was the first spacecraft to land on the surface of Mars. These Landers took pictures, studied samples and conducted the first biology experiments on the search for life on Mars. The studies concluded that the soil on Mars was too harsh for organisms to live in the soil both Landers sent their last messages to earth in the 80's. ("Program and missions")

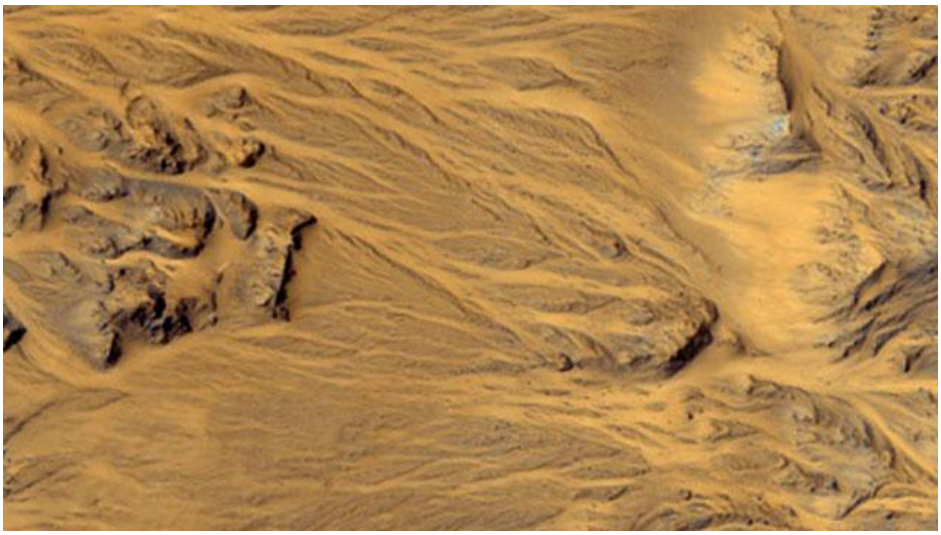


(Photo from Viking Lander 2 shows late-winter frost on the ground on Mars around the lander.)

It took almost 17 years for another Mars mission to surface, this time it was an orbiting spacecraft which was suppose to study the geology, geophysics and climate of Mars. The spacecraft was launched September 25th, 1992 but brought in disappointment when contact was lost in 1993 just before it was bound to enter Mars' orbit. ("Mars observer") This mission was followed by the Global Surveyor and the Mars Climate Orbiter mission both were much more successful and brought back a plethora of information. Another Failed mission for Mars was the Polar Lander/ Deep space lander which was suppose to land on the polar regions of mars. This lander lost contact with NASA shortly after its launch.

Two of Mars' successful Landers were the Mars Pathfinder and the Phoenix lander. The Path finder was launched in December of 1996 and returned over 2.3 bits of information. It

brought back more that sixteen thousand images from the lander and more than five hundred images from its Rover. It brought back extensive research on chemical analysis from rocks and soil. The Mars Pathfinder proved that Mars had water in the past and that the water did exist in its liquid state. Its final data transmission was received September of 1997. The Phoenix Lander was launched in August 2007 and arrived at Mars on May 25th, 2008. This lander was out to find water on Mars.



(One of the many dried riverbeds of Mars, evidence which suggests that liquid water used to flow on Mars.)

This was a very high tech explorer with a robotic arm and a 2 meter mast to which it took high resolution photos of the Martian landscape. The Phoenix brought back very detailed information on the landscape of Mars.

The 2001 Mars Odyssey was the next attempt to study Mars' climate. This was a very successful mission which was launched April 2001 and arrived in Mars' orbit in October 2001. It has continued to bring back extremely detailed information on the surface and atmosphere of Mars. The Mars' Odyssey still continues to bring data back to earth. This mission was followed by the Mars express spacecraft launched in 2003. Its main mission was to bring back evidence of sub-surface water. It has recently brought back evidence of Volcanism and Glacial activity. (NASA)

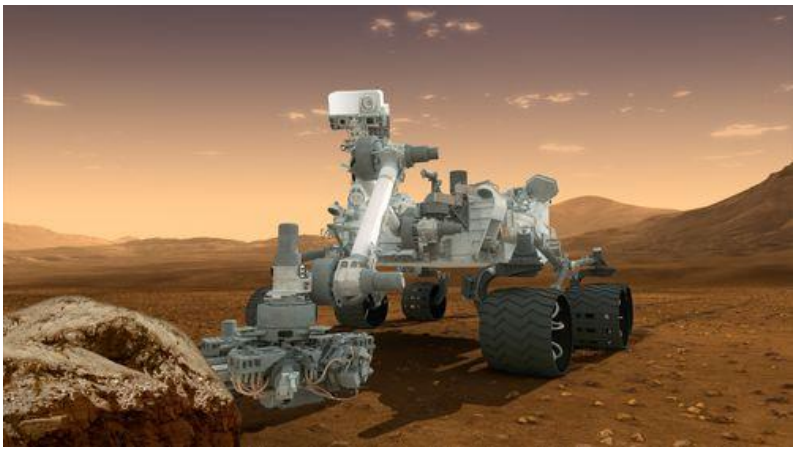
Probably the most famous of the Mars exploration missions is the MER's or the Mars Exploration Rovers. Launched in the summer of 2003 two robotic geologist which go by the names of Spirit and Opportunity, they landed on the surface of Mars in January of 2003. The Mars Exploration Rovers by far have been NASA's most successful mission to date. These two MERS have brought back breakthrough information from MARS' surface. They combined since landing on the dusty planet have sent more than one hundred thousand high definition full color photos of the Martian landscape. Opportunity has brought back evidence of sedimentary bedrock or more clearly riverbeds, proving that running water did in fact exist on the surface of Mars. While Spirit has brought back evidence that Mars is characterized by impacts and that there is subsurface water. ("Nasa")

These extremely advanced rovers have brought back such great detail about the composition of the rocks and soil on Mars' surface that provokes more questions than is there life on Mars. Opportunity is still going strong even after eight years on the surface, the rover is still mobile and is still researching and sending data back to earth. Sadly Spirit has had a different fate in March of 2010 Spirit sent its last communication to NASA, as the Martian winter approached the fuel cells on Spirit

(An artist's concept portrays a NASA Mars Exploration Rover on the surface of Mars. Two rovers have been built for 2003 launches and January 2004 arrival at two sites on Mars. Each rover has the mobility and toolkit to function as a robotic geologist.)

depleted and attempts to reawaken the rover had ended. Spirit studied the surface of Mars for around six years. The Exploration Rovers were only supposed to last only three months and Opportunity has shown no signs of defeat

The most current mission to Mars is the Curiosity rover launched November 26th 2011 and is predicted to arrive on the surface of Mars August 6th 2012 which is next Monday. This rover is a car sized one tone rover, NASA's biggest rover yet.



(Curiosity: Robot Geologist and Chemist in One! This artist's concept features NASA's Mars Science Laboratory Curiosity rover, a mobile robot for investigating Mars' past or present ability to sustain microbial life)

It has been programmed to research the polar caps of Mars and beyond. What will the future in Mars exploration bring us, more rovers, actual colonization, and the discovery of life on the surface? Mars is such a vast and immense planet that the possibilities may as well be endless. Who knows what the future will bring, but whatever it brings it will change our understanding of how we came to be on our planet and possible what the future holds for us.

Works Cited;

Mars global surveyor. N.p., n.d. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/past/globalsurveyor/>.

"Mars Science Laboratory." *Mars Exploration Program*. JPL, Nov. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/present/msl/>.

Mars observer. N.p., n.d. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/past/observer/>.

NASA, . "Pathfinder." *National Aeronautics and Space Administration*. USA.gov, n.d. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/past/pathfinder/>.

"Spirit and Opportunity." *Nasa*. NASA, n.d. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/present/2003/>.

USA.gov, . "Phoenix." *Mars exploration program*. NASA, 2012. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/past/phoenix/>.

Viotti , M.. "Mariner 3 & 4 ." *National aeronautics and space administration*. N.p., 2011. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/past/mariner34/>.

"Viking 1&2." *program and missions*. N.p., n.d. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/past/viking/>.

"2001 Mars Odyssey." *Mars exploration program*. NASA, n.d. Web. 2 Aug 2012. <http://mars.jpl.nasa.gov/programmissions/missions/present/odyssey/>.