

Research Assessment #3

Date: September 23,2016

Subject: Astrobiology: *Cassini Spacecraft*

Source:

1.)NASA'S JET PROPULSION LABORATORY. "Countdown Begins for Cassini's Final Plunge into Saturn." *Astronomy Now*. N.p., 19 Sept. 2016. Web. 19 Sept. 2016

2.)"Cassini." *NASA*. NASA, n.d. Web. 23 Sept. 2016.

Analysis:

As humans, we have a hunger to explore and discover things in uncharted territories. On October 15,1997, NASA launched the Cassini Spacecraft into space. The purpose for this unmanned spacecraft was to go to Saturn and collect data so we can get a clear understanding about the origin of the planet and its unique characteristics. In 2004, Cassini finally reached Saturn and was the first spacecraft to enter the planet's orbit. After reaching its orbit, Cassini proved to be successful through its findings about Saturn.

Before Cassini, we knew very little about one of Saturn's moons, Titan. The data sent by Cassini showed that Titan had a lot of features similar to Earth,like lakes and rivers. However on Titan, these liquid bodies did not contain water but instead contained liquid methane. Cassini found that Titan had its own sort of "water cycle", which had liquid methane cycling from the hydrogen clouds back to the surface and also that there may probably be a

underground fluid body, which is believed to consist of water and ammonia. These findings by Cassini show not only show how geographically diverse Titan is but it also indicates how the Earth might have been before life. Cassini has put forth new questions in the scientific world. Can life exist on Titan? Will humans and other organisms be able to survive on Titan? I find this discovery very imperative due to the fact that it showcases striking similarities to Earth and also expands on our understanding of our planet.

The analysis Cassini did on the ring planet proved revolutionary in the scientific world. It was the first time that a spacecraft had captured images of lightning strikes on the day side of Saturn. It also spent a considerable time studying the rings of Saturn. It has taken high definition images of moon-ring interactions and the rings during equinox, collected the coldest temperature for a Saturn ring, and also identified that Enceladus is the primary source of the E Ring. This is just a few of the remarkable discoveries that the spacecraft has made. I believe that the research that has been done on Saturn through Cassini is propelling the astronomical field. We now know more about the great ring giant than we have ever had before. We have realized that the gas planet actually has many similarities with our own planet. This changes how we perceive these outer gas giants.

Cassini has made so many discoveries but the most astonishing things are actually going to happen towards the end of the spacecraft's mission. Cassini is set to orbit right past the rings, which is going to give scientist one of the best views of the rings. I believe that we will discover remarkable things in the ring system of Saturn. After this Cassini will enter what Cassini Scientists call the Grande Finale. During this phase, the spacecraft will travel through the gap between the rings and the planet itself. This will be the first time any spacecraft has done that. During this flyby, the spacecraft will plunge/dive in 22 times, giving us a rare view of the Saturn System. With this path, Cassini will be able to collect data on the gravity field, the interior structure of the planet, the exact length of day/night, and the mass of the rings. After it

this is completed, Cassini will enter Saturn's atmosphere and keep recording data until it burns up. I can now see that Saturn isn't just a gaseous planet with pretty rings. It is an extremely complex system that will propel us into understanding the Earth's infrastructure and also other gas planets beyond our solar system. I believe that we are not coming to an end of a mission but that we are only arriving to a new one.