

2011 Cassini Scientist for a Day  
11-13 Winner: Alex McGregor, Ardingly College

The target I think the Cassini Mission should focus on is Target 2 – Rhea and Titan. Both of these moons are very unique, Titan is Saturn's largest moon, and the second largest moon in the Solar System, it comprises more than 90% of the mass in orbit around Saturn, including the rings. Rhea is Saturn's second largest moon and is very different to Titan; it may have a tenuous ring system of its own and also has a slight atmosphere. The main reason I think target 2 is of such a high priority compared to the other targets is because I feel they have the most to offer us.

The surfaces of Rhea and Titan are both complex. Rhea has a very cratered surface; these craters include a few Dione-type fractures, referring to the dark or light markings across the surface. Rhea also has a very faint line going around its equator, this is believed to be from its tenuous ring system, getting the chance to photograph this would provide great evidence of a ring system orbiting Rhea. Titan has already been photographed during previous Cassini fly-bys, where SAR imaging was used to capture images of parts of the moon. Cassini fly-bys also produced images of lakes filled with methane, making it the only satellite with hydrocarbon lakes. Getting the chance to photograph these features of the two moons surfaces would give us a huge insight into what is really happening on their surfaces.

The tenuous rings of Rhea are the most intriguing to me, if the moon really does have rings orbiting, it will be the first rings about a moon in our solar system. There is evidence for a ring system around Rhea, observed changes in the flow of electrons trapped by Saturn's magnetic field as well as the finding of ultraviolet-bright spots along the equator, believed to be the impacts of orbiting ring material, add up to suggest a ring system orbiting the moon.

Finally the atmosphere on both moons is very interesting. Rhea is thought have a slight atmosphere, consisting of oxygen and carbon dioxide of a ratio of 5:2 respectively, however unclear it may be at the moment where the oxygen comes from, I believe with more photographic evidence we will be able to delve deeper into this unknown world. Titan however is rather different; it is the only moon to have a fully formed atmosphere, made up of more than just trace gases, and with an atmosphere 1.19 times more massive than Earth's and gravity much lower than that on Earth, humans would be able to walk or even fly over Titan.

Overall I believe the opportunity to photograph Rhea and Titan is one that we must seize. There is so much that we don't know about these moons and so much we don't understand that every chance we get is a valuable one. This will give us a building block for future missions and fly-bys.