

Iapetus – Saturn's 3rd moon

By Jay nair

We have looked at Titan and Rhea in the last two editions of Orbit. This month we will look at Iapetus, the third largest of Saturn's Moons. I hope you found the first two moons of interest. Feedback will be very welcome as it gives me the encouragement to continue writing about Saturn's Moons. If on the other hand you are not reading these articles or if you feel they are inappropriate, I will discontinue writing them.

Iapetus is the eleventh largest and Saturn's 3rd largest moon and is distinct by having an odd shape with two-tone colouration. It was discovered by Giovanni Domenico Cassini in October 1671, when he studied the western side of Saturn. Having determined that it was a moon he waited for several months to view it on the eastern side. However he was unsuccessful, but instead found it again on the Western side the following year. It was only in 1705 that he viewed Iapetus on the Eastern side using an improved telescope.

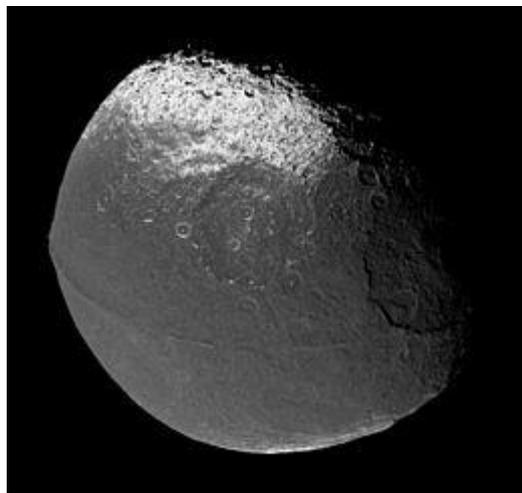


Fig 1 – Iapetus taken by the Cassini Spacecraft

So why then was it so difficult to view this moon on the Eastern side? Iapetus has a dark and a light hemisphere to it as can be seen in Fig 1. The dark hemisphere could only be viewed with advanced telescopes. Cassini correctly deduced this and that Iapetus being tidally locked to Saturn, the bright hemisphere is visible from Earth when the moon is on the Western side of Saturn and dark hemisphere is visible from the Eastern side. The dark hemisphere is named Cassini Regio in the discoverer's honour.

Iapetus has many geological features and they are named after characters and places in The Song of Roland – a French epic poem. Iapetus has features named Charlemagne, Balgiant and the northern bright region is called Roncevaux Terra. Cassini Regio is the exception as it still honours Giovanni Cassini.

Iapetus is composed mainly of ice with about 20% of rocky material. Unlike most other large moons, Iapetus is neither spherical nor ellipsoid, because it has a bulging waistline and squashed poles. This feature is another mystery yet to be solved, and there are different theories being argued. The equatorial bulge is so high that it visibly distorts Iapetus shape when viewed from a distance. This region comprises of a ridge of about 1300Km length with peaks up to 20Km and widths of 20Km. These peaks give Iapetus the record as having the tallest mountains in the solar system!

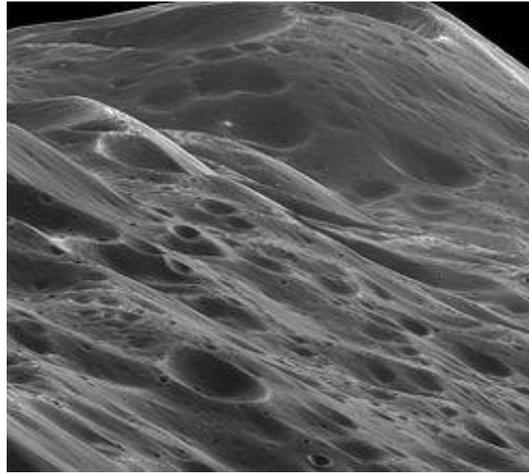


Fig 2 – Iapetus's Equatorial Mountains.

Iapetus is a heavily cratered moon and the Cassini probe has revealed large impact basins some of which are over 350Km wide. Its largest impact basin called Turgis had a 580Km diameter with an extremely rim.

The Cassini probe passed within 1640Km of Iapetus in September 2007 and demonstrated that both hemispheres are heavily cratered. It also determined that the dark material is extremely thin in some areas, according to radar imaging. It also showed that there were very small meteor impacts which punched to the ice underneath the surface.



Fig 3: Cassini Close up of polar region.

Iapetus is a cold place both in the dark and the light regions. Surprisingly, the lighter region is actually colder than the dark region as it is concluded that the light region absorbs less sunlight. So we have temperature of -143Deg C in the dark regions and a cooler -173Deg C in the lighter regions.

Iapetus has an orbital distance of 3.568Million Km around Saturn and has an inclined orbit with an orbital period of 79 days. It is the only moon from which the Rings of Saturn can be fully visible. All other moons give an edge-only view of the rings.

That is as much as I intend to write this time. Just so that I get a warm feeling after the cold visit to Iapetus, and that you have read this far, can anyone advise which the next of Saturn's Moons should be in order of size

Jay Nair – April 2015.