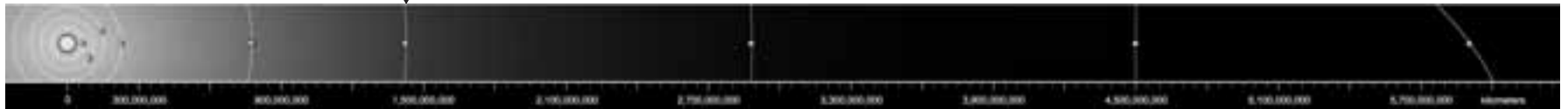
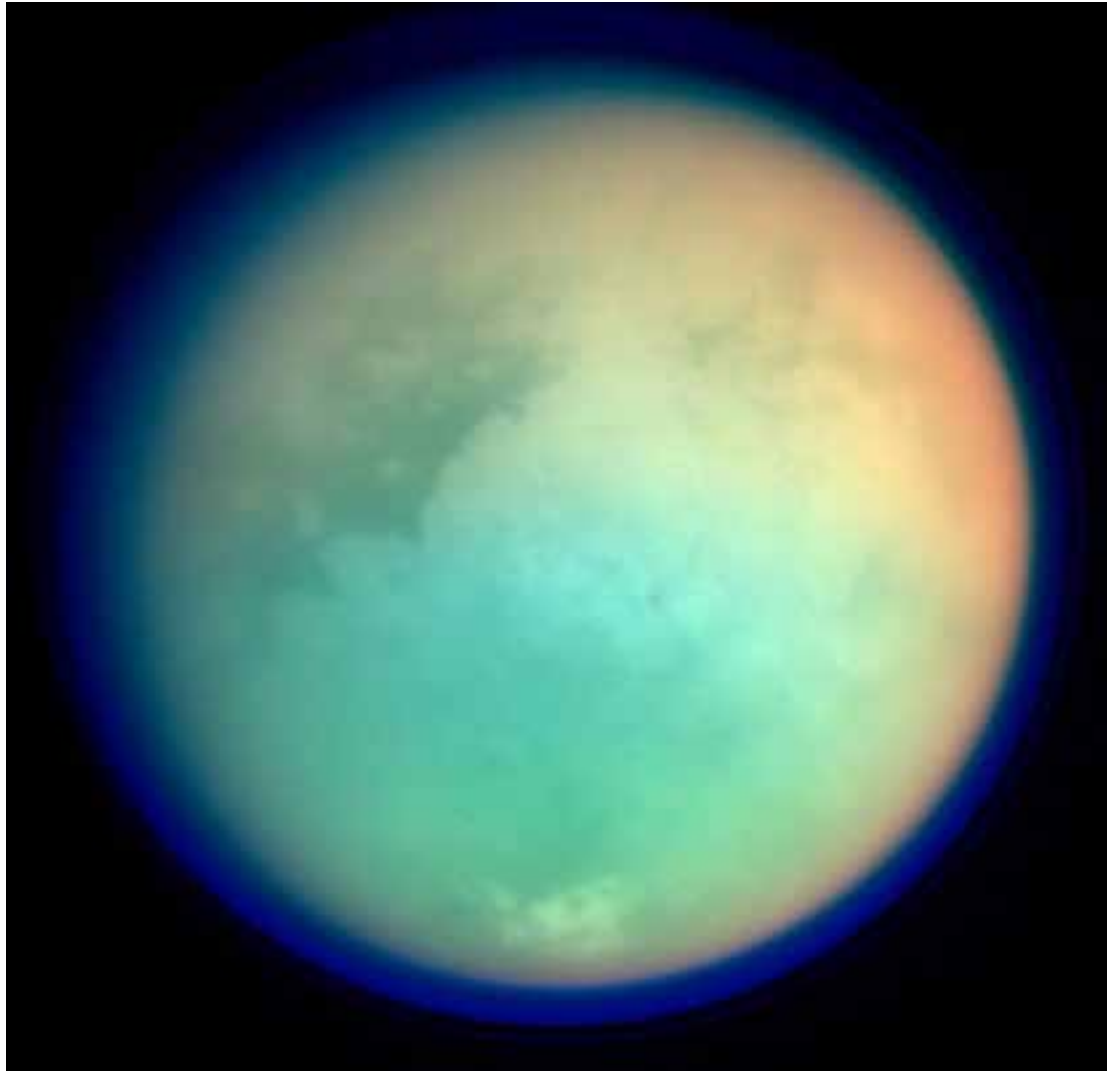


Moons of Saturn



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Saturn, the sixth planet from the Sun, is home to a vast array of intriguing and unique worlds. From the cloud-shrouded surface of Titan to crater-riddled Phoebe, each of Saturn's moons tells another piece of the story surrounding the Saturn system.

Christiaan Huygens discovered the first known moon of Saturn. The year was 1655 and the moon is Titan. Jean-Dominique Cassini made the next four discoveries: Iapetus (1671), Rhea (1672), Dione (1684), and Tethys (1684). Mimas and Enceladus were both discovered by William Herschel in 1789. The next two discoveries came at intervals of 50 or more years — Hyperion (1848) and Phoebe (1898).

As telescopic resolving power increased through the 19th century, Saturn's family of known moons grew. In 1966 Epimetheus and Janus were discovered. By the time Cassini-Huygens was launched in 1997, Saturn's moon count had reached 18. The number of known moons soon increased with high-resolution imaging techniques used on ground-based telescopes. Cassini discovered four more moons after its arrival at Saturn and may find even more during its mission.

Each of Saturn's moons bears a unique story. Two of the moons orbit within gaps in the main rings. Some, such as Prometheus and Pandora, interact with ring material, shepherding the ring in its orbit. Some small moons are trapped in the same orbits as Tethys or Dione. Janus and Epimetheus occasionally pass close to each other, causing them to periodically exchange orbits. Here's a sampling of some of the unique aspects of the moons:

- **Titan** — Titan is so large that it affects the orbits of other nearby moons. At 5,150 kilometers (3,200 miles) across, it is the second-largest moon in the solar system. Titan hides its surface with a thick nitrogen-rich atmosphere. Titan's atmosphere is similar to Earth's atmosphere of long ago, before biology took hold on our home planet. Titan's atmosphere is approximately 95% nitrogen with traces of methane. While Earth's atmosphere extends about 60 kilometers (37 miles) into space, Titan's extends nearly 600 kilometers (ten times that of Earth's atmosphere) into space.
- **Iapetus** has one side as bright as snow and one side as dark as black velvet, with a huge ridge running around most of its dark-side equator.

- **Phoebe** orbits the planet in a direction opposite that of Saturn's larger moons, as do several of the recently discovered moons.
- **Mimas** has an enormous crater on one side, the result of an impact that nearly split the moon apart.
- **Enceladus** displays evidence of active ice volcanism: Cassini observed warm fractures where evaporating ice evidently escapes and forms a huge cloud of water vapor over the south pole.
- **Hyperion** has an odd flattened shape and rotates chaotically, probably due to a recent collision.
- **Pan** orbits within the main rings and helps sweep materials out of a narrow space known as the Encke Gap.
- **Tethys** has a huge rift zone called Ithaca Chasma that runs nearly three-quarters of the way around the moon.
- Four moons orbit in stable places around Saturn called Lagrangian points. These places lie 60 degrees ahead of or behind a larger moon and in the same orbit. Telesto and Calypso occupy the two Lagrangian points of Tethys in its orbit; Helene and Polydeuces occupy the corresponding Lagrangian points of Dione.
- Sixteen of Saturn's moons keep the same face toward the planet as they orbit. Called "tidal locking," this is the same phenomenon that keeps our Moon always facing toward Earth.

The Cassini spacecraft will fly past Titan 45 times during its four-year primary mission. In addition, Cassini will gather data about many of the other satellites in an effort to fully understand the nature, formation, and dynamics of Saturn's moons.

FAST FACTS

- Largest Moon of Saturn Titan
Titan's Diameter 5,150 km (3,200 mi)
- Farthest Moon from Saturn Ymir
Ymir's Distance from Saturn 23,096,000 km (14,354,164 mi)

- Closest Moon to Saturn Pan
Pan's Distance from Saturn 133,583 km (83,022 mi)
- Fastest Orbit Pan
Pan's Orbit Around Saturn 13.8 hours
- Number of Moons Discovered by Voyager 3
(Atlas, Prometheus, and Pandora)
- Number of Moons Discovered by Cassini (So Far) 4
(Methone, Pallene, Polydeuces, and the moonlet 2005S1)

ABOUT THE IMAGES



- 1** An ultraviolet (blue) and infrared (red and green) image of Titan.
- 2** False color (blue) emphasizes icy walls of fractures on Enceladus.

- 3** The Herschel crater on Mimas is a relic of a large impact that nearly destroyed this moon.
- 4** One of the first images from the surface of Titan taken by the Huygens probe.
- 5** Titan's layers of haze are revealed in this ultraviolet image.
- 6** A mosaic of high-resolution images of Phoebe taken by Cassini during its historic close encounter in June 2004.
- 7** This image of Iapetus, the two-toned moon, shows the equatorial ridge as well as the icy-bright and dark regions.
- 8** Cassini's false-color image of Rhea enhances the slight differences in natural color across the moon's face.

FOR MORE INFORMATION

solarsystem.nasa.gov/planets/profile.cfm?Object=Saturn



Some of Saturn's moons are shown at relative distances to the planet.