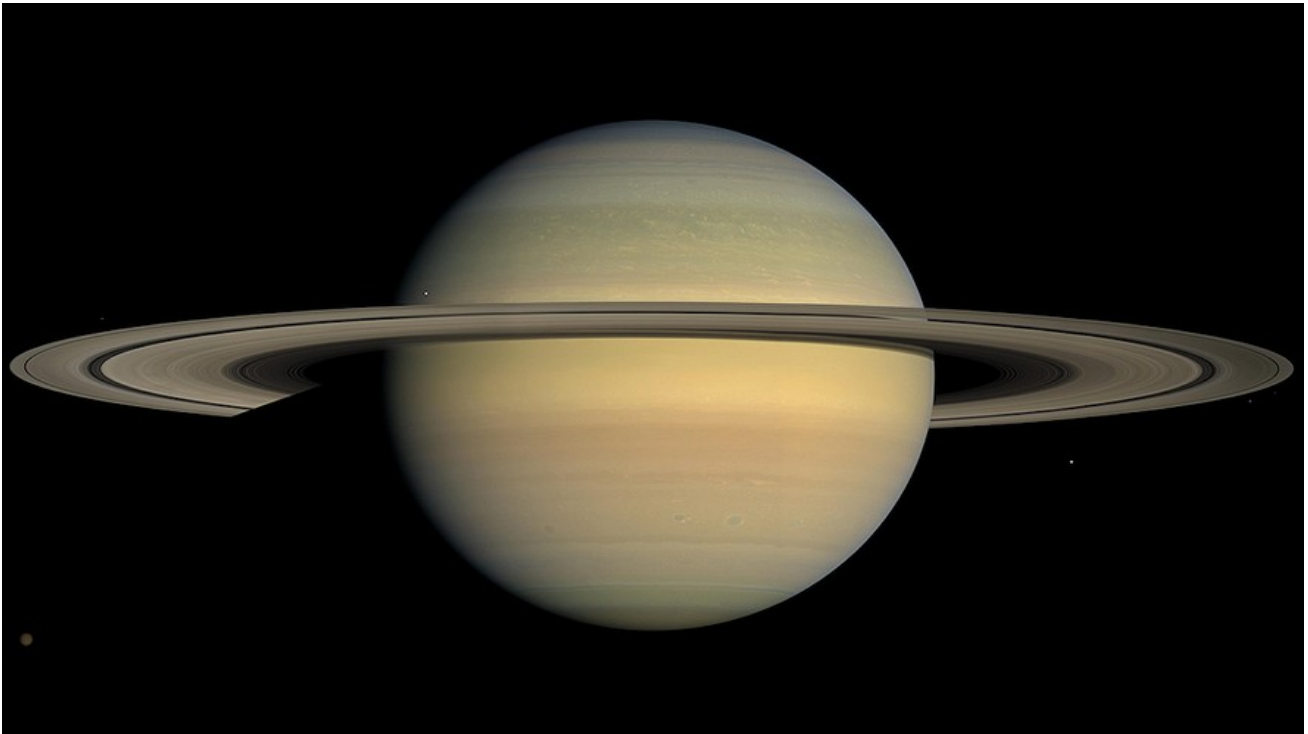


# The 20-year voyage of NASA's Cassini spacecraft ends dramatically

By Associated Press, adapted by Newsela staff on 09.19.17

Word Count **906**

Level **1150L**



This July 23, 2008, image from NASA shows the planet Saturn as seen from the Cassini spacecraft. After a 20-year voyage, Cassini was poised to dive into Saturn on September 15, 2017. Photo: NASA/JPL/Space Science Institute via AP

CAPE CANAVERAL, Florida — After a 20-year voyage, NASA's Cassini spacecraft dove into Saturn on Friday to become forever one with the ringed planet.

On Friday it careened through the atmosphere, burning up like a meteor in the sky over Saturn.

NASA is hoping for scientific dividends up until the end. Every bit of data radioed back from Cassini will help astronomers to better understand the entire Saturnian system — rings, moons and all.

## **Cassini's Excellent Five-Month Adventure**

The only spacecraft ever to orbit Saturn, Cassini spent the past five months exploring the uncharted territory between the gaseous planet and its dazzling rings. It has darted 22 times between that gap, sending back ever more wondrous photos.

Last Monday, Cassini flew past the jumbo moon Titan one last time for a gravity assist. It was a final kiss goodbye, as NASA calls it, nudging the spacecraft into a planned, no-way-out path.

During its final plunge, Cassini will keep sampling Saturn's atmosphere and beam back data until the spacecraft loses control and its antenna no longer points toward Earth. Descending at a scorching 76,000 miles per hour (122,000 kph), Cassini will melt and then vaporize. It should be all over in a minute.

"The mission has been insanely, wildly, beautifully successful, and it's coming to an end," NASA program scientist Curt Niebur said. "I find great comfort in the fact that Cassini will continue teaching us up to the very last second."

## **Without A Trace**

Telescopes on Earth watched for Cassini's burnout nearly a billion miles (1.6 billion kilometers) away. But any flashes are hard to see given the time — close to noon at Saturn — and Cassini's minuscule size against the solar system's second-largest planet.

The plutonium on board will be the last thing to go. The dangerous substance was encased in super-dense iridium as a safeguard for Cassini's 1997 launch and has been used for electric power to run its instruments. Project officials said once the iridium melts, the plutonium will be dispersed into the atmosphere. Nothing — not even traces of plutonium — should escape Saturn's deep gravity well.

The whole point of this one last exercise — dubbed the Grand Finale — is to prevent the spacecraft from crashing into the moons of Enceladus (ehn-SEHL'-uh-duhs) or Titan. NASA wants future robotic explorers to find pure worlds where life might exist, free of Earthly contamination.

## **"Profoundly, Scientifically Successful"**

It is unavoidable that the \$3.9 billion U.S.-European mission is winding down. Cassini's fuel tank is almost empty, and its objectives have been accomplished many times over since its 2004 arrival at Saturn following a seven-year journey.

The leader of Cassini's imaging team, planetary scientist Carolyn Porco, already feels the loss. "There's another part of me that's just, 'It's time. We did it.' Cassini was so profoundly, scientifically successful," said Porco, a visiting scholar at the University of California, Berkeley. "It's amazing to me even, what we were able to do right up until the end."

Until Cassini, only three spacecraft had ventured into Saturn's neighborhood: NASA's Pioneer 11 in 1979 and Voyager 1 and 2 in the early 1980s. Those were just flybys, though, and offered fleeting glances. And so Cassini and its traveling companion, the Huygens (HOY'-gens) lander, actually provided the first hard look at Saturn, its rings and moons. They are named for 17th-century astronomers, Italian Giovanni Domenico Cassini and Dutch Christiaan Huygens, who spotted Saturn's first moon, Titan. The current moon count is 62.

Cassini discovered six moons — some barely a mile or two across — as well as swarms of moonlets that are still part of Saturn's rings.

## **Huygens At Home On Titan**

All told, Cassini has traveled 4.9 billion miles (7.9 billion kilometers) since launch. It orbited Saturn nearly 300 times and collected more than 453,000 pictures and 635 gigabytes of scientific data.

The European Space Agency's Huygens lander — which hitchhiked all the way to Saturn aboard Cassini — still rests on Titan. It parachuted down in 2005, about six months after Cassini arrived at Saturn. It relayed data for more than an hour from the moon's frigid surface.

Still believed to be in one piece, Huygens remains the only spacecraft to actually land in one of our outer planetary systems.

## **Scientists Have Enjoyed The Ride**

Other than Titan's size — about as big as Mercury — little was known about Saturn's biggest and haze-covered moon before Cassini and Huygens showed up. They revealed seas and lakes of methane and ethane at Titan — the result of rainfall. The spacecraft also provided evidence of an underground ocean, possibly a brew of water and ammonia.

Over at the little moon Enceladus, Cassini unveiled plumes of water vapor spewing from cracks at the south pole. These geysers are so tall and forceful that they actually blast icy particles into one of Saturn's rings. Thanks to Cassini, scientists believe water lies beneath the icy surface of Enceladus, making it a prime spot to look for traces of potential life.

"Enceladus has no business existing and yet there it is, practically screaming at us, 'Look at me. I completely invalidate all of your assumptions about the solar system.'" Niebur said. "It's an amazing destination."

That is precisely why scientists did not want to risk Cassini crashing into it, said Earl Maize. He is the program manager at NASA's Jet Propulsion Laboratory in Pasadena, California.

"The book is not complete. There's more to come" from exploring the planets, Maize said. "But this has been a marvelous ride."