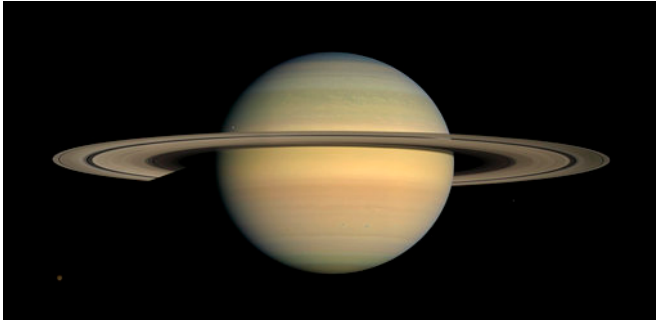


Farewell Cassini: Saturn spacecraft makes fiery, final dive (Update)

15 September 2017, by Marcia Dunn



This July 23, 2008 image made available by NASA shows the planet Saturn, as seen from the Cassini spacecraft. After a 20-year voyage, Cassini is poised to dive into Saturn on Friday, Sept. 15, 2016. (NASA/JPL/Space Science Institute via AP)

NASA's Cassini spacecraft disintegrated in the skies above Saturn on Friday in a final, fateful blaze of cosmic glory, following a remarkable journey of 20 years.

Confirmation of Cassini's expected demise came about 7:55 a.m. EDT. That's when radio signals from the spacecraft—its last scientific gifts to Earth—came to an abrupt halt. The radio waves went flat, and the spacecraft fell silent.

Cassini actually burned up like a meteor 83 minutes earlier as it dove through Saturn's atmosphere, becoming one with the giant gas planet it set out in 1997 to explore. But it took that long for the news to reach Earth a billion miles away.

The only spacecraft to ever orbit Saturn, Cassini showed us the planet, its rings and moons up close in all their splendor. Perhaps most tantalizing, ocean worlds were unveiled on the moons Enceladus and Titan, which could possibly harbor life.

Dutiful to the end, the Cassini snapped its last photos Thursday and sampled Saturn's atmosphere Friday morning as it made its final plunge. It was over in a minute or two.

Program manager Earl Maize made the official pronouncement:

"This has been an incredible mission, an incredible spacecraft and you're all an incredible team," Maize said. "I'm going to call this the end of mission."



Flight director Julie Webster reacts in mission control at NASA's Jet Propulsion Laboratory after confirmation of Cassini's demise Friday, Sept. 15, 2017, in Pasadena, Calif. Cassini disintegrated in the skies above Saturn early Friday, following a remarkable journey of 20 years. (AP Photo/Jae C. Hong, Pool)

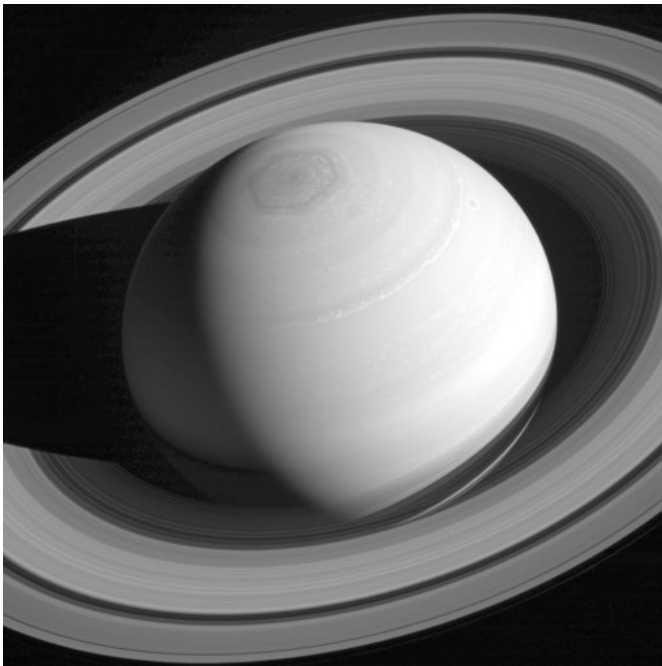
Flight controllers wearing matching purple shirts stood and embraced and shook hands. Project scientist Linda Spilker also had a purple handkerchief to wipe away tears.

"It felt so much like losing a friend," she told reporters a couple of hours later.

More than 1,500 people, many of them past and present team members, had gathered at California's Jet Propulsion Laboratory for what was described as both a vigil and celebration. Even more congregated at nearby California Institute of Technology, which runs the lab for NASA.

The spacecraft tumbled out of control while plummeting at more than 76,000 mph (122,000 kph). Project officials invited ground telescopes to look for Cassini's last-gasp flash, but weren't hopeful it would be spotted against the vast backdrop of the solar system's second largest planet. The radio link actually held on a half-minute longer than expected.

"There are times in this world when things just line up, when everything is just about perfect. A child's laugh, a desert sunset and this morning. It just couldn't have been better," said Maize. "Farewell, faithful explorer."



This May 4, 2014 image made available by NASA shows the persistent hexagonal cloud pattern on Saturn's north pole, as seen from the Cassini spacecraft. The hexagon is similar to Earth's polar vortex, which has winds blowing in a circular pattern around the polar region, and is nearly 25,000 kilometers (15,000 miles) across. Nearly four Earths could fit inside it. (NASA/JPL-Caltech/Space

Science Institute via AP)

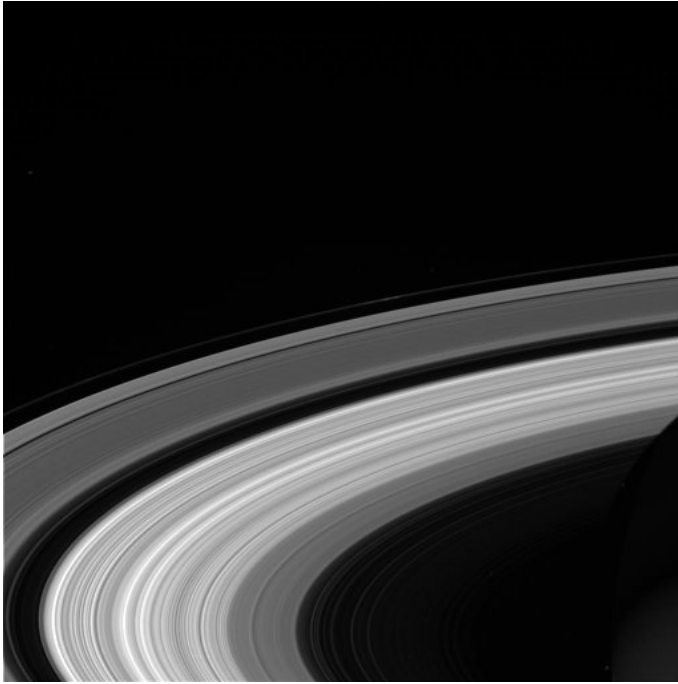
This Grand Finale, as NASA called it, came about as Cassini's fuel tank started getting low after 13 years exploring the planet. Scientists wanted to prevent Cassini from crashing into Enceladus or Titan—and contaminating those pristine worlds. And so in April, Cassini was directed into the previously unexplored gap between Saturn's cloud tops and the rings. Twenty-two times, Cassini entered the gap and came out again. The last time was last week.

Cassini departed Earth in 1997 and arrived at the sixth planet from our sun in 2004. The hitchhiking European Huygens landed on big moon Titan in 2005. Nothing from Earth has landed farther. Three other spacecraft previously flew past Saturn, but Cassini was the only one to actually circle the planet.

In all, Cassini collected more than 453,000 images and traveled 4.9 billion miles. It was an international endeavor, with 27 nations taking part. The final price tag was \$3.9 billion.

European space officials joined their U.S. colleagues to bid Cassini farewell. Seventeenth-century astronomers supplied the spacecraft names: Italy's Giovanni Domenico Cassini, who discovered four moons and the wide division in Saturn's rings, and Holland's Christiaan Huygens, who spotted the first and biggest moon, Titan.

The latest count is 62 moons, six of them found by the spacecraft Cassini.



This Wednesday, Sept. 13, 2017 image taken using the CL1 and RED filters and made available Thursday by NASA shows Saturn's rings, as seen from the Cassini spacecraft. NASA's Cassini spacecraft at Saturn is closing in on its fiery finish, following a remarkable journey of 20 years. Cassini is on course to plunge through Saturn's atmosphere and vaporize like a meteor Friday morning. (NASA/JPL-Caltech/Space Science Institute via AP)

There were some lighthearted touches during the morning. At one point in the broadcast, NASA played a video clip of the Cassini Virtual Singers, spacecraft team members who belted out, "Tonight, tonight, we take the plunge tonight ..." to the music from "West Side Story." Parties were planned for the teams throughout the weekend, complete with Champagne.

Scientists are already eager to go back and delve into the wet, wild worlds of Enceladus and Titan. Proposals are under consideration by NASA, but there's nothing official yet. In the meantime, NASA plans sometime in the 2020s to send an orbiter and lander to Europa, a moon of Jupiter believed to have a global ocean that might be compatible for life.

"These (water) worlds that they found, we never knew were there, are changing how we think about life itself," said NASA's science mission director, Thomas Zurbuchen. "And so for me, that's why it's truly a civilization-scale mission, one that will stand out among other missions, anywhere."

Julie Webster, spacecraft operations manager for Cassini, said she's been blasting the Moody Blues' "Your Wildest Dreams" in her car the last few days.

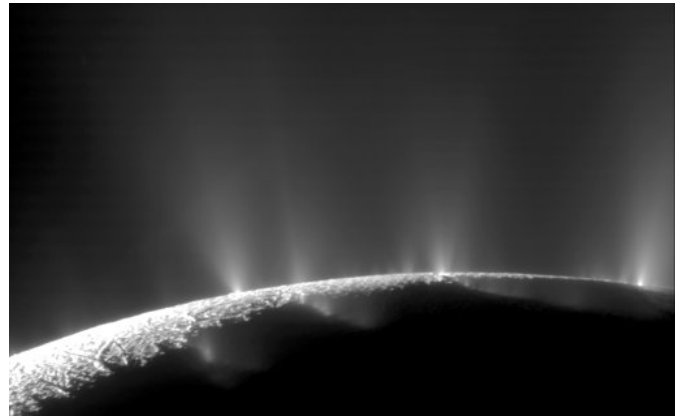
"This has truly been beyond my wildest dreams."



Engineer Mar Vaquero monitors the status of NASA's Cassini spacecraft as it enters the atmosphere of Saturn in mission control at NASA's Jet Propulsion Laboratory, Friday, Sept. 15, 2017, in Pasadena, Calif. Cassini disintegrated in the skies above Saturn early Friday, following a remarkable journey of 20 years. (AP Photo/Jae C. Hong, Pool)

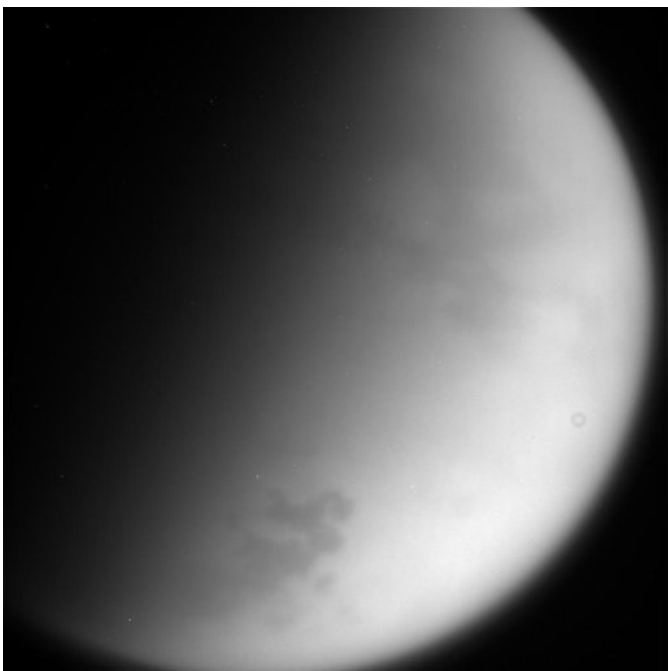


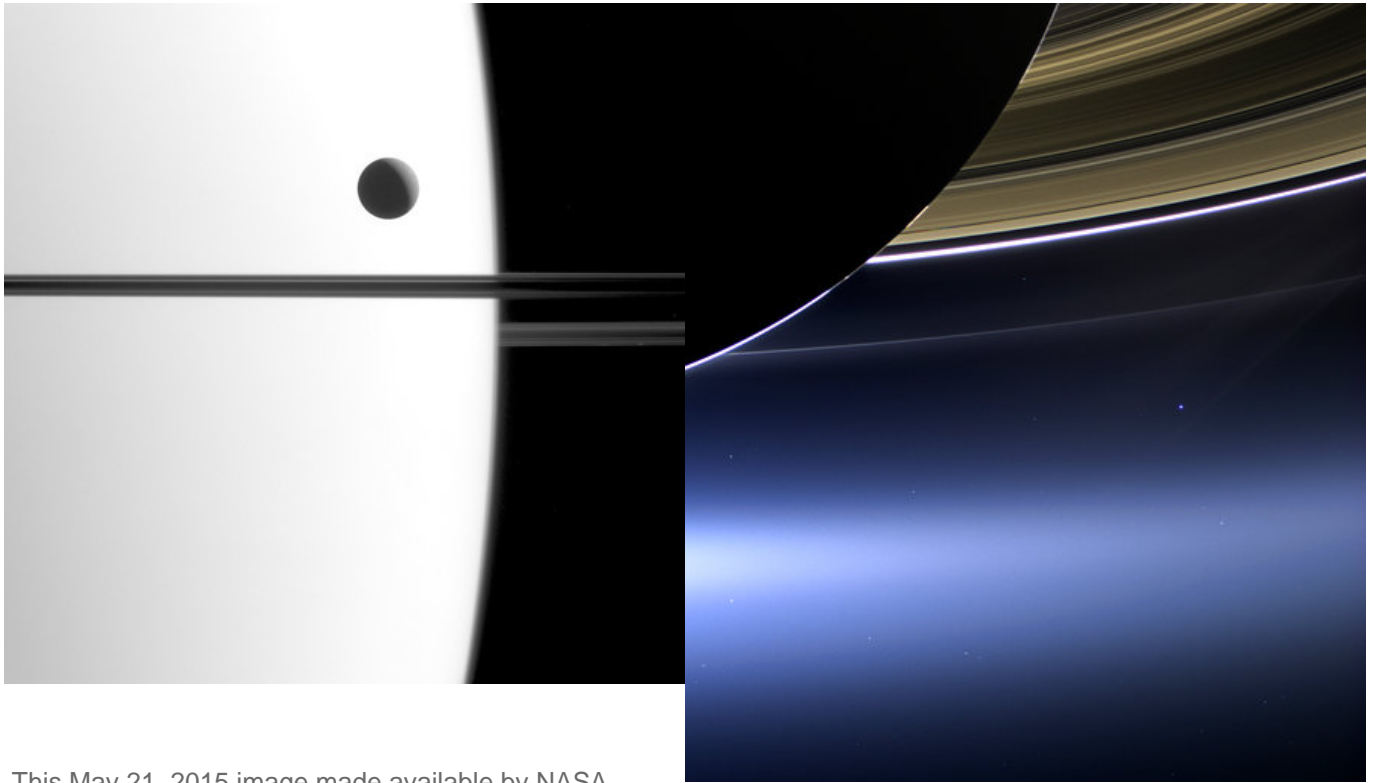
This Wednesday, Sept. 13, 2017 image taken using the CL1 and RED filters and made available Thursday by NASA shows Saturn's moon Titan, as seen from the Cassini spacecraft. NASA's Cassini spacecraft at Saturn is closing in on its fiery finish, following a remarkable journey of 20 years. Cassini is on course to plunge through Saturn's atmosphere and vaporize like a meteor Friday morning. (NASA/JPL-Caltech/Space Science Institute via AP)



This image made available by NASA shows the moon Enceladus and the edge of Saturn as seen from the Cassini spacecraft on its descent towards the planet on Wednesday, Sept. 13, 2017. The probe disintegrated in the skies above Saturn early Friday, Sept. 15, 2017, after a journey of 20 years. (NASA/JPL-Caltech/Space Science Institute via AP)

This Feb. 17, 2005 image made available by NASA shows plumes of water ice and vapor from the south polar region of Saturn's moon Enceladus. The activity is understood to originate from the moon's subsurface ocean of salty liquid water, which is venting into space. (NASA/JPL/Space Science Institute via AP)





This May 21, 2015 image made available by NASA shows Saturn's moon Dione crossing the face of the gas giant, in a phenomenon astronomers call a transit. Transits play an important role in astronomy and can be used to study the orbits of planets and their atmospheres, both in our solar system and in others. (NASA/JPL-Caltech/Space Science Institute via AP)

This July 19, 2013 image made available by NASA shows Saturn's rings and planet Earth, center right, as seen from the Cassini spacecraft. (NASA/JPL-Caltech/Space Science Institute via AP)



Flight director Julie Webster gets emotional in mission control at NASA's Jet Propulsion Laboratory after confirmation of Cassini's demise Friday, Sept. 15, 2017, in Pasadena, Calif. Cassini disintegrated in the skies above Saturn early Friday, following a remarkable journey of 20 years. (AP Photo/Jae C. Hong, Pool)



Engineer Nancy Vandermay, left, wipes her tears in mission control at NASA's Jet Propulsion Laboratory after confirmation of Cassini's demise Friday, Sept. 15, 2017, in Pasadena, Calif. Cassini disintegrated in the skies above Saturn early Friday, following a remarkable journey of 20 years. (AP Photo/Jae C. Hong, Pool)



Project manager Earl Maize, center, shakes hands with Bill Heventhal in mission control at NASA's Jet Propulsion Laboratory, Friday, Sept. 15, 2017, in Pasadena, Calif. after confirmation of Cassini's demise. Cassini disintegrated in the skies above Saturn early Friday, following a remarkable journey of 20 years. (AP Photo/Jae C. Hong, Pool)



IO manager Luis Morales monitors the status of NASA's Cassini spacecraft in mission control at NASA's Jet Propulsion Laboratory, Friday, Sept. 15, 2017, in Pasadena, Calif. Cassini disintegrated in the skies above Saturn early Friday, following a remarkable journey of 20 years. (AP Photo/Jae C. Hong, Pool)



In this Oct. 31, 1996 photo made available by NASA, the newly assembled Cassini Saturn probe undergoes vibration and thermal testing at the Jet Propulsion

Laboratory facilities in Pasadena, Calif. It was subjected to weeks of "shake and bake" tests that imitate the forces and extreme temperatures the spacecraft would experience during launch and spaceflight. (NASA via AP)

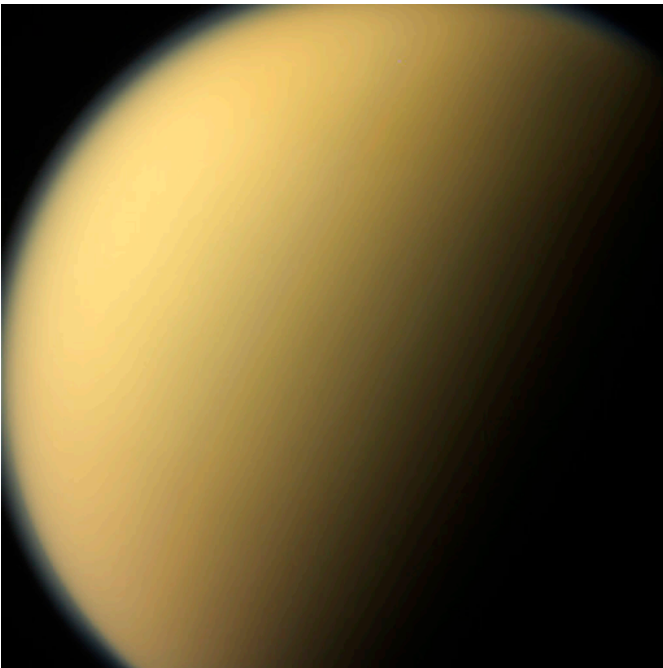
This Wednesday, Sept. 13, 2017 image made available by NASA on Friday, Sept. 15, 2017 shows the atmospheric haze on the moon Titan as seen from the Cassini spacecraft on its descent towards Saturn. The probe disintegrated in the skies above the ringed planet early Friday after a 20-year mission. (NASA/JPL-Caltech/Space Science Institute via AP)



More information: NASA: saturn.jpl.nasa.gov/

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Project manager Earl Maize, center, shakes hands with Bill Heventhal in mission control at NASA's Jet Propulsion Laboratory, Friday, Sept. 15, 2017, in Pasadena, Calif. after confirmation of Cassini's demise. Cassini disintegrated in the skies above Saturn early Friday, following a remarkable journey of 20 years. (AP Photo/Jae C. Hong, Pool)



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