

Going out in a blaze of glory—Cassini's grand finale

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With the conclusion of the international Cassini mission set for September 15, 2017, the spacecraft is poised to soon begin a thrilling two-part endgame.

Cassini will enter the first part of this denouement on November 30, 2016, when the <u>spacecraft</u> begins a series of 20 passes just beyond the outer edge of the main rings. These weekly loops around Saturn are called the F ring orbits, and they send the spacecraft high above and below the planet's poles. During these orbits, Cassini will approach to within 4,850 miles (7,800 kilometers) of the center of the narrow F ring, with its wispy and ever-changing structure.

"During the F ring orbits we expect incredible views of the rings, along with the small moons and other structures embedded in them, as we've never seen them before," said Linda Spilker, Cassini project scientist at NASA's Jet Propulsion Laboratory, Pasadena, California. "The last time we got this close to the rings was during arrival at Saturn in 2004, and we saw only their backlit side. Now we have dozens of opportunities to examine their structure at extremely high resolution on both sides."

Cassini's final phase—called the Grand Finale—begins in earnest in April 2017. A close flyby of Saturn's giant moon Titan will reshape the spacecraft's orbit so that, instead of passing outside the rings, it passes through the gap between the rings and the planet. The spacecraft is expected to make 22 plunges through this gap—an unexplored space only about 1,500 miles (2,400 kilometers) wide—beginning with its first



dive on April 27.

During the Grand Finale, Cassini will make the closest-ever observations of Saturn, mapping the planet's magnetic and gravity fields with exquisite precision and returning ultra-close views of the atmosphere. Scientists also hope to gain new insights into Saturn's interior structure, the precise length of a Saturn day, and the total mass of the rings—which may finally help settle the question of their age. The spacecraft will also directly analyze dust-sized particles in the main rings and sample the outer reaches of Saturn's atmosphere—both first-time measurements for the mission.

The mission will come to a dramatic end on Sept. 15, 2017, after more than 13 years studying Saturn, its rings and moons—and nearly 20 years since launch. On that day, Cassini will dive into Saturn, returning data about the chemical composition of the planet's upper atmosphere until its signal is lost, after which the spacecraft to burn up like a meteor.

"While it will be sad to say goodbye, Cassini's final act is like getting a whole new mission in its own right," said Spilker today at the joint 48th meeting of the American Astronomical Society's Division for Planetary Sciences and 11th European Planetary Science Congress in Pasadena, California. "The scientific value of the F ring and Grand Finale orbits is so compelling that you could imagine an entire mission to Saturn designed around what we're about to do."

Provided by NASA

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