**Cassini: Diving Into History**

**TX: 12th September 2017**

**Suggested webcopy:**

Following over a decade of ground-breaking discoveries, Cassini is now approaching its mission end.

With little fuel left to correct the NASA's spacecraft trajectory, it has been decided to end the mission by plunging it into Saturn’s atmosphere on 15 September 2017. In the process, Cassini will burn up, satisfying planetary protection requirements to avoid possible contamination of any moons of Saturn that could have conditions suitable for life. These include Saturn’s largest moon Titan and Enceladus, which has a liquid ocean under its icy crust.

The grand finale is not only a spectacular way to complete this extraordinary mission, but will also return a bounty of unique scientific data that was not possible to collect during the previous phases of the mission. Cassini has never ventured into the area between Saturn and its rings before, so the new set of orbits is almost like a whole new mission.

These close orbits will provide the highest resolution observations ever achieved of the inner rings and the planet's clouds. The orbits will also give the chance to examine *in situ* the material in the rings and plasma environment of Saturn. It will also probe the planet's magnetic field at close distances.

This video explains Cassini 's final operations, what the Cassini-Huygens mission has taught us about Saturn, the potential for life on its moons and the promise of more science to come.

It contains soundbites from Michele Dougherty, the Principal Investigator of Cassini’s magnetometer (English on A roll) and Nico Altobelli, ESA Cassini Project Manager (English on A roll; French on B roll).

**CASSINI: DIVING INTO HISTORY**

TAPE STARTS: 10:00:00

VT STARTS: 10:00:10

10:00:10

[ARCHIVE LAUNCH AND CONTROL ROOM SHOTS - caption 15 October 1997]

Cassini’s seven year journey to Saturn began in 1997.

10:00:28

[SATURN, RINGS AND MOONS IMAGES; credit NASA]

Huygens landed on Saturn’s largest Moon, Titan, in 2005 and, together with observations from Cassini, found methane clouds and lakes, as well as canyons flooded with hydrocarbons. Cassini also unveiled closer images of other moons such as Prometheus, the sponge-looking Hyperion and even one moon, Mimas, that resembles the Death Star from science fiction’s Star Wars. While Enceladus is covered in icy ridges with active water jets on its south pole.

10:01:11

[INSET CLIP: Michele DOUGHERTY, Principal Investigator Cassini Magnetometer]

*“My favourite moon is Enceladus…and the reason I’m partial to Enceladus is that it’s the moon that my team discovered a water vapour plume at. But not only is there liquid water underneath the surface, but there’s organic material, there’s a heat source and when people get excited about the potential for life elsewhere in the Solar System there are four things that you need. You need a heat source, you need liquid water, you need organic material and you need those things to be stable over some period of time so that life could potentially form.”*

10:01:49

[ENCELADUS IMAGE AND CASSINI/SATURN ANIMATION; credit NASA]

Enceladus has three of the four conditions for life - the only thing still under debate is their stability over time. And this exciting finding helped define Cassini’s priorities for how it would end its successful mission after years of extensions.

10:02:07

[INSET CLIP: Nico ALTOBELLI, ]

*“After 20 years of operations the spacecraft is running out of fuel so it becomes increasingly difficult to navigate it through the system and what we want to avoid is to crash on one of the icy moons like Enceladus where habitability and huge astro-biological potential has been discovered.”*

10:02:24

[ANIMATION OF CASSINI AT ENCELADUS AND CASSINI AMONG THE RINGS; credit NASA]

This potential life could be locked inside the liquid ocean beneath Enceladus’ icy crust where the hydrothermal heat sources are also located - in the same way that life has been found deep in Earth’s dark ocean depths near hydrothermal vents.

To make the most of its last few months, Cassini has been performing some daring manoeuvres, diving through the gap between Saturn’s upper atmosphere and the icy particles that make up its innermost ring for a final series of 22 orbits.

10:02:59

[IMAGES OF HURRICANE ON SATURN AND NORTH POLE; ANIMATION OF CASSINI STUDYING THE RINGS]

It has allowed closer glimpses of Saturn’s hurricanes, some with winds reaching 500 kms per hour, and the hexagonal spinning storm at its north pole. This is as wide as two Earths and surprised everyone when recent images showed that, over the years, it had changed colours from blue to gold. In a few days, however, Cassini’s adventures must come to an end.

10:03:27

[INSET CLIP: NICO ALTOBELLI]

*“During the final orbit, on September 15, we are going to dive at 30 km per second through the upper layer of the atmosphere. The spacecraft will be able to maintain for one minute approximately by pointing to Earth with the high gain antenna and, at the end, the drag force of the gas will destabilise the spacecraft so much that we will lose the link to Earth and this is then the end of mission before the spacecraft burns in the atmosphere.”*

10:03:53

[ANIMATION OF CASSINI’S FINAL DESCENT; credit NASA]

In its final moments Cassini will become an atmospheric probe, sending back scientific data from Saturn - including information about its magnetic field - until its demise. When Earth receives this new data the spacecraft will no longer exist. But the discoveries will continue. So far the Cassini-Huygens mission has produced around two and a half thousand scientific papers, with one in three led by a European scientist. And so the legacy from this successful collaboration between the American and European space agencies will continue to open up Saturn’s secrets for decades to come.

10:04:37

[ENDS]

**B-ROLL**

**10:04:37**

Michele Dougherty, Principal Investigator Cassini Magnetometer

[ENGLISH]

*“My favourite moon is Enceladus…and the reason I’m partial to Enceladus is that it’s the moon that my team discovered a water vapour plume at. But not only is there liquid water underneath the surface, but there’s organic material, there’s a heat source and when people get excited about the potential for life elsewhere in the solar system there’s four things that you need. You need a heat source, you need liquid water, you need organic material and you need those things to be stable over some a period of time so that life could potentially form. At Enceladus we’ve got three. We’re not sure about the stability over time yet and so, based on the Cassini observations we made back in 2005, we’ve had lots and lots more flybys of Enceladus. We now understand it much better. We understand what organic material is there. One of the instruments, the ion and neutral mass spectrometer, in a very close flyby through the plume found some ammonia in the plume.”*

**10:05:49**

Nico Altobelli, Cassini Project Manager, ESA

[FRENCH]

10:05:58

Soundbite 1 - Altobelli explains in French what has been happening since April and how the Cassini mission will end.

10:06:49

Soundbite 2 - Altobelli explains in French why it is important for Cassini to burn up in Saturn’s atmosphere and avoid the moons.

**10:07:44**

Cassini-Huygens Mission Animation

Credit: NASA

Animation showing Cassini manoeuvre between Saturn’s inner most ring and its upper atmosphere before burning up in the atmosphere.

**10:10:25 END**