Landing on Titan: The new movies

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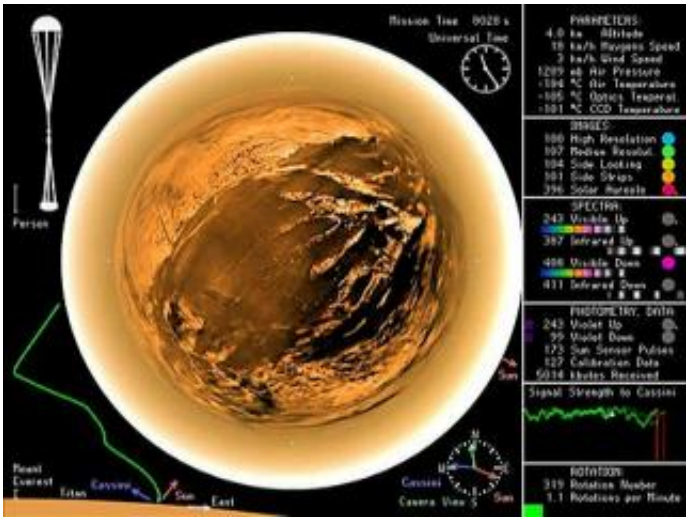
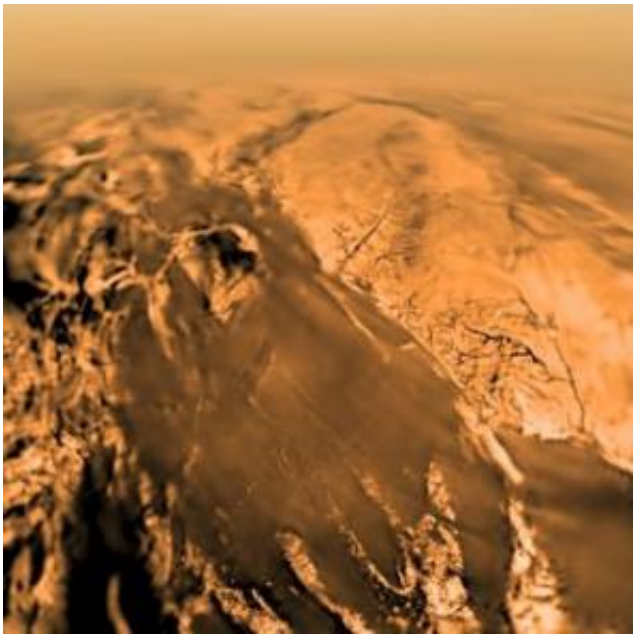


Scientists at the University of Arizona Lunar and Planetary Laboratory (LPL) have made two new movies of the Huygens probe's landing on Saturn's giant moon, Titan, on Jan. 14, 2005.

The movies -- made from images taken by Huygens' Descent Imager/Spectral Radiometer (DISR) during its 147-minute plunge through Titan's thick orange-brown atmosphere to a soft sandy riverbed -- are the most realistic way yet to experience the far-out-world landing.

The movies are being released today on these Web sites: http://www.lpl.arizona.edu/DISR/,

http://www.saturn.esa.int/,
and http://www.nasa.gov/cassini.



This image of Titan was taken by the Descent Imager/Spectral Radiometer on board the European Space Agency's Huygens probe, on Jan. 14, 2005. It was taken looking west from 5 miles above the surface. This is one of several images taken in different directions and at different altitudes that are being released today on the DISR website, http://www.lpl.arizona.edu/DISR/ (Credits: ESA/NASA/JPL/University of Arizona)

DISR was developed with NASA funding by UA and Lockheed Martin researchers on a team headed by LPL Research Professor Martin Tomasko. The European Space Agency (ESA) Huygens probe is part of the joint NASA, ESA and Italian Space Agency Cassini-Huygens mission to the Saturn system. The probe landing was the most distant touchdown ever made by a human-built spacecraft.

LPL senior staff scientist and DISR team member Erich Karkoschka created the new Huygens landing movie and the new DISR movie.

Scientists were extremely busy analyzing data for months after the landing, Karkoschka said. They didn't have a chance to give the public a good overview of what was going on until later. "I hope the new movies help to put the different results into context," he said.

In the Huygens movie, "I wanted to show what the Huygens probe 'saw' within a few hours," Karkoschka said. "At first, the Huygens camera just saw fog over the distant surface. But after landing, the probe's camera could resolve little grains of sand millions and millions times smaller than Titan. A movie is a perfect medium to show such a huge change of scale."

DISR team member Chuck See scripted this narrated movie, "The View from Huygens on January 14, 2005," which runs 4 minutes 40 seconds. KUAT radio broadcaster David Harrington of Tucson, Ariz., narrates. Another version is accompanied by a recording of Beethoven's Piano Concerto No. 4 performed by Debbie Hu of Yelm, Wa.

For the second, more technical movie, Karkoschka shows DISR's 4-hour operating life in less than five minutes, too. It takes some text to follow all the graphics and sidebar information that comes with this version. Karkoschka's text describing the movie is online at http://uanews.org/extras/12587_20060427.html

"DISR was a very complicated instrument," Karkoschka said. "It had to be programmed to take its 3,500 exposures in a way to get the most science. It had to decide where and when to take exposures."

DISR was designed when the best images showed Titan as a featureless, hazy disk. "We didn't know the dynamics of Titan's atmosphere very

well, and we didn't know how fast Huygens would rotate and swing," Karkoschka said. "It was an extremely challenging programming task to make DISR work well under every imaginable condition."

A movie is ideal for showing how DISR worked.

For example, the first part of the movie shows how Titan looked to DISR as it acquired more and more images during the probe's descent. Each DISR image has a small field of view, and dozens of images were made into mosaics of the whole scene.

Karkoschka analyzed Huygens' speed, direction of motion, rotation and swinging during descent. His DISR movie includes sidebar graphics that show such things as:

-- (Lower left corner) Huygens' trajectory views from the south, a scale bar for comparison to the height of Mount Everest, colored arrows that point to the sun and to the Cassini orbiter.
-- (Top left corner) A close-up view of the Huygens probe highlighting large and unexpected parachute movements, and a scale bar for comparison to human height.
-- (Lower right corner) A compass that shows the changing direction of view as Huygens rotates, along with the relative positions of the sun and Cassini.
-- (Upper right corner) A clock that shows Universal Time, also referred to as Greenwich Mean Time, on Jan. 14, 2005. Above the clock, events are listed in Mission Time, which starts with the deployment of the first parachute.

A musical score comes with this movie, too. But it's definitely modern, not classical.

"There's so much information in the different displays that come with

this movie that one can easily miss something important," Karkoschka said. "Therefore, I added sound to track the most important features, because the ears hear all the sound no matter where you look."

Sounds from a left speaker trace Huygens' motion, with tones changing with rotational speed and the tilt of the parachute. There also are clicks that clock the rotational counter, as well as sounds for the probe's heat shield hitting Titan's atmosphere, parachute deployments, heat shield release, jettison of the DISR cover and touch down.

Sounds from a right speaker go with DISR activity. There's a continuous tone that represents the strength of Huygens' signal to Cassini. Then there are 13 different chimes - one for each of DISR's 13 different science parts - that keep time with flashing-white-dot exposure counters.

All parts of DISR worked together as programmed, Karkoschka said. It was pure harmony.

Source: University of Arizona