# Cassini Controllers Overcome Software Glitch

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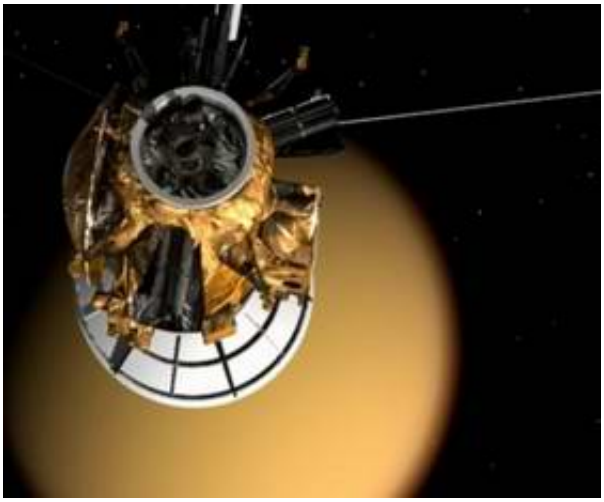

NASA mission controllers said Friday that Cassini remains in "an excellent state of health and is operating normally" – although they did encounter a serious software problem last week that required a bit of jury-rigging with the Saturn spacecraft's software.

The problem arose during transmission of a complex command sequence. Controllers at Jet Propulsion Laboratory learned to their surprise that the sequence had used so much of Cassini's memory that it could accommodate only 720 more words of code – not enough to record the entire command. So controllers decided to send the sequence

in pieces, and allow the spacecraft to reassemble them after it received the complete message.

That approach caused a second and potentially more serious problem, because when controllers attempted to send the transmission piecemeal, they discovered errors in the spacecraft's software prevented it from reconstituting the commands. Worse, controllers found that their additional transmissions would require up to 13,000 words of memory, so failure to solve the problem could have left Cassini crippled.

Controllers fixed the problem, however, and have since developed a new technique to send a single code sequence in as many pieces as necessary to accommodate the software limitations.

Further analysis showed the software error appeared because of an incompatibility between one of the sequence-transmission directives and the spacecraft's basic software package. Controllers said they definitely have worked around the problem and they do not expect a repeat.

Meanwhile, controllers said they have successfully recharged Cassini's hydrazine tank to bring the spacecraft's thrusters up to full capacity in advance of its planned lower-altitude Titan flybys, starting with the one scheduled for July 22. They said they do not expect another recharge will be necessary for at least 10 months.

So far in its mission, which reached Saturn on July 4, 2004, Cassini's cameras have recorded nearly 69,000 raw images – including the one above of the planet's horizon as its moons Dione and Janus glide past.

A few craters are visible on Dione (1,126 kilometers, or 700 miles across). Janus (181 kilometers, or 113 miles across) is slightly blurred due to its motion during the exposure.

The rings appear essentially edge-on in this view, as the Cassini spacecraft continues its recent activities close to the ring plane. Cassini took the image with its narrow-angle camera on March 10, using a filter sensitive to wavelengths of infrared light centered at 750 nanometers. The image was acquired at a distance of approximately 2.9 million kilometers (1.8 million miles) from Saturn. The image scale is 17 kilometers (11 miles) per pixel.