2002 Genesis Mission Status Updates: July, August, September

September 25, 2002
Genesis is operating in good health. The flight team and spacecraft completed a sixth stationkeeping maneuver without a hitch on Sept. 25. The maneuver adjusted the orbit Genesis is traveling around the L1 point. It accelerated the spacecraft by about 1.45 meters per second (4.76 feet per second) in a direction about 22 degrees off a line toward the Sun. Initial results from the navigation team indicate that the execution was within about 1 percent of design.

Science activities are back up and running after a brief pause for the stationkeeping maneuver.

Ten good star-tracker images were downloaded following the maneuver.

The Genesis team received a NASA Group Achievement Award on Sept. 24 for "outstanding contribution to successful development, test, and launch of the Genesis spacecraft and the implementation of an outstanding mission operations system." Lockheed Martin Astronautics and Boeing were each awarded a NASA Public Service Award for Genesis development and launch.

September 18, 2002
Genesis is continuing to collect solar wind material and is operating normally.

The flight team is preparing for the spacecraft's sixth station-keeping maneuver, scheduled for Sept. 25. These maneuvers fine-tune the orbit that Genesis is traveling around the L1 point. A thruster burn will accelerate the spacecraft by 1.45 meters per second (4.76 feet per second) in a direction that is about 22 degrees off of a line toward the Sun and 11 degrees off a line toward Earth.

September 8, 2002
With less than two years remaining until Genesis returns its collected sample material to Earth on Sept. 8, 2004, the spacecraft continues collecting solar wind material and operating normally.

Planning for the sample return operations at the U.S. military's Utah Test and Training Range advanced during a meeting at the range near Salt Lake City last week. Participants included Genesis team members from the California Institute of Technology, the Jet Propulsion Laboratory, NASA's Johnson Space Center, the U.S. Department of Energy's Los Alamos National Laboratory, Lockheed Martin Astronautics and Mid-continent Research for Education and Learning (McREL); and representatives from the Utah Test and Training Range, Hill Air Force Base and the U.S. Air Force Space Command. We discussed the release, entry, mid-air recovery and handling of the sample.

On Sept. 2, a software patch was uploaded to the spacecraft to avoid problems from a corrupt bit identified last month in a programmable memory chip in one of the spacecraft's memory modules. Like another bad bit identified seven months earlier in a different chip in the same module, this bit was one that toggles between a high state and a low state before coming to rest in the low state. Without the patch, if we were to have a reset, the "bad" image would be decompressed and loaded.

August 28, 2002
Genesis continues to collect solar particles. During an energetic particle event on Aug. 24, more bright objects than normal were identified in the star tracker, with no ill effect.

On Aug. 28, the flight team identified a problem with a memory chip in one of the spacecraft's memory modules. Initial indications are that the chip, which is an electronically erasable programmable read-only memory, has one corrupt bit. The team dealt successfully with a similar situation about seven months ago, when a corrupt bit was identified in a chip in a different memory module and a software patch was transmitted to the spacecraft to bypass the bad bit. Engineers are in the process of determining the exact location of the newly detected corruption.

August 21, 2002
A solar wind shock this week provided the opportunity for successfully using a software patch that was previously installed for autonomous recovery of the solar wind concentrator's rejection grid when voltage climbs too high. The rejection grid of fine wires carries a positive charge to deflect hydrogen ions in the solar wind, so that the solar wind sample being collected will have a relatively high proportion of the more scientifically interesting oxygen ions. The shock reached the spacecraft on Aug. 18, and the rejection grid's voltage quickly rose from about 1,000 volts to about 2,000 volts. When a fault occurred at about 2,025 volts, the software patch successfully went to work. The rejection grid was autonomously brought down to 1,400 volts, paused for 1 hour, and then ramped up again, ending at about 1,950 volts.

Another highlight of the week was approval of an improvement in the flight software for the sample return capsule's avionics unit.

July 25, 2002
Genesis' fifth station-keeping maneuver was successfully completed on July 24th. Recently, the team has been testing to see how they can efficiently reduce the time needed for maneuvers. In this maneuver, the time allocated for damping of the induced nutation was reduced. Spacecraft performance was monitored and the spacecraft remained just as stable as previous maneuvers that took longer. All the subsystems

performed normally during the maneuver. The maneuver was performed 23 degrees off-Sun (4 degrees off-Earth). Firing the small hydrazine thrusters for 322 seconds made the spacecraft's speed change by 1.46 meters per second (3.2 miles per hour). The Systems team did their typical great job supporting the maneuver and even supplied treats! Solar wind collection continues, except for a brief interruption during the maneuver. Over the last weekend, the concentrator reverted to non-collection mode briefly because of very high solar wind speeds and temperatures and then returned to normal operation.

July 11, 2002
Solar particle collection continues as we approach one year of flight. We continue to remain mainly in low-speed solar wind. Last week during some high-speed wind, the concentrator rejection grid's voltage autonomously went to its maximum value of 2060 V without incident. Also, the team is developing the next stationkeeping maneuver. It will be similar to the last maneuver, since in both Genesis passes close to the Sun on the way to the maneuver's starting point.

July 5, 2002
Sample collection continues. The spacecraft observed and autonomously collected samples from the slow solar wind regime for most of the week, punctuated by a Coronal Mass Ejection observed on 6/27-28.