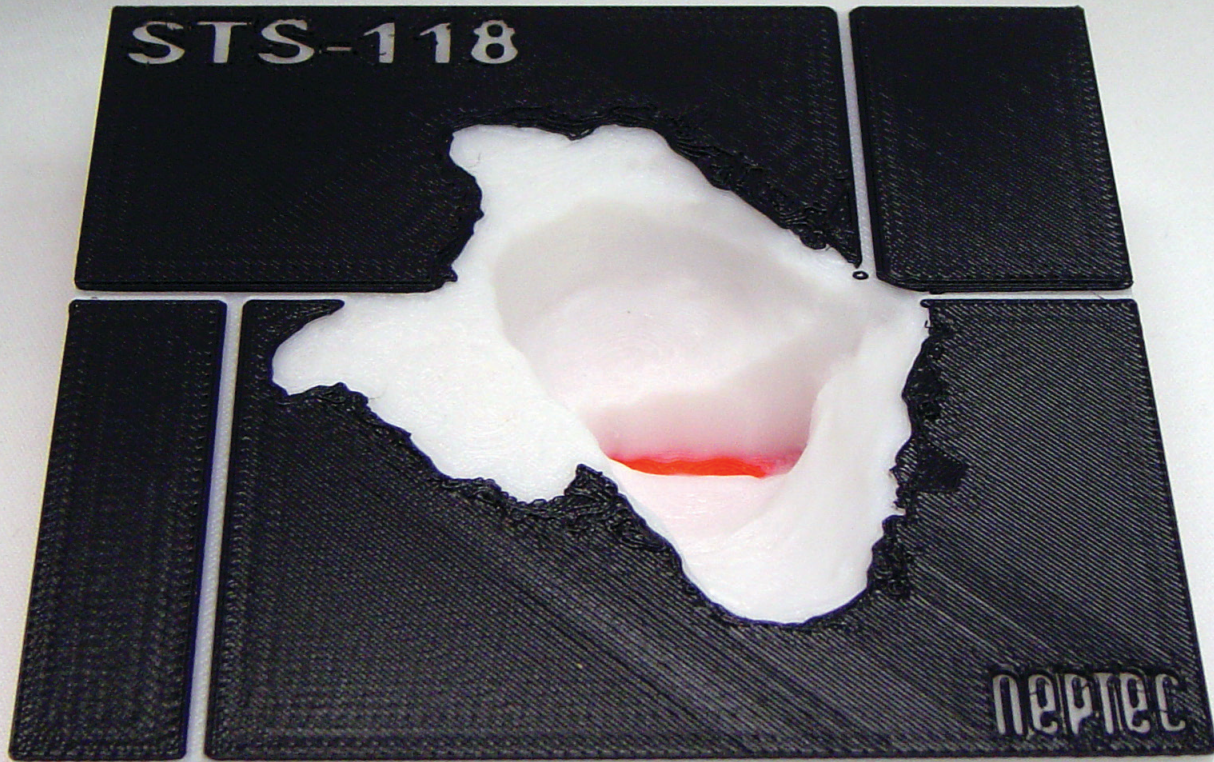




“The LCS data gave NASA the tangible information they needed to test the damaged tiles. This allowed them to make a very confident and educated decision about bringing the shuttle home.”

Maureen Campbell / Neptec



Neptec 3D Printed this model from images captured in flight.

CASE STUDY

Return From Space

3D PRINTING HELPS BRING ENDEAVOUR HOME SAFELY

On Aug. 13, 2007, just after lift off, the space shuttle Endeavour's Thermal Protection System (TPS) suffered damage due to falling foam from the fuel tank. Sensors detected damage to the heat-resistant tiles lining the orbiter's underbelly, posing a threat to the shuttle's safe re-entry to Earth.

NASA called on Neptec Design Group, a prime contractor to NASA since 1995, to collect three-dimensional information to evaluate the severity of the situation. Neptec's Laser Camera System (LCS) was used to collect 3D images, which provided NASA with the tangible information required to test the damaged tiles.

Neptec's LCS, designed specifically for these situations, is a permanent part of the 50-foot inspection boom, used by the Canadarm, which flies on every Space Shuttle mission. Using the LCS, Neptec collected detailed 3D images of locations where sensors detected possible damage to the Shuttle's outer surface.

The Dimension Solution

Using a Dimension 3D Printer, Neptec was able to use the three-dimensional information from the LCS to print a 3D model of the damage aboard the Endeavour. The model provided visual representation of the tiles and was used to evaluate the damage to the shuttle's Thermal Protection System.

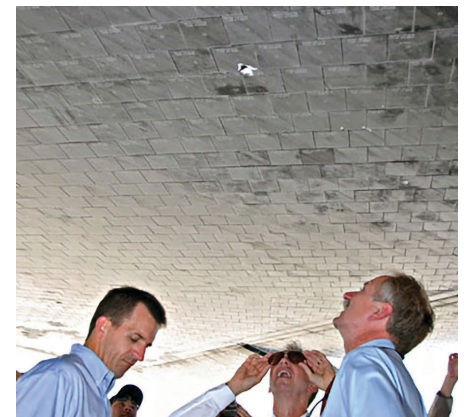
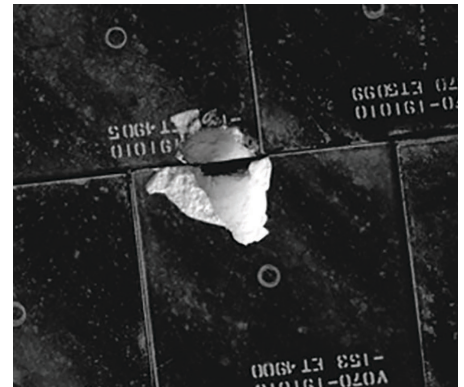
"The LCS data gave NASA the tangible information they needed to test the damaged tiles," said Maureen Campbell, marketing and communications manager for Neptec. "This allowed NASA to make a very confident and educated decision about bringing the shuttle home without filling the damaged area.

"The Dimension 3D model of the damage to the heat-resistant tiles assisted NASA mission managers in gaining an appreciation as to the extent of the damage. Although the gouge was deep, mission managers believed it posed no risk to the space shuttle's re-entry into the Earth's atmosphere.

On Aug. 21, the Endeavour space shuttle and its seven-astronaut crew returned safely to Earth. The shuttle's landing completed a 5.3 million-mile, 13-day flight for the orbiter. On the mission, Endeavour's astronaut crew performed four space walks and primed the station for the delivery of its fourth and final set of U.S. solar arrays on a future shuttle flight.

"Due to the extreme nature of the environment, every space mission presents an elevated level of risk," Maureen Campbell said. "By providing accurate, three-dimensional information and clearly communicating the extent of the damage, NASA was able to make a better educated decision, which, in turn, brought the Endeavour crew home safely."

This is not the first time Neptec used its Dimension 3D printer to assist engineers. Neptec uses its 3D printer to aid in the design and development of its product lines. "The 3D printer allowed us to do a variety of testing issues, including a certain amount of fit and interference checking," Campbell said.



stratasys

E info@stratasys.com
STRATASYS.COM

ISO 9001:2008 Certified

HEADQUARTERS

7665 Commerce Way,
Eden Prairie, MN 55344
+1 800 801 6491 (US Toll Free)
+1 952 937-3000 (Intl)
+1 952 937-0070 (Fax)

2 Holtzman St., Science Park,
PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)