

Abstract Submission for IV Pan American Conference on END

A Handheld, Wireless 3D Laser Scanner for Shuttle Tile Inspection

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Abstract

NASA Ames Research Center engineers have developed a unique wireless handheld instrument to increase the accuracy, reliability, and speed of Orbiter Thermal Protection System (TPS) surface flaw measurements. The small 3D scanning device, called the Mold Impression Laser Tool (or MILT), operates on the principle of laser triangulation, weighs only 1.3 Kg, and scans over a 7.6x7.6 cm area in about 2 seconds with an accuracy of .127 mm X, Y and Z. The device is placed over the TPS area to be measured, optically scans the area for flaws, and sends the resultant data to a laptop PC via wireless transmission. Thus, the instrument is completely unencumbered by cables allowing technicians to take scans up to 25 meters and more separated from the computer. Scan images of the surface come up on the PC in real time as the instrument is scanning. The images can be rotated, zoomed, and panned to closely inspect the damage. A software analysis program running on the PC will locate and identify all of the flaws in the scanned area and display the dimensions (volume, depth, length, width, and area) of each one in a table. The PC software also identifies the TPS area under consideration, and updates the TPS database with the latest flaw information.

Keywords: 3D Scanner, Laser, Wireless, Space Shuttle



Figure 1. MILT Instrument with Laptop PC.

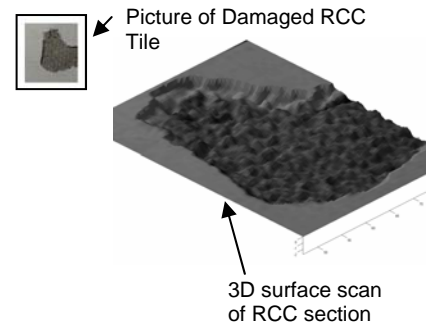


Figure 2. Scan of Orbiter RCC panel