

# NIST shielding data help launch shuttle

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As the National Aeronautics and Space Administration (NASA) plans for the next launch of the space shuttle, a critical aspect of the program's safety is being assured by 5 million pieces of data collected recently by the National Institute of Standards and Technology (NIST).

To help prevent a repeat of the 2003 accident when launch debris damaged the shuttle Columbia, causing it to break up on re-entry, NASA has begun illuminating shuttles with tracking radars during launches and ascent to detect and quantify potential hazards. Concerns about possible disruption of onboard electronic guidance and control systems led NASA to request NIST's help in determining how much radar energy can penetrate the orbiter in key locations.

During the launch of Discovery in July, radar was used to track debris during ascent and NASA considered the NIST shielding data vital to the resumption of shuttle flights.

NIST has been conducting research in this area for several years and has developed a portable system that efficiently measures the electromagnetic shielding characteristics of airframes. The system previously has been used to evaluate both commercial and military aircraft. NIST engineers visited the Kennedy Space Center in Florida to evaluate the space shuttle Endeavor and the hanger in which the measurements were made.

The NIST system incorporates ultra-wideband antennas, a precision optical link between them, and a computerized data analysis system. The

two-step measurement process consisted of a reference measurement with the transmitting and receiving antennas outside the shuttle, and a penetration measurement with the receiving antennas at selected locations inside the orbiter. A computerized comparison of these two measurements over specific time periods and frequency bands provided a measure of shielding characteristics in the frequency range 30 megahertz to 6 gigahertz. The data enabled NASA to set safe power levels on radar systems used to detect debris.

Source: NIST

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