



## Welding Sensor System

134

The accompanying photos show a demonstration of a new ARI Weld Sensor System being marketed by Applied Research, Inc. (ARI), Huntsville, Alabama. It is a modified version of a system originally designed at Marshall Space Flight Center (MSFC) for welding components of the huge Space Shuttle External Tank. The modification was accomplished as a cooperative project of MSFC, ARI and Martin Marietta Manned Space Systems, New Orleans, Louisiana, NASA's prime contractor for the External Tank.

Key to the weld technology is a laser sensor that tracks the seam where two pieces of metal are to be joined, measures gaps and minute misfits, and automatically corrects the welding torch distance and height. The system uses a small industrial computer to translate the sensor's information to the weld head; the computer also records

and displays extensive weld data for control purposes and statistical process control analysis.

After a series of laboratory tests at MSFC, a proof of concept test was successfully conducted at a manufacturing facility of Copeland Corporation, Hartselle, Alabama. Copeland, a leading manufacturer of compressors for home air conditioning applications, produces some 6,500 air conditioner canisters daily. The necessity for producing a quality, airtight weld at that high volume made the Copeland facility an ideal candidate for operational testing of the system. In late 1991, a run of several hundred canisters was completed.

The automated weld joint tracking system is expected to find wide application in indus-



trial welding processes, especially those that require repetitive operations and a high degree of reliability. The commercial system is being produced by ARI, which pays royalties to co-developer Martin Marietta. The latter company is also a customer; the ARI Weld Sensor System will be part of a new robotically-controlled facility for manufacturing launch vehicle fuel tanks at Martin Marietta's Denver plant. ●

SPACE SHUTTLE

TECHNOLOGY SPAWNS

A LASER-BASED

AUTOMATED WELDER

FOR INDUSTRIAL USE

135

