Ares I and Ares V Launch Vehicles

Robotic Weld Tool (RWT)

It is a 7-axis robot that can perform conventional friction stir welding (FSW) or self-reaction (SR-FSW) on complex composite structures. Weld fixtures are used to position and secure fitting, gas, and wiring structures on the trailer.

Process Development System (PDS)

It is used to develop weld parameters at the panel level.

Vertical Trim Tool (VTT)

Trims welded fork barrel sections to length.

Vertical Weld Tool (VWT)

Can perform conventional FSW or SR-FSW on fork barrel sections.

Mortar Table Tool (MIT)

Creates friction pull plug welds to close-off SR-FSW keyholes as well as fusion welds for the Aries I upper stage common bulkhead.

Thermal Stir Weld (TSW)

System is used to fabricate nozzle extensions to improve performance of the J2-X rocket engine.

Space Shuttle Launch Vehicle

External Tank (ET)

PDS

VPPA/GTAW

Variable Polarity Plasma Arc/ Gas Tungsten Arc Weld System

WWT

Microstructural Results From Four Weld Processes

VPPA Weld (Fusion) on Aluminum (0.320-inch thick)

SR-FSW (Friction—Pinch Force) on Aluminum (0.320-inch thick)

Conventional FSW (Friction—Push Force) on Aluminum (0.320-inch thick)

TSW (Friction—Electromagnetic Induction) on Aluminum (0.320-inch thick)