Debra Rahn
Headquarters, Washington, DC
(Phone: 202/358-1778)

March 28, 1997

June Malone
Marshall Space Flight Center, Huntsville, AL
(Phone: 205/544-0034)

RELEASE: 97-58

SHUTTLE'S NEW LIGHTER, STRONGER EXTERNAL TANK COMPLETES MAJOR PRESSURE TESTS

The first new, super lightweight, external fuel tank for the Space Shuttle is set for final assembly after successfully completing proof pressure tests that verify its design. The achievement is a significant step toward the first launch of the International Space Station. The new external tank is the same size as the one currently used on the Space Shuttle -- but about 7,500 pounds lighter.

"Each pound we remove from the external tank is a pound that can be added to the payload," said Parker Counts, manager of the External Tank Project at the Marshall Space Flight Center, Huntsville, AL. "The lighter tank is essential for launching the Space Station because the Station components will be assembled in a more demanding orbit than previously planned."

The 154-foot-long external tank, higher than a 15-story building and as wide as a silo with a diameter of about 27 feet, is the largest single component of the Space Shuttle. The external tank holds the liquid hydrogen and liquid oxygen propellants in two separate tanks for the Shuttle's three main engines.

The two major changes to the external tank involve materials and design. Both the liquid hydrogen and the liquid oxygen tank are constructed of aluminum lithium -- a lighter, stronger material than the metal alloy used for the Space Shuttle's current external tank. The tank's structural design also has been improved. The walls of the redesigned hydrogen tank are manufactured in an orthogonal waffle-like pattern, providing more strength and stability than the previous design.

"The new external tank has passed one of the most innovative structural verification test programs ever designed, culminating with these proof tests," Counts said.

The proof test for the liquid oxygen tank was a hydrostatic, or water pressure test. The tank was placed vertically on the test stand at NASA's Michoud Assembly Facility in New Orleans, LA, and filled with water, which has similar density to liquid oxygen. The tests simulated conditions encountered during flights and validated the design changes.

The liquid hydrogen tank was pressurized with gaseous nitrogen

and subjected to conditions simulating the thrust of the orbiter's main engines and solid rocket boosters. Tests checked the new design by exposing the tank to harsher conditions than it will encounter in flight.

After the tests, comprehensive X-ray and dye penetrant inspections will be performed to further verify the tank's flight worthiness.

The proof tests completed March 25 were the final in a series of rigorous certification and structural verification tests.

"Our team of dedicated employees -- both at Marshall and Lockheed Martin Corporation -- completed the ambitious task of designing and building the improved external tank and verifying its design," said Counts.

"All of this was achieved successfully on a tight schedule of about three-and-a-half years. They pushed the state of the art of test technology, looking beyond current program requirements and squeezing all the information possible out of each test to understand the capability of the new tank," he added.

After thermal protection foam is sprayed on its exterior, the first super lightweight tank will be shipped by barge from Louisiana to the Kennedy Space Center, FL, for its launch with the first elements of the International Space Station. The changes to the external tank will not affect the assembly process when the orbiter is mated to its tank and solid rocket boosters.

The Shuttle's current external tank and the new super lightweight tank are manufactured by Lockheed Martin.

- end -