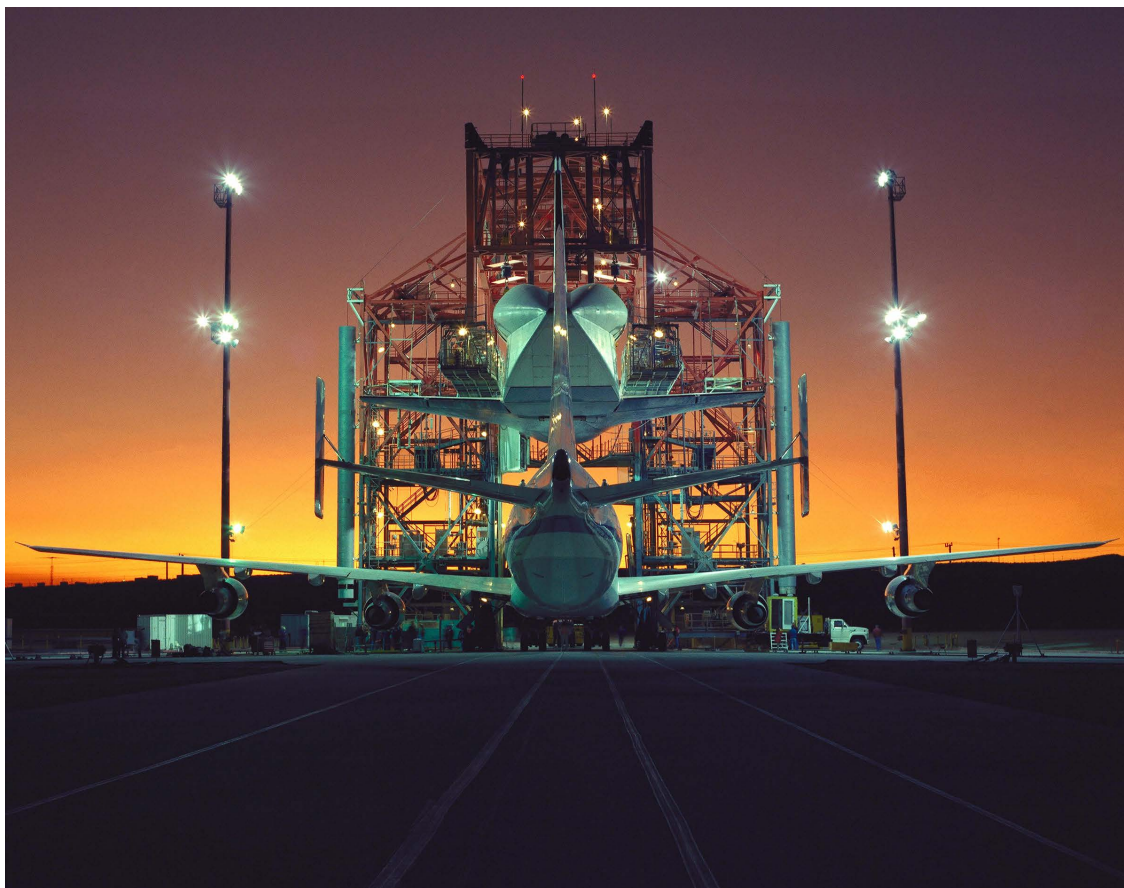




Space Shuttle Mate-Demate Device (MDD)



Evening light begins to fade as technicians begin the task of mounting the Space Shuttle Atlantis atop NASA's 747 Shuttle Carrier Aircraft (NASA 911) for the ferry flight back to the Kennedy Space Center, Fla., following its STS-44 flight 24 November-1 December 1991. (NASA / Jim Ross)

The Space Shuttle Mate-Demate Device (MDD) at NASA's Armstrong Flight Research Center on Edwards Air Force Base, California, is a large gantry-like steel structure that was used to hoist the shuttle orbiters off the ground during post-landing servicing operations and during mating and de-mating operations with the modified Boeing 747 Shuttle Carrier Aircraft (SCA).

Construction of the MDD was completed in late 1976. It was first used during mate-demate operations with the prototype shuttle orbiter Enterprise during the five Approach and Landing Tests (ALT) in 1977. It was then used for post-landing and SCA mating opera-

tions at NASA Armstrong following shuttle orbital missions that landed at Edwards. Fifty-four of the 135 shuttle missions landed at Edwards between STS-1 in 1981 through STS-128 in 2009.

MDD Description

The facility consists of two 100-foot towers with stationary work platforms at the 20-, 40-, 60- and 80-foot levels on each tower and a horizontal structure mounted at the 80-foot level between the two towers. The horizontal unit cantilevers out 70 feet from the main tower units. It controlled and guided a large lift beam that attached to the orbiters to raise and lower them.

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Three large hoists were then used simultaneously to raise and lower the lift beam. Two of the hoists are connected to the aft portion of the lift beam and one hoist is attached to the beam's forward section. Each of the three hoists has a 100,000-pound lift capability. Operating together, the total lifting capacity of the three units is 240,000 lbs (120 tons).

Orbiter Servicing

During orbiter turnaround operations, two access platforms for orbiter servicing specialists were positioned on each side of the orbiter after it was towed into the MDD. The platforms were normally stored at the 60-foot level when not in use. During servicing operations, the platforms were lowered on each side of the orbiter by a pair of telescoping tubes extending down from the cantilever section. Two equipment hoists, each capable of lifting 10,000 lb. were also built into each tower. These hoists operated up to the 60-foot level of the MDD.

MDD Construction

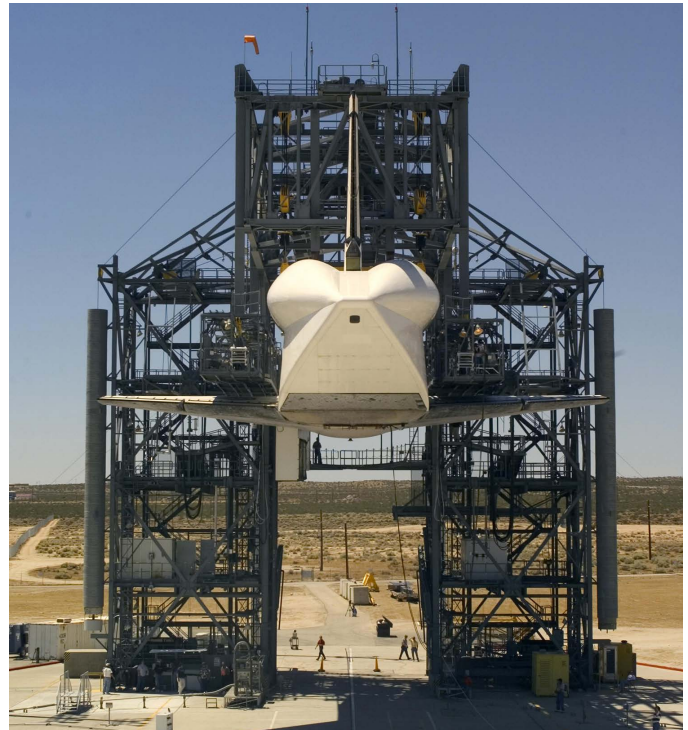
Connell Associates Inc. of Coral Gables, Florida, designed the MDD. It was constructed in 1976 by George A. Fuller Co., Chicago, Illinois, at a cost of \$1.7 million. A similar but slightly less complex MDD was constructed adjacent to the Shuttle Landing Facility runway at NASA's Kennedy Space Center in Florida.

Space Shuttle Hangar

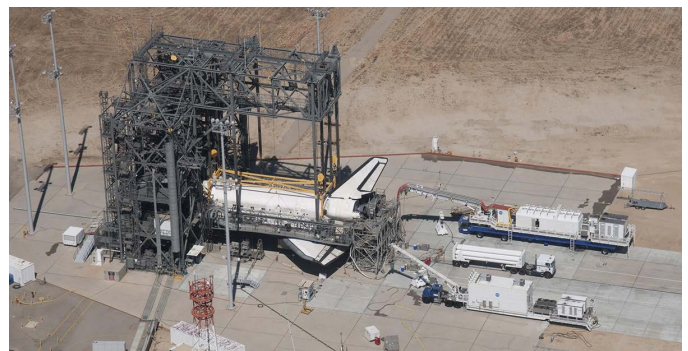
The former space shuttle hangar, near the MDD, is a single-bay 25,000 square-foot structure 170 feet deep, 140 feet wide and 80 feet high. A 6,700 square-foot annex on the north side of the hangar building includes administrative offices, ground operations control room, and a joint-use shop area.

Inside the hangar, two overhead bridge cranes provided lift capability for orbiter (or aircraft) servicing and maintenance operations. Each crane has a lift capability of 50,000 lb. Voorheis, Trindle, and Nelson, Irvine, California, designed the hangar. It was built by Santa Fe Engineers Inc., Lancaster, California, at a cost of \$3.7 million. Construction was completed in early 1976. The hangar is being retained for other current research projects at NASA Armstrong.

A concrete tow-way, 60 feet wide and 15 inches thick, connects the MDD and the Space Shuttle hangar with the aircraft ramp at the main Dryden complex. The taxiway extends onto the Edwards Air Force Base flight line and runway network.



STS-114 Shuttle Discovery is raised for the 747 Shuttle Carrier Aircraft to position itself underneath. (NASA / Carla Thomas)



Space Shuttle Discovery is surrounded by the Mate-DeMate Device gantry and ground support equipment during processing for its ferry flight back to the Kennedy Space Center in Florida. (NASA / Carla Thomas)

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