

HOUSTON BRINGS HOME A SHUTTLE

All photos courtesy of Alan Montgomery and Woodallen Photography, Houston, Texas.



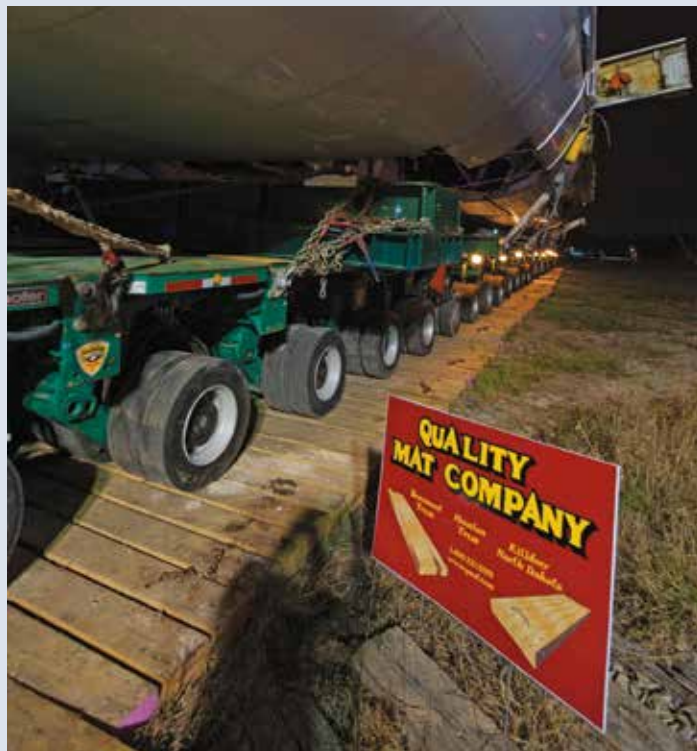
FOR EVERYONE TO SHARE *By Alicia M. Nichols*



The new Space Center Houston exhibit will feature the mock-up shuttle Independence sitting atop the Boeing 747, in the “ferry position.” Both exhibit director Paul Spana and educational director Dr. Melanie Johnson agree that the Houston exhibit offers a unique opportunity. Visitors here will have a far more tangible, hands-on educational experience than those who visit sites housing the formerly active shuttles. They can explore the insides of the 747 and the shuttle itself and see what it would be like to pilot the shuttle, crammed into the pilot’s deck. Interactivity and the higher level of engagement make it far more likely that young visitors will take away something from the experience, perhaps inspiring a future astronaut who will set foot on Mars.¹

Thirty-one years after NASA launched the first space shuttle into Earth's orbit, a shuttle carrier aircraft carrying the space shuttle *Endeavour* flew over Houston. In July of 2011, the shuttle *Atlantis*, STS-135, marked the 135th and final flight of the space shuttle program, known officially as the Space Transport System (STS). Just over a year later, while moving *Endeavour* to its permanent housing at the California Science Center in Los Angeles, the shuttle briefly stopped in Houston en route. *Endeavour's* arrival reminded many Houstonians how, controversially, NASA administrators bypassed Houston as one of the cities chosen to house the three remaining shuttles, despite being home to Mission Control since the Gemini missions of the nation's space program. Instead, *Atlantis* came to rest at the Kennedy Space Center in Florida, the shuttle *Discovery* went to the Udvar-Hazy Center in Virginia, an annex of the Smithsonian National Air and Space Museum, and shuttle *Enterprise*, which was built for testing purposes and never actually flew in space, was sent to New York City.²

While perhaps not as glamorous as the Apollo missions and moon landings, the space shuttle program allowed for a number of scientific discoveries and advancements in human space flight, and the craft remain visible reminders of our journeys into space. The conception of the space shuttle dates to 1969, and President Richard Nixon issued a proclamation launching the idea in 1972. The shuttle was



The seven-truck convoy carrying NASA 905 began its historic trek from Ellington Field to Space Center Houston at 9:00 p.m. on April 28, 2014. Going no more than 4.5 m.p.h., it reached a stopping point at 6:30 the next morning. The fleet, unable to make the ninety degree turn from Highway 3 onto NASA Road 1, had to take the side street Commerce Road at the end of the first night. Cutting the corner required stacking wooden mats due to railroad tracks. The narrow spacing allowed no more than six inches on either side of the trucks. Fortunately, the 920-foot-long procession met fewer complications the second night.⁶

envisioned as a practical tool to transport people, goods, science experiments, and equipment between Earth and what became the International Space Station—a place to conduct further research and study space. Throughout the 1970s, NASA scientists and engineers continued to develop and test the shuttle's design.³

In April of 1981, *Challenger* became the first space shuttle to launch and orbit the earth. The orbiters *Columbia*, *Challenger*, *Discovery*, *Atlantis*, and *Endeavour* flew more than 130 times, carrying over 350 people traveling more than half a billion miles, or more than enough miles to reach Jupiter. The *Challenger* and *Columbia* tragedies in 1986 and 2003 respectively brought the space program and the shuttles to the forefront of the nation's mind and spurred investigation into the efficacy of the shuttle program. Originally intended to last a mere fifteen years, the program finally concluded after three decades of service.⁴

In 2012, Johnson Space Center (JSC) was awarded the mock-up shuttle *Explorer* housed at the Kennedy Space Center. It was then transported to Space Center Houston, the official visitor center for JSC. Renamed *Independence*, the mock-up shuttle is a full-sized replica of the shuttle models, complete with parts that were used in space flight, such as the landing tires. Memories of being snubbed for a “real” shuttle resurfaced among Houstonians, as Space Center Houston worked on a new exhibit to showcase *Independence*. In 2013 Space Center Houston also acquired NASA 905, one of the two modified Boeing 747 Shuttle Carrier Aircraft (SCA) owned by NASA. A convoy transported the SCA approximately eight miles from Ellington Field to Space Center Houston.⁵

Space Center Houston plans to open the exhibit the summer of 2015.

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The horizontal stabilizer and elevators were removed from the rear of the 747, exposing a portion of the fuselage that helps maintain cabin pressure. Also removed were the specially made vertical stabilizers placed at each end of the horizontal stabilizer of NASA 905 (and her sister carrier NASA 911) to enhance directional stability.⁷

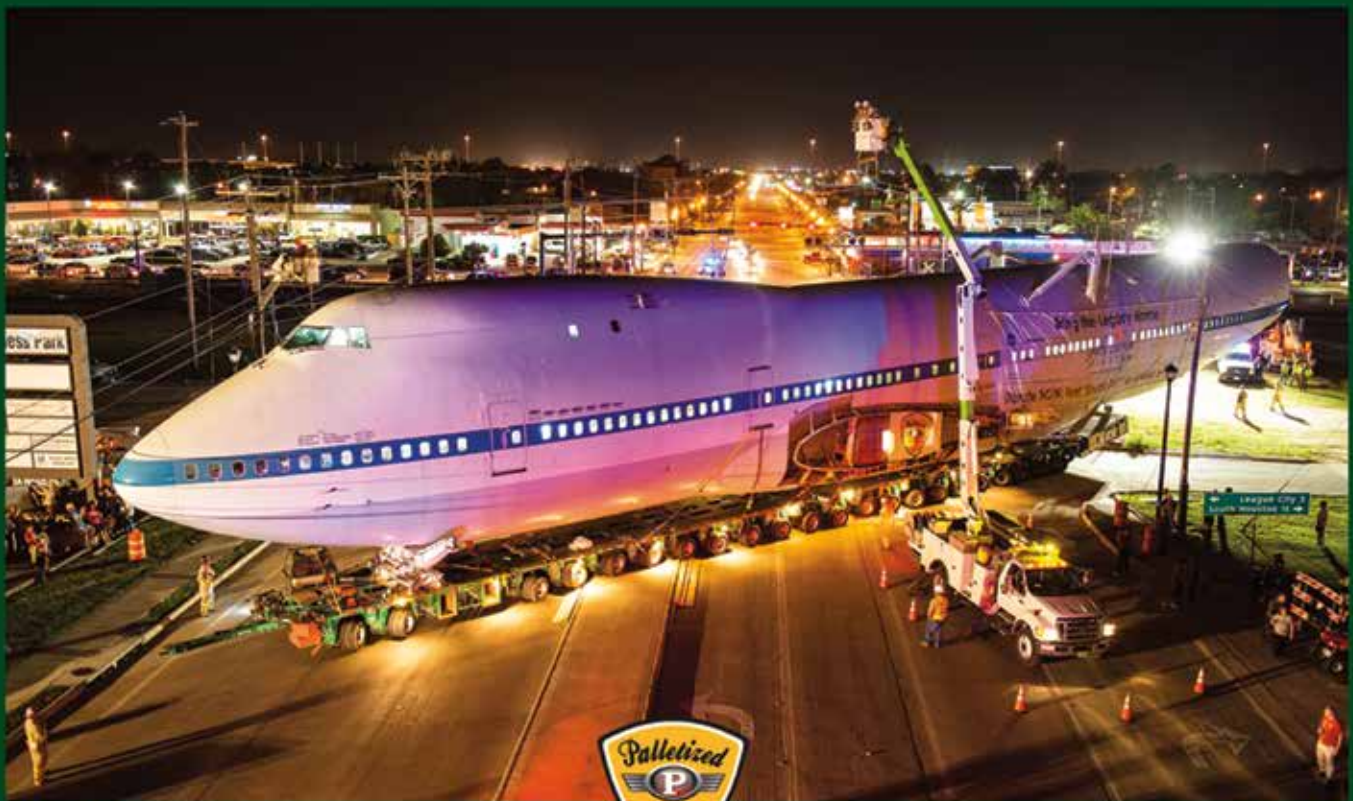
The Shuttle Carrier Aircraft (SCA) NASA 905, a modified Boeing 747, was disassembled in six weeks at Ellington Field by the Boeing Aircraft on Ground (AOG) incident repair crew, a unit accustomed to fixing 747s. The main wings rested on a specially built platform as they were transferred to Space Center Houston. Determining how to remove the wings from the 747 body was the most difficult part of the disassembly process, as neither the AOG crew nor Boeing had ever done so. Eight hydraulic pumps were required to detach the wings, which weigh approximately 14,000 pounds.⁸



The rudder and vertical stabilizer of NASA 905, emblazoned with the NASA logo, makes the final turn before reaching Space Center Houston. The subsequent reassembly of all seven pieces to the 747 after it reached its final destination took a mere month. The AOG had a much easier task than usual because they did not have to reconnect all the electrical wiring and hydraulic systems for the land-bound exhibit.⁹

The Palletized Trucking, Inc., team stops to commemorate the unique two-night move. Mike King, Palletized Trucking president and CEO, center, and his son Brady King, center kneeling, were among those who transported the SCA from Ellington to Space Center Houston. Palletized Trucking, founded in Houston in 1969 by Rex and Marilyn King, has grown to serve clients throughout the contiguous United States and Canada and regularly moves loads far heavier than the 747.¹⁰





NASA 747 Space Shuttle Transport moving from Ellington Airport to Space Center Houston

Woodallen Photography - Houston

As NASA 905 made its way towards Space Center Houston, traffic light lines had to be raised and sometimes removed, power shut off, poles taken down, and a traffic control plan implemented to alleviate issues caused by closing Highway 3. Once the convoy passed, traffic lines and the like were re-installed to resume regular traffic. Planning the “Big Move” took over six months of coordinating, and everyone from NASA, Palletized Trucking, Space Center Houston, the Department of Transportation, Boeing, Union Pacific, and state troopers were involved.¹¹



A Palletized trailer holds the space shuttle Independence in preparation for hoisting it onto the back of the 747. Each of the tiles on a shuttle, which protect it from the extreme temperatures of space travel and reentry, is unique to its place on the spacecraft and is marked with a number identifying its batch and location.¹²

Crowds gathered to see Independence placed atop NASA 905. Here a worker maneuvers Independence into the correct position as it is lowered onto the reassembled 747 on August 14, 2014. Before placing Independence on the 747, the shuttle saw many renovations and updates. It will feature two main decks: the lower mid-deck, where the crew would have worked and slept, and the upper flight deck, where the pilot and commander would have operated. The lower mid-deck also opens to the payload bay, which visitors can explore to see where cargo would have been stored.¹³

