

Preservation of the Historical Saturn Rocket Artifact for Future Generations

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Constructing a metal building certainly poses a degree of challenge. Usually, the issues are related to site selection, wind loading factors, decorative exteriors, and so forth. Construction of the 425 ft x 90 ft metal building that now stands at the front entrance to Johnson Space Center (JSC) was faced with those issues, as well as one unique challenge: The building was constructed over a priceless, one-of-a-kind artifact representing a piece of history that interests each new generation of space aficionados. The artifact is the Saturn V rocket, and is one of only three displays of this type in the world. The one at JSC is unique because it is the only display that includes all flight components. Others, such as those at Kennedy Space Center and the one in Huntsville, Ala., contain mockups or training pieces. JSC's display portrays an element of recent history that is of interest to tourists and space aficionados alike, as well as recording NASA's achievement of a great engineering and scientific feat.

The Saturn V rocket display has been situated outside JSC since the late 1970s. Transported in pieces via the barge dock, the artifacts rested on handling fixtures (artifacts themselves) and an earthen berm to simulate a straight line from main engine to Launch Escape System Tower. This horizontal display position and exposure to the typical Gulf Coast humidity, salt-laden air, and sunshine took their toll on the mighty Saturn V rocket. Because it was designed to launch into space, the rocket was never engineered to lie on



Lifting steel over Saturn V.

the ground. Consequently, water collected inside its various pieces and contributed to internal corrosion. Ultraviolet rays and the salt air accelerated the corrosion from the outside. Animals used the interior spaces as diners; catching their prey and devouring them wherever they were able to enter. The remains of their prey and the results of the feasts added debris to the rocket's interior spaces. Trees had sprouted from Stage 2 in two locations, and algae and mold were present on all stages. The Saturn V was dirty and rotting away.

When the decision was made to preserve the Saturn V, the first step was to stop the deterioration. The artifact needed a controlled environment, inside and away from the humidity, salt air, and sunshine. Because the pieces were literally crumbling in many areas, moving it was not an option. Using a design-build contract, NASA/JSC and the National Air and Space Museum

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contracted with a restoration firm, Conservation Solutions, Inc., to design and construct the building and restore the rocket. Jacob White Construction Company designed a metal building to enclose the entire display.

Because funds were limited, the building process required a bare-bones approach. Piers and a grade beam were constructed around the perimeter of the display, leaving room for future installation of sidewalks and other space-related displays. Houston weather can often cause inconvenience during construction, as it did in this case. Rain set in for 3 months and water stood inside the grade beam. Finally, the ground dried out enough for the setting of columns, and progress resumed.

Concurrent with this activity, the pieces spanning the roof sections were assembled just east of the rocket display, and bolt-up was performed in sections of two bays. These were completely assembled on the ground to minimize the work over the priceless display. The greatest challenge of the construction phase then began.



A crane lifted these preassembled sections over the Saturn V, and two crews of two iron workers worked from lifts to attach each section to the preset columns. Although the restoration effort was to follow construction of the building, paramount in everyone's mind was the potential damage that could result not only from a loss of the steel sections, but by dropping a tool or bolt onto the already aged and fragile artifact. Repairs could be done, but preserving as much of the original hardware as possible remained the goal.

Finally, the steel was in place. Although the remaining phases of construction, including the sheeting and roof installation, posed risks to the display, the riskiest phase was now complete. All team members had worked together to define each risk and eliminate it with controls. Each group of contractors focused on the task at hand and worked with all other groups to ensure coordination of tasks. The foreperson of the steel erection company commented, "I've built this building in my head many times. I've dreamed about it." The level of commitment was high, and no incidents were experienced during construction; safety or otherwise.



Before and after photos.



Completed steel erection.

The original contract included the essentials for a metal building. As a result, air conditioning and heat are provided by ten 10-ton heating, ventilation, and air-conditioning units. Receptacle power is provided around the interior perimeter along with overhead lighting. A fire-detection system and exit lights are also provided. Personnel doors on all sides and two roll-up doors for equipment allow access into the building. A row of windows, an exterior walkway, and translucent panels along the roofline allow for visibility into the building as well as providing day lighting.

Enhancements to the display have been added to the building and surrounding grounds. Eventually, visitors will see interior displays amid a garden setting. Sidewalks have been added. Tourists and employees alike can walk around the rocket and get closer than ever before. Although the entrance to JSC now looks quite different, with a giant white building where the massive Saturn V was once in full view, protection of history with a challenging project was the right choice.