open space

Satellite Manufacturing Inside Out

RIGHT NOW, making a satellite is an expensive, drawn-out process that can take years and hundreds of millions of dollars. A common production delay is LATE BOX REPLACEMENT, which occurs at least once on 75% of satellites. A single box replacement costs up to FOUR MONTHS and MILLIONS OF DOLLARS due to the extensive re-testing that becomes necessary when everything is disconnected. A DRASTIC REDESIGN IS NEEDED to improve the satellite production process.

The "OPEN SPACE" SATELLITE SOLUTION, as a concept, is simple: allow the satellite to fold open for easier access during manufacturing. This feature is expected to RADICALLY IMPROVE the process by allowing the wires to REMAIN CONNECTED. Furthermore, the hexagonal structure has narrower panels to allow EASIER REACH of internal components, and the horizontal surface provides a more ERGONOMIC work environment.

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LOCKHEED MARTIN

A HINGE MECHANISM

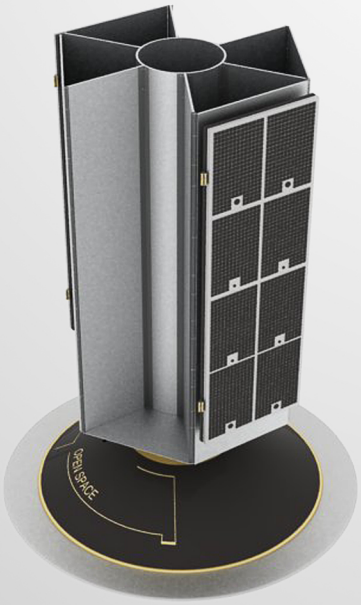
is part of the ground support and allows the panel to open during manufacturing, with the help of a crane.

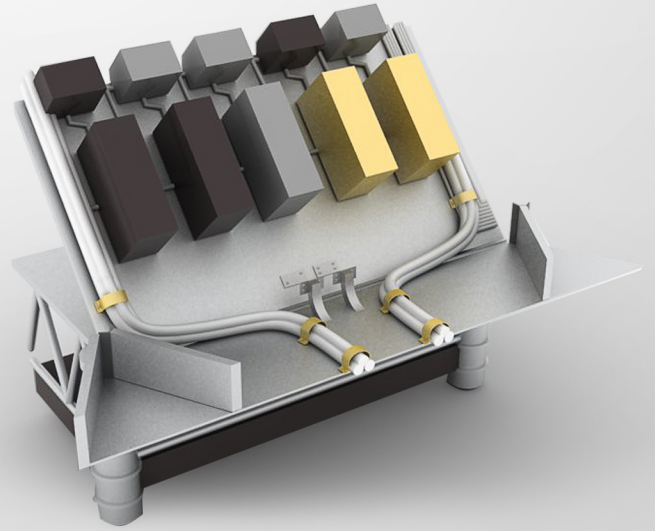
THE PAYLOAD

of the satellite includes hundreds of electrical components. These “boxes” are arranged on the four panels of the OPEN SPACE satellite according to wiring, heat, and mass.

WIRE BUNDLES

are large, and two 1.5”-diameter bundles must cross the folding joint on each panel. Although bending the bundle can cause fatigue, the wires can be twisted to allow panel folding.





THE CORE STRUCTURE

can handle launch loads and vibration while holding over a thousand pounds of fuel. The central cylinder of the OPEN SPACE satellite provides structural support while the six panels increase the structural stiffness.

HEAT PIPES

are sealed tubes that carry heat from one side of the satellite to the other—an integral function to prevent boxes from overheating in space. These must also cross the foldable joint, so a conductive thermal interface is used.