

# INDUSTRY WEEK

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## NASA Tool Could Cross Over to Manufacturing

*HyperSizer analysis optimizes design architectures, predicts performance of composite materials.*

**F**rom cars to space craft to jets, railcars and sea vessels, traditional metals are being replaced with lighter composite materials. But when one material is replaced with another, the structure is fundamentally altered. Predicting how these new structures will perform has been difficult to gauge.

But NASA's recent use of HyperSizer software suggests engineers are getting a more accurate read on predicting a material's performance.

In a series of critical, full-scale, physical tests just completed by NASA, HyperSizer—a structural-sizing and composite-analysis software from Collier Research Corp.—accurately predicted the Composite Crew Module (CCM)'s successful performance under simulated flight conditions.

HyperSizer is a structural sizing and design optimization software tool that works in a feedback loop with finite element analysis (FEA) to automati-

cally search for solutions that minimize weight and maximize manufacturability. Although it can also be used on metallic structures, HyperSizer is particularly applicable to complex composite materials, providing the capability to optimize the architecture of large structures such as aircraft, railcars, or wind turbine blades ply-by-ply and element-by-element.

NASA's CCM is an all-composite

alternative for the flight crew module Orion, which is part of NASA's Constellation program to return man to the moon or go to Mars. The recent tests were considered a milestone in the design of human-rated spacecraft that points toward increased use of lightweight composites in space vehicles.

HyperSizer software was used throughout the almost three-year project to optimize the design, weight and manufacturability of the CCM, which is constructed of honeycomb sandwich and solid laminate composites. HyperSizer was the first NASA software to be licensed and commercialized as part of the agency's effort to transfer technology to U.S. business and industry. ◀◀



PHOTO COURTESY NASA

*The design and construction of NASA's Composite Crew Module was optimized with the help of HyperSizer structural sizing and design analysis software.*