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THE NEXT INSTALLMENT

Putting the smarts in the smart grid isn't as simple as connecting new meters.

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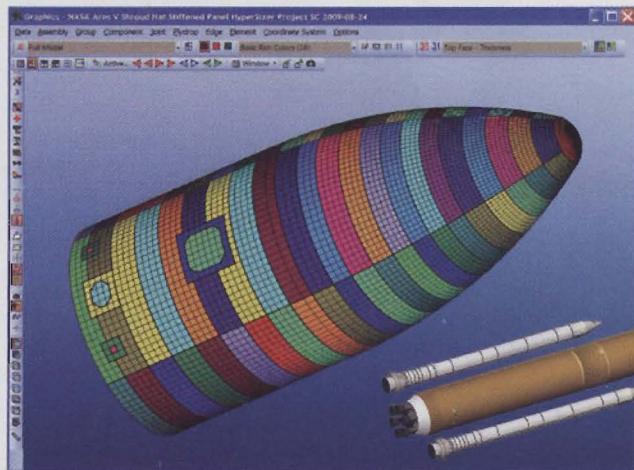**TURBINE BLADES HIT THE RIGHT PITCH**

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Composite Aid

The Ares V is NASA's next generation space launch vehicle. In order to streamline the design process, NASA engineers paired finite element analysis software with special software that can verify the vehicle's structural integrity.

NASA engineers recently analyzed the composite shroud that's part of its Ares V space launch vehicle. The simulation is pictured. The engineers paired FEA and composite-analysis software to find the best dimensions and composite materials for the shroud.

According to the vehicle specifications, the shroud of the Ares V will separate into four petals during flight, to release the lunar lander, said Craig Collier, president of Collier Research of Hampton, Va. His company makes the structural integrity software, called HyperSizer, used for the Ares simulation.

One factor that designers must account for is that, during flight, the aerodynamic pressure on the shroud is resolved into internally distributed forces, Collier said.

The NASA designers first used the finite element analysis software Abaqus from Simulia of Providence, R.I., to determine the load path, load direction, and also to determine how much load is in the stiffened panel and the ringframe, said Tom Battisti, Simulia director of alliances.

They then used HyperSizer to size the panels' cross-sectional dimensions to the Abaqus computed load, Collier said.

The HyperSizer software surveyed millions of dimensions and laminates for a composite design. It works in a feedback loop with the FEA program to identify the optimum design and composite variables, he said.

The software helped the NASA engineers reduce structural weight, and to find the best dimensions and composite materials for the shroud, Collier added. ■