Structural Analysis and Design Software

O ne-of-a-kind Langley Research Center computer code for designing exotic hypersonic aircraft was transferred to a private company for more pedestrian use in ground transportation, building construction and marine industries.

Working through the Technology Applications Group at the NASA center, the Collier Research and Development (R&D) Corporation of Hampton, Virginia received the first ever Langley software copyright license agreement. The agreement was signed in May 1996.

Collier R&D transformed the NASA computer code into a commercial software package called HyperSizer™. The commercial software package integrates with other popular Finite Element Modeling (FEM) and Finite Element Analysis (FEA) private-sector structural analysis and design packages.

The Langley and Collier R&D agreement is viewed as a pioneering step for government transfer of technology to U.S. industry. Collier R&D will pay NASA royalties from software sales.

"For NASA, it represents the emerging recognition of the value of computer software as a potentially licensable technology. The software intellectual property rights were treated similarly to hardware patent rights," says Collier R&D's Ivonne Collier, president of the company.

"For Collier R&D, the agreement represents a broadening of its business from engineering consulting to developers and marketers of software technology," says the company president.

The NASA software, called ST-SIZE, was chiefly conceived as a means to improve and speed the structural design of a future aerospace plane for Langley's Hypersonic Vehicles Office. Different classes of materials under consideration for use on a hypersonic plane could be computer modeled, then shown how they would react under extreme temperature changes, speeds, pressures and other operating conditions. The software tool gave structural engineers the confidence to select the proper lightweight materials for use in high-speed aircraft.

Including the NASA computer code into the HyperSizer software package has equipped Collier R&D to look beyond aerospace to other high-tech applications. These include improved design and construction for offices, marine structures, cargo containers, commercial and military aircraft, rail cars and a host of everyday consumer products.

HyperSizer can evaluate and optimize:

- any cross sectional shapes, sizes, thicknesses, materials selections, and material layups;
- many composite material types such as polymer, ceramic, metal matrix, as well as concrete, wood, steel, and aluminum alloys;
- thermal stress problems caused by thermal gradients from aerodynamic heating and/or cryogenic fuels; and
- weight estimations and structural integrity. Failure mode checks performed with HyperSizer can recognize potential structural deficiencies of any component early in the project's design phase.

Previously an engineering consulting organization, the addition of HyperSizer has enhanced the Collier R&D Corporation portfolio of services and products, while strengthening its competitive posture within the software industry.

™ HyperSizer is a trademark of Collier Research and Development Corporation.
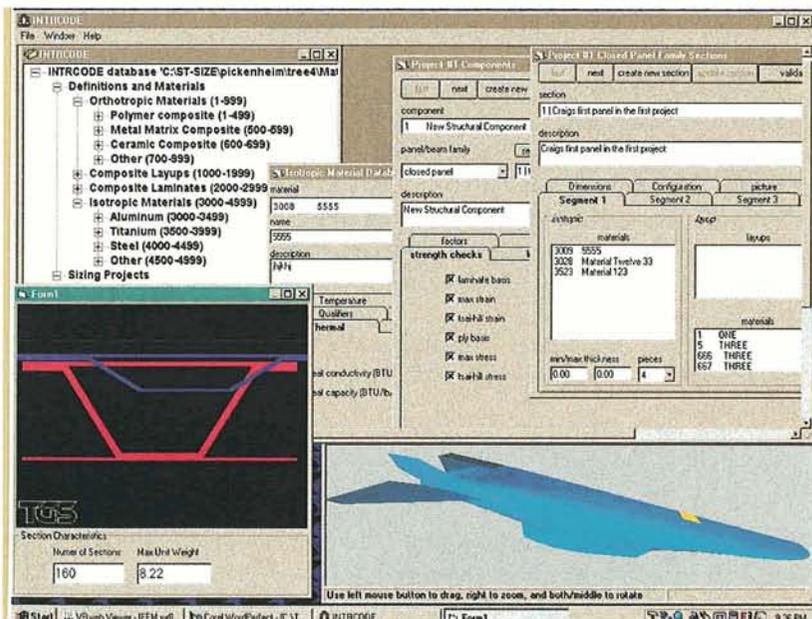
Collier R&D's HyperSizer software, developed from NASA technology, displays an aircraft's surface in multicolored pixels.