Computers in engineering

Making changes right

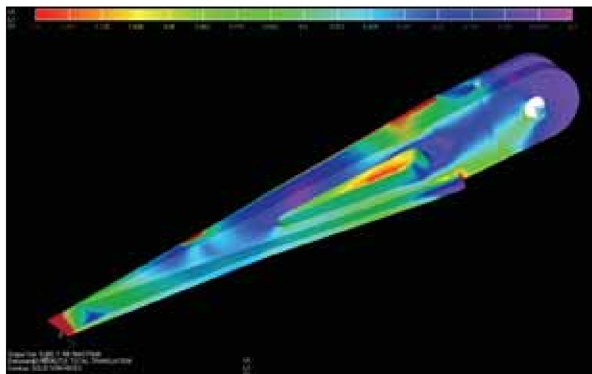
Georgian Aerospace develops repairs and modifications for the business aviation industry. Since 1992 it has provided DER (designated engineering representative) services in the corporate and private aviation industries all over the country. DER's are appointed by the Federal Aviation Administration (**FAA**) to review engineering changes to aircrafts. Georgian specializes in corrosion repairs, interior modifications, and antenna installations.

"Until about two years ago, we relied exclusively on hand calculations to support our engineering reports," said Joel Simansky, Senior Engineer at Georgian Aerospace. "Then we tackled a couple of projects that needed a more detailed analytical approach." The task was to find a complete finite-element (FE) package that met the company's functional requirements and stayed within budget.

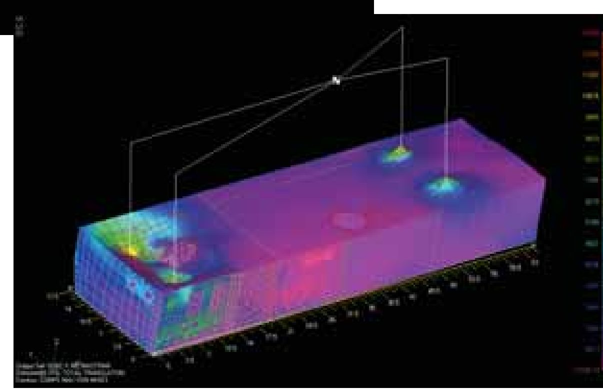
Simansky identified 115 potential software packages, and then reduced the list to 17 that could handle both composite and metallic materials, perform buckling analysis, import IGES data created in Microstation from **Bentley Systems**, build FE models and analyze the results—and do all of that on a PC.

Georgian Aerospace finally selected NE/Nastran from **Noran Engineering**. Key factors in the decision were low cost, comprehensive support, and the fully functional trial copy provided by Noran. FEMAP, the built-in pre- and post-processor from **UGS**, was an important consideration, because its functionality allowed Georgian to get up to speed quickly without a lot of training.

The software was put through its paces by first analyzing a test that had been run on a U-channel sample that had failed under a buckling load.



The main spar attachment for a business jet was analyzed by Georgian Aerospace, using NE/Nastran, to show that modifications were not in a critical area.



Georgian Aerospace uses NE/Nastran to evaluate structural modifications such as this medical box and stretcher support for an air ambulance.

NE/Nastran successfully predicted the load and deformed shape, giving confidence in the accuracy of the software and the ability of the engineers to identify similar problems.

One of the first projects to be tackled with the new tool was the spar attachment on a business jet. Because the customer's aircraft had been significantly modified, it was no longer supported by the original manufacturer. Some corrosion and maintenance work had caused some damage to the original component that Georgian was asked to investigate. A detailed model and analysis of the part before and after the modifications showed that the load-carrying capability was not affected by the changes, so the aircraft was certified safe.

Another project called for the evaluation of modifications made to an aircraft so that it could be used as an air ambulance. A structure was added to contain medical equipment and support a stretcher with a patient. The structure was analyzed to make sure nothing would come loose in the event of a heavy landing or severe turbulence.

"I was a neophyte FEM analyst, and during my first few projects I had many questions," said Simansky. "Noran handled them all, which has allowed me to complete my projects on time."

David Alexander