



Component Analysis

ANSOL adopts cluster computing to enhance analysis, boost business

Advanced Numerical Solutions (ANSOL) is proof the industrial engagement efforts of the Ohio Supercomputer Center (OSC) are quite beneficial to the "little guy."

ANSOL is a small consulting software company located in Hilliard, Ohio, just outside of Columbus. The company writes special software for finite element analysis (FEA) of gear boxes and transmissions for large automotive and aircraft companies, such as Boeing, GM and Ford, to name a few.

Since 1988, ANSOL has worked with OSC, but recently amped up its usage as it gets pushed by its clients to make sure it's using the fastest computers possible.

"There's no way we could compete with bigger companies if it weren't for OSC," said Sandeep Vijayakar, Ph.D. president at ANSOL. "Having a cluster of our own is not in the realm of possibility for us. A large company can afford that.

"All the mathematics are implemented by us but we do need the compilers, debuggers, profiling tools, etc., so there's a bunch of tools at OSC we use to speed up the program."

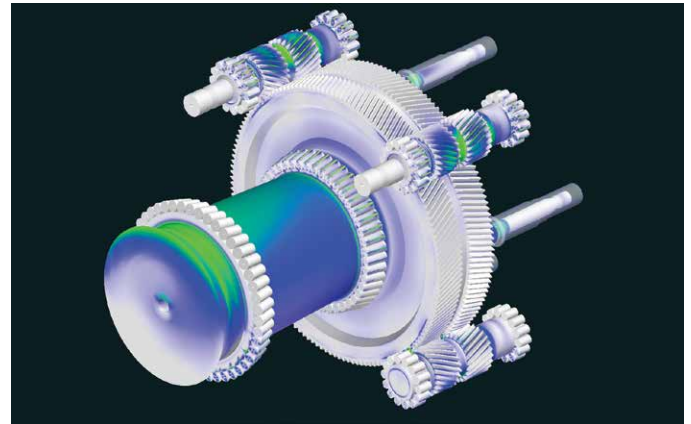
As companies continue to want more and more analyzed, ANSOL's models have become significantly bigger, causing challenges that need to be addressed now rather than later.

"People have been throwing everything into the computer models, and we've reached the point we can't do some of these models in single computers anymore; that's why we've been trying to get our software to work on clusters," Vijayakar said. "A lot of our customers have supercomputers of their own, but it takes a lot of work to convert a standalone computer program to a parallel one."

To help with this, ANSOL recently received a grant from NASA to start a feasibility study to move the company's software into a cluster environment. That started recently with small examples run on OSC's Oakley Cluster.

ANSOL's proposal to NASA was to create a new computational method for generating the data needed to create decision-making strategies for condition-based monitoring algorithms that can differentiate between a healthy system or a defective or damaged system. The only means available for this currently are physical testing, which is expensive and time-consuming.

"It's going to allow us to do things that were simply not possible before," Vijayakar said. "Once this works out, there will be a lot of projects coming from our existing customers." •



► ANSOL writes special software to perform finite element analysis of gear boxes and transmissions for large automotive and aircraft companies. That software provides uniform 3D finite element analysis for all components of a gear box, including the bull gear (above) and power takeoff unit (top).

Project Lead: Sandeep Vijayakar, Ph.D., Advanced Numerical Solutions LLC

Research Title: Transmission and gear box development for automotive and aerospace companies

Funding Source: Advanced Numerical Solutions LLC, NASA

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