

## Investing in CAE During an Economic Downturn

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Engineering companies affected by the economy are looking to control expenses. But whatever you do, don't cut your CAE resources—especially your CAE engineers, who are the key to your business survival, and your best insurance for emerging stronger when the climate improves.

“Analysis-led design” will keep you focused on cost-effectively producing quality products. A well-developed computer-aided engineering (CAE) system lets you design your product properly up front and test it virtually before you start prototyping, which helps manage your expenses without jeopardizing your business.

### Find Your “Sweet Spot”

It is essential to identify the “sweet spot” for your HPC (high-performance computing) system as it runs today's large, complex models. HPC, used with the right software, will give you the proper scaling and performance. The “sweet spot” is the right combination of hardware, software, and engineering costs that gives you the lowest expense-per-unit for your process.

A critical way to maximize your existing HPC investment is to upgrade your software whenever new releases come out. Only the newest software best utilizes hardware performance, minimizing the cost-per-unit of both hardware and software. Recent developments in software are boosting performance even further, to a point where hardware is a minor factor in simulation costs.

### Software Boosts Performance

In 2007, Dana performed a benchmark using Abaqus FEA on a basic powertrain model. At that time, we identified a sweet spot around 64 cores. In 2009, we tested the latest software release, Abaqus 6.9, and found that—on essentially the same model and analysis—we only needed about 32 cores to hit the sweet spot. The hardware provided some degree of better handling, but the main reason for the reduction was software improvements.

However, it's not enough just to have the resources: you also need to be well-organized to use them efficiently. At Dana, we make sure that when there is a new software release, our entire CAE team upgrades—globally. We are now at the point where our hardware and software work in tandem and everyone on the team is able to communicate more easily.



CAE Team at the Lisle Technical Center discussing simulation results. (from the left: Amit Deshpande, Marsha Minkov, Rohit Ramkumar, Frank Popielas, and Jason Tyrus.)

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### How CAE Saved a Business

The success of a large customer of ours is an example of how a focused CAE development strategy pays off. In the past, they wasted time and money getting a product to market that was no longer profitable or competitive. To survive, they had to rethink the way they did business. They could have slashed costs by just cutting staff—which, to some extent, they did. But they also reexamined how they allocated existing resources, changing their mindset from a costly process of build/test/error–build/test/error to a new focus on upfront design. They invested in CAE technology and began using Analysis-led Design to optimize their product on the computer before they began cutting prototypes. This helped control costs while building a new technology foundation. The end result: after several years, the company doubled its market share.

### Investing in CAE Promotes Faster Recovery

How can you invest in CAE during an economic downturn? First, step back and look at the big picture. Even if you have a

small CAE team in place, you should strongly support them—they are the foundation for your future success. Make sure you establish basic simulation techniques and standards, and only then should you look for an HPC system that will support those needs. While you may not see immediate results, any delay will put your company at further risk.

What is your company's sweet spot? What will be your return on investment? An exact ROI figure will depend on how well you employ your CAE capabilities. Given the lower costs of hardware and software, ROI within two years seems very likely. So, hang on to your CAE team, support them at the best level you can, and stay up-to-date with current software releases—then, you'll be ahead of the game when the economy picks up again.

The results of the HPC study, “Accelerated Simulation Performance through High Performance Computing for Advanced Sealing Applications,” by Dana, R-Systems, and SIMULIA was presented at the 2009 SIMULIA Customer Conference.

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