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Software Made Solstice in 15 Weeks

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The Pontiac Solstice won attention for more than its sporty looks. General Motors is particularly quick to point out that the driveable concept came about in a mere 15 weeks.

It normally takes six months to a year to build a concept car. But GM had the resources in place to put the Solstice on the fast track - the designers, clay modelers and engineers. And the technology.

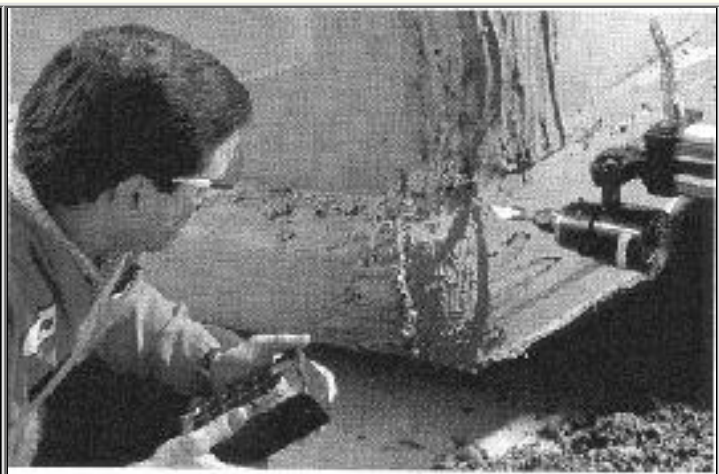
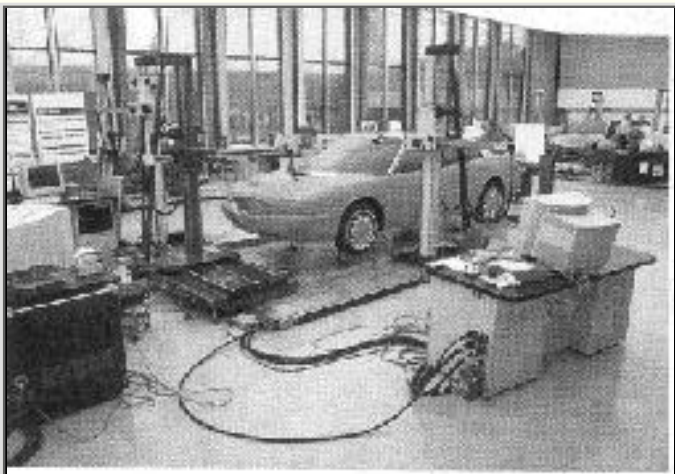
Key to the project's speed was three-dimensional design software from Alias Wavefront, a division of Silicon Graphics Inc. (sqi.com). Most of the numerous design modifications made to the full-sized clay model were done with Alias' digital modeling software called AutoStudio.

The software is not unique to GM designers. Alias says its software is used by almost all car companies. "It's always fun to push a car very quickly and really get it going," says Nick Mynott, a modeler in GM's Los Angeles design studio. Mynott's specialty is working with the Alias software. His digital changes were transferred to the clay model by computer-guided milling machines.

Making changes faster

"The fewer models that you have to create, and the more decisions you can make without waiting for someone to sculpt it, the more you are going to be able to speed up the design process," says Paul Dyck, StudioTools product manager for Alias in Toronto. The AutoStudio software is part of Alias' StudioTools suite of design tools. The company on April 17 released the tenth version of the software.

"You are far better off making the modifications in the digital realm," Dyck says. "When you think about it, it sure is a lot quicker for a digital modeler to start changing profiles, puffing out shapes, changing aspects of the car profile, than it would be for someone to pack on clay, scrape it off, and then do it on both sides."



General Motors uses computers to save time designing vehicles and producing clay models, such as the hummer H2, and Buick Le Sabre. Milling machines peel clay as they follow digital designs made using Alias Wavefront software. The process was used for the Pontiac Solstice.

The Solstice was a pet project for GM Vice Chairman Robert Lutz. Shortly after joining GM in September, Lutz told design chief Wayne Cherry to create a Pontiac roadster concept car for the Detroit auto show in January. That set in motion a sketch-off among designers, won by designer Franz Von Holzhausen, who

submitted a sport coupe sketch that he had designed earlier.

There's no question having Lutz's backing was crucial, those close to the project say. He instilled a sense of urgency and more importantly, the executive support for the team to question the norms.

The Solstice went from sketch to full-sized clay model in the California studio within two weeks. The project then moved to GM's Warren, Mich., studio, where the clay model was reworked and refined. At this stage, the team relied more heavily on the 3-D digital software. "The computer was used as a way of really cutting time, and it was the quickest possible way of working with the model," Mynott says.

Changes to the side

The concept car team had the use of two milling machines - one for each side of the clay model. As the design process progressed, the team decided it wanted to modify a body side. Making the change digitally was easy.

"The quickest way to do a body side was for me to quickly model (via computer) a simple surface in, and then they milled that surface straight back onto the clay," Mynott says. Changes made digitally are transmitted to the milling machines, which accurately alter the clay without human intervention. "We were then doing a to-and-from, back-and-forth process between the full-sized clay and me," Mynott says. "As the model went along, you are always seeing within a couple of hours exactly what I modeled on the machine in full size. It's just an incredibly quick way of working."

The way the Solstice project was handled was not the norm. The team had access to two clay milling machines - for one car. And all the designers were expert users of the Alias software and Silicon Graphics computers.

"We also had the momentum and the drive to do this car very quickly," Mynott says.

Still some knife work

Not all of the clay manipulation was by the computer-directed milling machines.

Designers using knives also made some changes. Von Holzhausen "would say, 'OK, that's what I want. Make it work,'" Mynott recalls.

The changes to the clay model would have to be scanned, then fed into Mynott's computer to update his digital model. In all, the modeling phase took about seven weeks. An additional

the auto industry's reliance on clay models has added time and cost to automotive design schedules. No automaker is at the point where it is willing to make a \$500 million to \$1 billion investment to bypass full-scale clay models.

eight weeks were needed to build a driveable vehicle using existing components.

GM is one of Alias' largest customers.

Two years ago, GM (gm.com) purchased more than \$10million in Alias software and services.

"I think we're starting to see the benefits of their investment in the digital tools,' Dyck says.

The auto industry's reliance on clay models has added time and cost to the automotive design schedules, Dyck says. But no automaker is at the point where it is willing to make a \$500 million to \$1 billion investment to bypass full scale clay models. Says Dyck: "What GM has been doing is relying a lot more on the digital model, and as much as possible, relying on the visualization of the digital model for decision making." It

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