

SOFTWARE

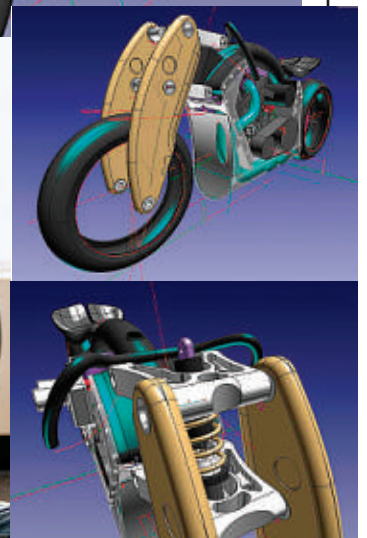
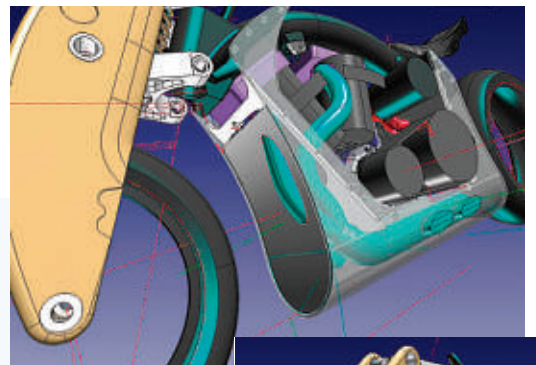
Easy Designer

Computer-aided-design tools are getting so cheap and powerful any metal-bending firm can find its inner Frank Gehry.
By Christopher Steiner

SCROUNGING FOR WORK IN May at an industrial design convention in Pittsburgh, Brian Case scored a coup: a deal with Confederate Motor Co. to pump out computer-aided drawings for a new \$45,000 bike, the Wraith. Case had one serious problem, however. He didn't own a computer-aided design, or CAD, program.

He set off through the expo in search

of one. He shunned better-known programs, such as Dassault Systèmes' Solid-Works and Ashlar-Vellum, because their on-hand staff seemed content selling strictly on name. A good rapport with a representative from a little company called Think3 led him to plop down \$4,500 for a year of its Thinkid program. Think3's free training classes and comprehensive in-person help trumped



The Confederate Wraith motorbike and codesigner Brian Case. Its striking innards were dreamed up with Think3's 3-D CAD software.

any brand-cachet issues. "I felt totally supported with them," he says.

Case mastered Thinkid in two weeks and finished the drawings by Aug. 10. As he worked, the changes to his precise three-dimensional models were reflected instantly in the engineering and two-dimensional CAD files, the working drawings for the motorcycle's assembly. Using Thinkid, Case changed the bike's backbone from an unwieldy 4-inch-wide aluminum tube to a seamless carbon fiber piece weighing 14 pounds. The first 120hp Wraith rolled out Aug. 30, and Confederate was beyond satisfied with Case: The company credits him with 50%

applications take full advantage of today's cheap Intel-based servers and are at the right price—low—with interfaces so intuitive that CAD novices, especially mechanical engineers, can swiftly pick them up.

Sales of CAD software to midsize companies are growing 15%, while large-company sales are expanding at a piddling 5% a year, says Gearoid Smyth, global marketing director of PTC, a CAD maker formerly known as Parametric Technology. Every year another 5% of the 1.2 million 2-D CAD users in manufacturing migrate to 3-D. Privately held Think3 expects its revenue to increase 40% this year to \$50 million. Middle-

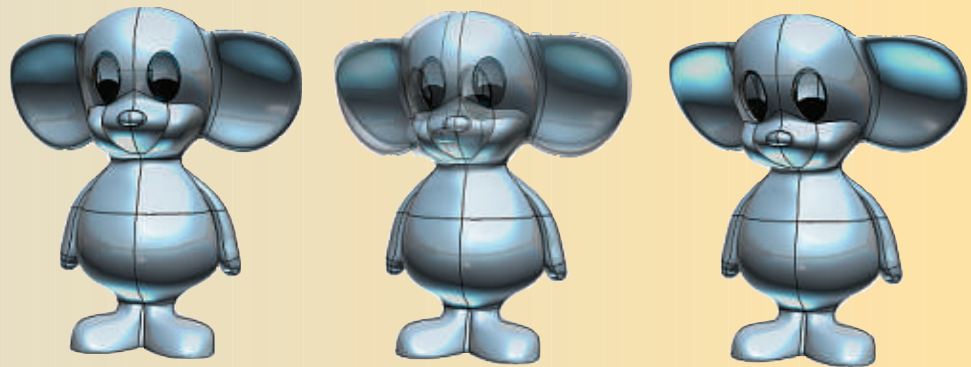
Pro/Engineer Wildfire runs \$5,000.

The productivity gains from some of these integrated 2-D/3-D software packages can be staggering. In the past a product's shape alterations would be hammered out by designers in a surface-modeling program, a tool that allows for easy curve design and concept change. That 3-D data then got plugged into a solid-modeling program where engineering parameters such as material, thickness and structure were assigned to the shape. That transition could take weeks, making even small design changes exorbitantly costly.

But modifications are far easier in programs such as Think3's. Designers can

Mouse Play

The Michael Graves Design Group conjured up this mouse to sit atop a chic Italian cheese plate. In a few minutes its head is easily tilted for the cheekiest effect in Think3's Thinkid software. The same operation in a stand-alone 3-D surface modeler would have taken half a day.



of the bike's creative design and signed his four-person firm, Foraxis Design, to a three-year contract.

In the past small-scale designers like Brian Case never could afford the cost or learning time required to work with high-end CAD software. The power to make rapid, wholesale modifications in 3-D rested mostly with big architecture firms or companies the size of Boeing, which designed its entire 777 digitally using Dassault's Catia software. High-end CAD programs can take years to master, making defections of skilled employees especially damaging and leading companies to pay upwards of \$120,000 a year for CAD mercenaries with little in the way of real engineering skills.

That's all changing. Small and midsize businesses, many facing product and project complexities a bit less thorny than those in the 777, are enjoying a democratization of sophisticated 3-D design. New brawny

market manufacturers make up 80% of its 5,000 customers.

CAD's bigger players have noticed the midmarket surge. Dassault's Catia line now comes in a slimmed-down version geared toward smaller customers for \$12,000, compared with a typical Catia package price of \$25,000. Autodesk's 3-D modeling product, Inventor CAD, can be had for \$5,200 a chair, not much more than its mainstay 2-D product, AutoCAD. The entry-level version of PTC's

type in descriptors such as "sharpness" or "acceleration" (which refers to a curve's severity) and watch as the lines of a sports car or tea kettle automatically undulate.

Boeing is again using Catia software for much of the structural design of its new 7E7 jet, but it is using Thinkid for the plane's cabin plans because of the software's flexibility in making changes. Boeing engineers have laid out more than 1,000 cabin variations thus far.

The descriptor capabilities come from a European design project called Fiore II that Think3 participates in along with companies such as BMW and Pininfarina, a Ferrari design firm. Fiore II is an effort to develop software standards that will retain a design's intended esthetic, if not its exact shape, when being altered in the engineering process.

Many new CAD programs are also being bundled with product-management programs that allow for on-the-fly

"You drop the motor into the frame, attach a couple of bolts and you're done."

updating of a bill of materials. For instance, when a product's aluminum surface is shrunk or bent, the amount of on-order aluminum sheet metal changes instantly. In the past materials were painstakingly tracked by hand or by programs that required separate entries.

PowerSki International, a San Clemente, Calif. firm, used PTC's Wildfire to design its Jetboard, a \$6,000 surfboard-shaped craft powered by a 45hp engine capable of 40mph. The 3-D CAD's flexibility let PowerSki engineers almost eliminate the need for pricey prototypes.

Moving all 23 designers at Michael Graves Design Group to Thinkid has cut

by 20% the design time for products like teapots and wall clocks sold at Target stores. "That's really important when you're developing 80 to 100 products a year," says Donald Strum, senior director of product design at Graves. Universe Corp. in St. Louis, which makes cladding for buildings such as the Staples Center in Los Angeles, hooked up with Think3 two years ago. Customers once waited an average of six weeks for delivery after a building was measured. Engineering the panels in 3-D CAD halved that wait.

Design pro Brian Case estimates that going 3-D with the Wraith bike slashed the number of parts by half, to 70. The 3-

D visual allowed him to eliminate redundant fasteners and bolts as well as structural members that could be combined into one part instead of several needing welds. "Now you drop the motor into the frame, attach a couple of bolts and you're done," Case says.

Confederate now offers clientele the option of customizing a bike online so that it better fits the buyer's height and weight. "We now can create a man-machine interface that's as symbiotic as possible," says Confederate Chairman Matthew Chambers. Why not, if you can afford it? Customizing adds only \$10,000 to the price tag. **F**

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