About the Cover

Software Getting Down to Business
Margaret Neal, Managing Editor

Figure 1. A car database converted from ComputerVision data with ray tracing used to reflect the environment onto the body and glass. This slide shows the styling capabilities of ray tracing the surrounding environment onto the auto body and glass.

Figure 2. This is a scientific visualization of a virus showing proteins attaching to its surface.

Most of us are quite familiar with the creators of this month's cover (John Grower and Bruce Jones of Wavefront Technologies). The firm is well known for stunning and exciting pictures. But Wavefront Technologies has gone far beyond that now.

...And a chef
The firm was started by Bill Kovacs, coming out of Robert Abel and Associates, Larry Barels, the current president, and Mark Sylvester, a long-time chef and window painter who was unabashedly enamored of computer graphics. They started as a production company, but quickly turned to creating software because the financing possibilities were much greater.

With the Robert Abel background a reputation for imaginative pictures was inevitable. And this month's cover is proof that Wavefront can still meet the competition in that area. But the firm has come up with a more generic software, easily adaptable to many different hardwares and multiple front ends that fill the bill for a long list of diverse customers.

One package, many applications
Wavefront's highly adapted software is used, just for example, to design the interior of planes. Furniture placements and fabric choices can be tried and changed with a fly-through animation possibility. It can also be used to simulate flight for training pilots to land on carriers and other breathtaking stunts of pilotry.

Wavefront Technology software can also be used to put a foreign object like a car in a particular scene and through ray tracing make it pick up its surroundings so it looks realistic. In Figure 1 you see a car converted from ComputerVision data but with ray tracing used to reflect the environment onto the body and glass as though being reflected by the automobile.

The software can be used for "fly-throughs" of the human body, depicting microscopic events for the eye to see. In Figure 2 you see a scientific visualization of a virus with proteins attached to its surface.

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Figure 3. The tank was created using Wavefront software. It is used for training/simulation purposes.

Figure 4. In this aerospace application we see a T-45 jet built using the Wavefront model program. The frame is from a 30-second flight simulation/animation, which includes the landing gear deploying hierarchically.

Figure 5. This highly accurate visualization of a space shuttle carrying equipment into space to build a space station uses all the aerospace, scientific, and engineering expertise available.

Figure 3 shows a tank created with Wavefront software. This is used to target ID in training and simulation. Then in Figure 4 we see a Wavefront model program represented by a frame that comes from a 30-second flight simulation animation which includes landing gear deploying hierarchically. Figure 5 is a combination of aerospace, scientific, and engineering applications. This shot is a highly accurate visualization of a space shuttle carrying equipment into space to build a space station.

Not good bye to pretty pictures
But Wavefront still keeps its hand in the world of pretty pictures. Not only is there this month’s dynamic cover, but you see in Figure 6 an entertainment application. This complete and detailed human body was rendered and animated with Wavefront software using a database created by Jeff Kleiser and Dianna Walczak.

More serious business
One of the most important things Wavefront software is being used for is analysis and reconstruction of accidents. Failure Analysis Associates of Palo Alto, California, uses Wavefront software for its exacting work. Failure Analysis uses a standard Wavefront package because it is open and lets them do their own front ends in house. The firm uses a Silicon Graphics Iris 2400 Turbo. The engineers and scientists show up at auto crashes (see Figure 7), air crashes (see Figure 8), and building accidents like the collapse of a hotel balcony a few years ago.
These pictures aren’t pretty or high res. They’re not supposed to
Figure 6. Another of the pretty pictures Wavefront is justly famous for. The complete detailed database of a human body was done by Jeff Kleiser and Dianna Walczak. It was rendered and animated with Wavefront software.

Figure 7. Here we see the impact point of an engineering animation scenario done by Failure Analysis. The rest of the strip shows the cars ricocheting into the places they landed after the impact, all of which tells a lot about the accident.

Figure 8. At first glance this is a pretty picture of an airplane taking off. Unfortunately, the airplane is landing and is clearly going to overshoot the runway, on the other side of which is a bay. This, like the fatal car crash, actually happened, and both are accidents analyzed by Failure Analysis, using Wavefront software.

be. They are animated videotapes re-creating an engineering prospective of what happened. Using physical evidence like the black box from airplane crashes, tire marks, skid marks, impact points, and witnesses’ stories from car crashes, etc., they put together a short animation of the engineering data, which makes the whys very clear. They are often called on to show and explain their work in courts.

When Failure Analysis started three years ago, there was no Wavefront, so they often had to write their own software to do what they call “engineering animation.” The people at Failure Analysis are engineers and scientists. What they do now with their Wavefront software is extremely precise. Each image, at 30 per second, must be backed up with numbers. But when they’re through making their animations, based on physical tests and engineering analyses, the facts must be perfectly clear to the lay public. At the moment they are developing software to inspect structures and make nondestructive evaluations about where flaws or overloads may be taking place.