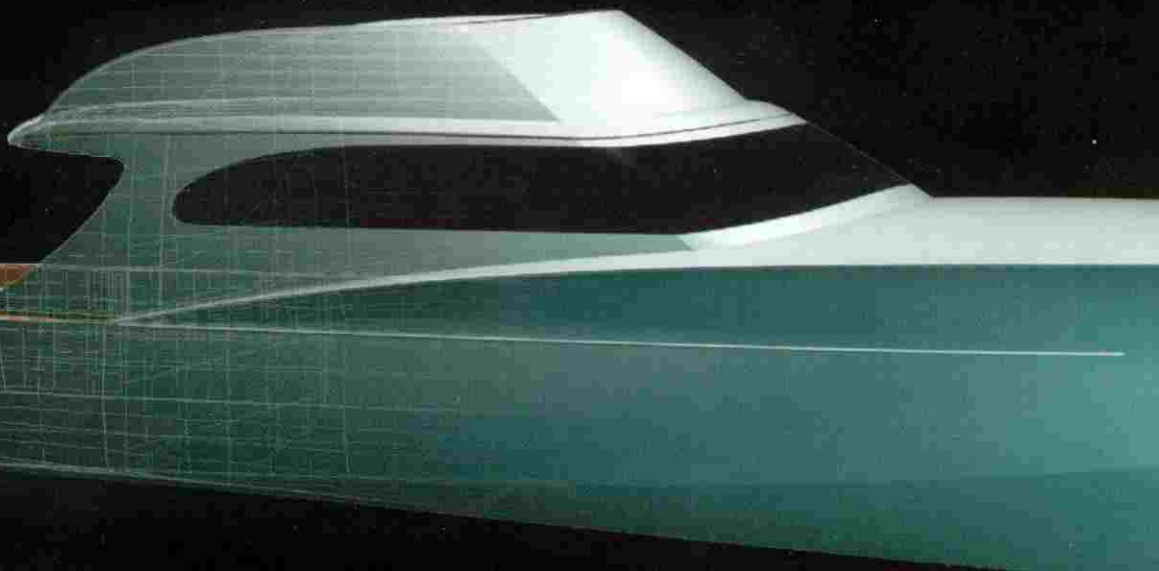


Virtual Boat

Emerging
Computer
Technology
Takes the
Surprises
Out of
Building a
Custom Boat



THE STAGGERING POWER AND BEAUTY OF CUSTOM SPORT-fishers is, in itself, a human phenomenon. It's not just their breathtaking lines and craftsmanship; it's the fact that many have been built from nothing more than a few scribbles on loose paper.

Maybe you're surprised to hear this, and if so, that's just another indication that the craftsmen who create these classics should be recognized more frequently for their ability to do so much with so little. The feat is even more amazing when you consider that these boats are built from scratch in 12 to 24 months, perform a few sea trials, and then carry lives safely through punishing oceans at 25 knots or more, for decades. It's nothing short of phenomenal.

You might think building on the fly is limited to low-end boats. Truth be told, from the top of the heap on down, many of the classics have been built with very little or no detail in drawing. "We've all done that at one time or another, but we've had enough experienced people to do the job without detailed drawings," says Roy Merritt, though he notes Merritt Boat & Engine Works has been drawing their boats in two-dimensional CAD (computer-aided drafting) for about 10 years.

Now, to give proper credit to the builders, rest assured that most go much further than a napkin sketch and do create detailed drawings as a starting point. This does help improve

the communication between the builder and the buyer, but during the customization process, most drawings become outdated when things start to change. Two-dimensional drawings are used to get the ball rolling, and then things are modified as the builder's eye directs the design through either mock-ups or floor layouts.

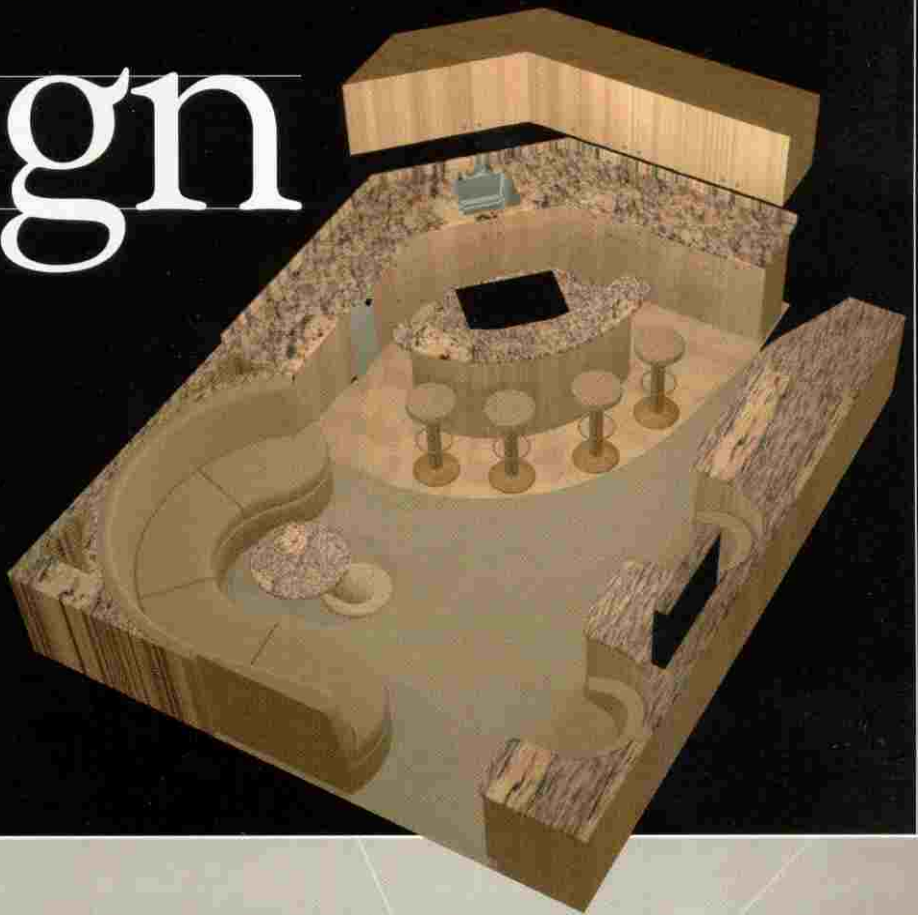
When a custom sport-fisher is delivered, more often than not the builder and buyer will have some disagreements over unmet expectations. For most buyers, the completed vessel is as much a surprise as a thrill. That's not a criticism of the builder; it's just the nature of the business of building highly customized vessels with thousands of components and hundreds of decisions to be made.

As an example: At the very beginning of the process, the buyer has a vision of what he wants in his next boat. In his mind's eye it's as clear as the nose on his face. Then he meets the designer or perhaps goes straight to the builder to tell them his ideas and they translate those into what they think they heard him say. They see *their* vision as clearly as the nose on

Computer models simplify the entire construction process. Designers used the image above to create a three-axis CNC hull, deckhouse and bridge for a 62-foot Spencer that is now in its final stages of construction. The images at right show the salon of a 58-foot Briggs that has yet to be built.

By Stephen French

Design



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but the tools they use can convince you that it is.
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model a boat's geometry inside the computer.*

their face. You can see where I'm going here. Everyone in the loop can have a different idea of what this boat is going to be. Worse yet, everyone can easily believe they're talking about the same thing, at least until the ball is well down the hill.

That's why those who've already been through the process of having a custom boat built will usually require more thorough drawings on future projects to assure they're on the same page as the builder.

Enter 3-D Modeling

The fact is we all speak with different visions. That's where three-dimensional modeling technology comes in. Used for years in more sophisticated enterprises such as the aerospace and automotive industries, 3-D computer modeling is just now spreading into the world of custom sport-fish building. One of the first areas the new technology has been applied is in designing custom interiors.

Sam Rowell of SR Marine is a respected interior designer for custom sport-fishers. He sees boats in their final stages every week. "Delivery dates are postponed regularly for things to be reworked," Rowell says, "and usually it's something that could have been avoided by showing the interior in 3-D."

To reduce the waste, Rowell now uses 3-D modeling to show his customers exactly what their interior will look like before the first piece of fabric is cut. Computer operators scan in every material that is being considered for a boat — fabrics, woods, countertops and more — and then apply them in various combinations to the 3-D model of the boat's interior. The result is an amazingly realistic picture of the finished product.

"Our customers really like the service," Rowell says. "It's just the best way to see what the boat will really look like with different colors or veneers."

Some custom builders are now beginning to apply the 3-D technology to their hulls and superstructures, as well. Ironically enough, North Carolina builders — often stereotyped as low-tech backyard builders — are leading the way. One project currently under construction is a 58-footer being built by Sonny Briggs in Wanchese for Ed Hawn of Corpus Christi, Texas. Hawn's entire vessel, except for ship's systems, is being 3-D modeled, and they wouldn't have it any other way.

"It's just a lot easier for me and Sonny to stay on the same page," Hawn says. "I don't like hidden costs, and with what these designers know about how Sonny builds his boats, it's helping nail down my costs a lot better."

The Various Roles of Computers

"Well," you might be asking yourself, "why aren't all boats worked out in computers?" The fact is many are, in some fashion or another, but typically in 2-D.

Production manufacturers such as Viking, Hatteras and others, rely heavily on computers and other high-tech equipment to trim costs and increase efficiency in the way they build their boats. CNC (computer-numeric-controlled) routers cut bulkheads and myriad other components to 1/1000-inch tolerances, automatically labeling every part. Computer-controlled wire bundlers automatically measure, coil and label every piece of wiring that goes into a boat, so problems can be easily traced.

Custom builders may not be that high-tech in their manufacturing processes, but more and more now utilize the same two-dimensional CAD software that the big production guys have been using for years to design their hulls and interior layouts. Some, however, have proven reluctant to upgrade to the new technology, largely

because what they've been doing for 20 years works well, and because they experience too many drawings that simply haven't worked out on the shop floor.

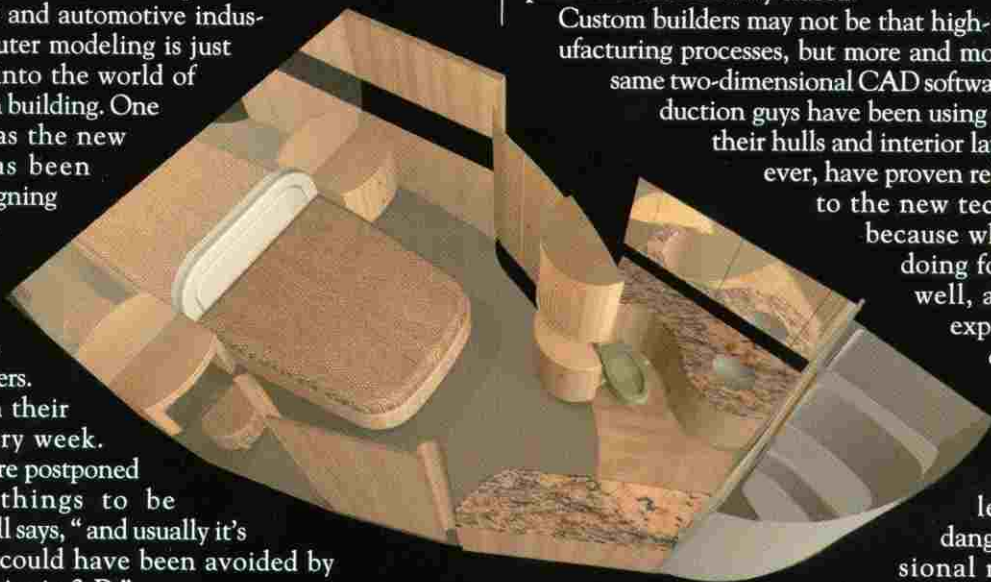
That problem points to the danger of two-dimensional renderings. The

important letter to remember in CAD is the "A," which stands for "aided." The computer is just another tool. A chisel only performs as well as the person hammering it, and a computer is no different. Do not assume that because a boat is designed on CAD that the details are all correct. Two-dimensional CAD does make modifications much quicker than when using hand sketches or drawings, but it still leaves quite a bit to the imagination.

Three-dimensional models convert imagination into reality.

John Whitticar of Whitticar Boat Works has been working with two-dimensional CAD for a number of years, but of late has relied more heavily on 3-D design tools. "The 3-D has been great for us to see our new hull designs better," Whitticar says. "We use 3-D designing to check our styling and get a good idea of what the boat is really going to look like. It's also a great tool to check hydrostatics and cut accurate jigs from, as well."

Whitticar also uses the 3-D modeling on his interiors, as much as a marketing tool as anything else, but he takes great care to balance its use with the client's need for visualizing concepts. "It can be good and bad," he says. "Good because it forces forethought on details that can be costly later. And bad because it requires a lot of decisions to be made early in the process."





However, if everyone is ready to spend time to study the details in the beginning, 3-D can save money in the long run.”

Benefits of 3-D

A lot of what you see out of Hollywood these days isn't reality, but the tools they use can convince you that it is. These are the same tools that allow boat designers to actually model a boat's geometry inside the computer. The process is extremely accurate and reliable for fitting all components together. In this 3-D-computer realm, adding or deleting an item is much less costly than building it or tearing it out. Because they represent a three-dimensional model of the boat as it truly will be, the programs can identify errors that don't show up in 2-D drafting — like that stringer coming up through the cabinet, or the house that's too high for the hull. Even small flat spots on the sheer line that won't show up on the drafting table will be identified by this technology.

These models also allow you to view any room or any part from any angle with actual lighting and materials. Turn the lights on, turn the lights down. Change from teak to eucalyptus wood. Want mirrors? Add them. The technology is here, now, to create a fully animated walk-through of a boat that won't exist for at least another year. Not only does this help the buyer know what they're going to get for the money,


Using 3-D computer models, every detail can be viewed from any angle or under different lighting conditions. The top two images show the same master salon in a 58-foot Briggs from different viewpoints, while the bottom image shows a “simple” fully rendered master stateroom.

it also helps the builder's team stay on track and cut time from the schedule. The bill of materials can be accurately assessed because the programs help identify all the parts required, and many different components can be built simultaneously using CNC routers. This was previously only heard of in big production facilities, but

thanks to 3-D modeling, four custom boats (by Spencer Yachts, Briggs Boat Works and Hudson Boat Works in North Carolina) are currently being built in this fashion.

The use of 3-D drawings also helps build hulls and decks quicker and better (not a bad combination) when jigs and molds are cut directly from the computer files. Details that used to take days or weeks to refine can now be planned out in 3-D and carved by a computer out of foam overnight. Many companies, like Wanchese Boatworks and Stuart's American Custom Yachts, have cut jigs using 3-D and CNC because they see such significant savings in time.

The up-front costs to design a boat in 3-D are obviously higher than with 2-D, and significantly more than the costs of designing with hand drawings, but most uses of the technology thus far have saved money in the long run. To create a complete vessel in 3-D costs somewhere in the neighborhood of 5 to 10 percent of the cost of the vessel. This, coincidentally, was the same percentage used by naval architects in the 1930s and 40s to price proper planning of a vessel. Some things just have a way of coming back around.

So what's the next step? How about walking through your vessel in real space — similar to the holographs projected by R2D2 in Star Wars. It's not as far off as you might think. 

Stephen French is the president of Applied Concepts, a Stuart-based design firm that specializes in the use of 3-D technology. Contact him at 561-283-3850; acunleashed@flinet.com. — Ed.