

Ultra-stable boats with SWATH hulls are ideally suited to rough seas—but they're slow. The inventor has now come up with a 17-foot planing version that's plenty quick.



On a blue, breezy day a few miles offshore of San Diego, one-foot swells underlie a three-foot chop in a random sea.

The man in the Hawaiian shirt shuts down his boat's motor without bothering to toss out an anchor. He's concentrating instead on unpacking a picnic lunch. Sandwiches and a pair of beers appear, while the boat does what it pleases in the lively water. Does this sound like a recipe for seasickness?

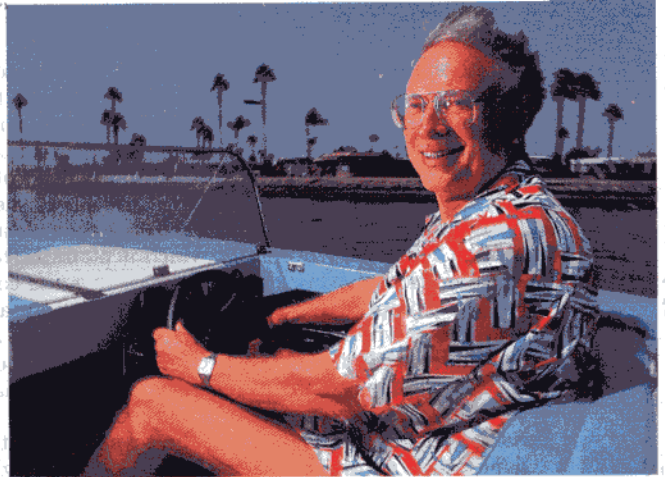
People in nearby V-hulled boats pause only long enough to fish for a minute before they weary of ceaselessly bobbing up and down. They are the unlucky ones. After 20 minutes or so spent in pleasant conversational repast, it becomes clear that Dr. Thomas Lang's truly different-looking 17-foot boat does just what he says it will: remain remarkably stable where other craft can't. He calls it a Tomcat, shorthand for Tom's catamaran.

"Let's get her up on the planes," urges the hydrodynamicist, firing up the 125-horsepower outboard and gently easing open the throttle. As the SWATH (small waterplane-area twin hull) boat picks up speed, sharp-

edged chines forming the edges of the catamaran's semi-submerged pontoons begin to surface at the bow, trailing a white foamy wake. At 15 or 16 mph, the water has separated away from the chines' entire length, and the boat planes on the shallow V-angled bottoms of the twin pontoons. A third, above-water center hull helps cut through waves, and generates a bit of aerodynamic lift to soften the bumps. Zipping into nearby Mission Bay at about 37 mph, the boat takes the smaller chop in stride, riding like a stiffly sprung sports car on a back road.

The Tomcat has an endearing characteristic as it accelerates up onto its planes. "You don't really know it's planing unless you look at the pontoons because the pitch hardly changes at all," Lang observes. "Most boats have what they call a hump drag—they climb up to a large angle and then finally settle down and plane. But a planing SWATH boat can go pretty efficiently at any speed, and you can always see over the bow." Almost everyone perched along the docks wants to know what kind of boat this is as the slowing Tomcat pulls up with its pontoons slipping beneath the surface like a pair of diving submarines.

DR. LANG'S AMAZING SWATH BOAT



By **STUART F. BROWN**




PHOTOS BY JOHN B. GARNETT

Lang is a distinguished inventor with many awards for his achievements in hydrodynamics and mechanical engineering. He founded and directed a brainstorming group called the Advanced Concepts Division at the U.S. Navy's Ocean Systems Center in San Diego, where he worked from 1951 to 1978. It was during those years that he invented the SWATH ship design ["Semi-Submerged Platform," Dec. '75; "Don't Rock the Boat," Feb. '89], which derives its exceptional stability from widely spaced torpedo-shaped submerged pontoons connected to a catamaran hull through thin vertical struts. He originated the first of a number of highly successful SWATH ships now in operation, the 88-foot Navy workboat SSP *Kaimalino*, launched in 1973.

A SWATH boat's underwater pontoons provide the ship's buoyancy while remaining largely unaffected by wind and waves. The supporting struts help by presenting a minimal area to the water's turbulent surface. Together, these features keep vertical accelerations—the up-and-down motion that provokes seasickness—at less than one-tenth the force of gravity, the maximum level for comfort. Typical V-hulled boats have accelerations many times greater.

"After I retired from the Center," he recalls, "I started thinking of ways to make SWATH useful for a smaller,

faster boat. I patented the Tomcat-type hull design in 1989. It's really a hybrid that's in between a SWATH boat and a regular catamaran. It's a planing SWATH." Lang is offering manufacturing licenses to boat builders through his company, Semi-Submerged Ship Corp. in Solana Beach, Calif.

The Tomcat may look a bit odd, but so do a lot of genuinely new ideas. One ride in the 2,000-pound plywood-and-fiberglass prototype proves it to be a deft compromise design that delivers unparalleled stability at rest and troling speeds, with smooth cruising at much higher speeds. The 125-hp motor, Lang says, has powered the hand-built craft to 40.5 mph. It's designed to be towed on a trailer and fit in the average-size garage. 

Dr. Thomas Lang (left) believes in wild shirts and tame boats. Up on its planes (above), his planing SWATH design has a small wetted area for low drag. The airborne center hull helps conquer waves. Sharply angled chines (right) on the semi-submerged V-bottomed pontoons help the boat to plane.

