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—Mark Gundersen  
Technical Manager  
Marine Advanced Research, Inc.

# Dances on Waves.

## Marine Advanced Research creates a new way to travel and protect the seas.

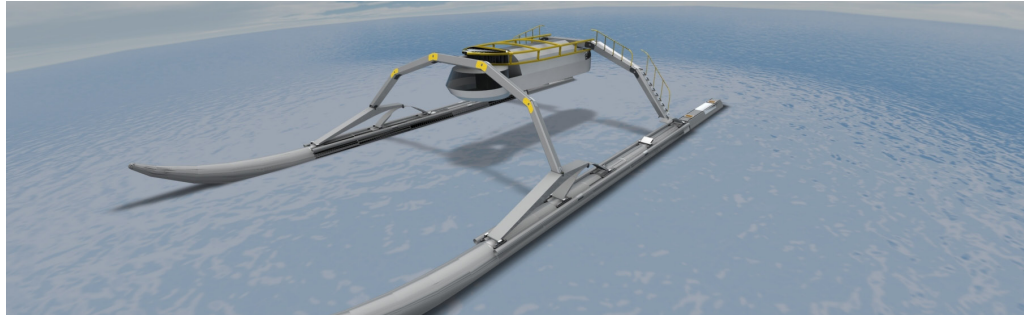


Image courtesy of Marine Advanced Research, Inc.

### Project Summary

When traditional vessels go to sea, they take a beating from the waves. Ugo and Isabella Conti wanted to change that, and in 2004 they founded Marine Advanced Research, Inc. to design the WAM-V® (Wave Adaptive Modular Vessel). With several corporate partners, including Autodesk, Inc., the California-based company built *Proteus*, a 100-foot prototype named for the Greek shape-shifting sea-god. It was launched in the San Francisco Bay, completed sea trials in both the Atlantic and Pacific, and is now undergoing testing by the Navy in Virginia.

The WAM-V is a light, fast, flexible, catamaran-style vessel that looks like a spider on pontoons. Rather than forcing the water to conform to the hull, it adjusts to the surface of the water. It not only provides a smoother ride, but it is eco-friendly in that it can travel 5,000 miles using only 2,500 gallons of fuel. Just like a spider's body, a modular payload is suspended at the center of the WAM-V superstructure. This payload can be changed out depending on the vessel's purpose—from ocean exploration to sea rescue—and can operate independently.

In developing *Proteus*, Marine Advanced Research uses Autodesk® Inventor® and Autodesk® Alias® Surface software exclusively to help:

- Reduce the need for building physical prototypes
- Check for interferences between multiple, complex moving parts
- Save costs in validating revolutionary new designs
- Sell potential customers with conceptual renderings and animations

### The Challenge

To design a new type of seagoing vessel and make it scalable, Marine Advanced Research needed to be able to design, simulate, and visualize its designs.

### The Solution

"This is a pretty complicated design," says Chief Engineer Mark Gundersen. The spider body—the modular payload and command bridge—is connected to two inflatable pontoons by four legs complete with springs, hinges, shock absorbers, ball joints, and other moving parts. At the end of each pontoon is a hinged engine pod designed to allow 10 degrees of motion up and 30 degrees of motion down. This ensures that the propellers are always in the water.

"What we have is something that moves with the waves, and that movement is reduced from the hulls through the center structure by the articulation and suspension system. A big advantage of Inventor is figuring out the geometry and how the movement in one joint affects others," Gundersen says. "Inventor lets us view it from different angles and run through a simulation to see whether we have to change the design accordingly. Plus realistic Autodesk Alias Surface renderings help us sell potential customers on new ideas."

### The Result

After the successful launch of *Proteus*, Marine Advanced Research is moving into the next generation design—a small, unmanned version of WAM-V technology.

"The WAM-V is scalable from 12 to 150 feet in length with payload capacity up to 40,000 pounds," Gundersen explains. "The Autodesk solution for Digital Prototyping provides us capabilities to adapt the design for meeting the individual needs of our customers quickly and efficiently."

To find out more about Autodesk Inventor and Digital Prototyping, visit [www.autodesk.com/inventor](http://www.autodesk.com/inventor).