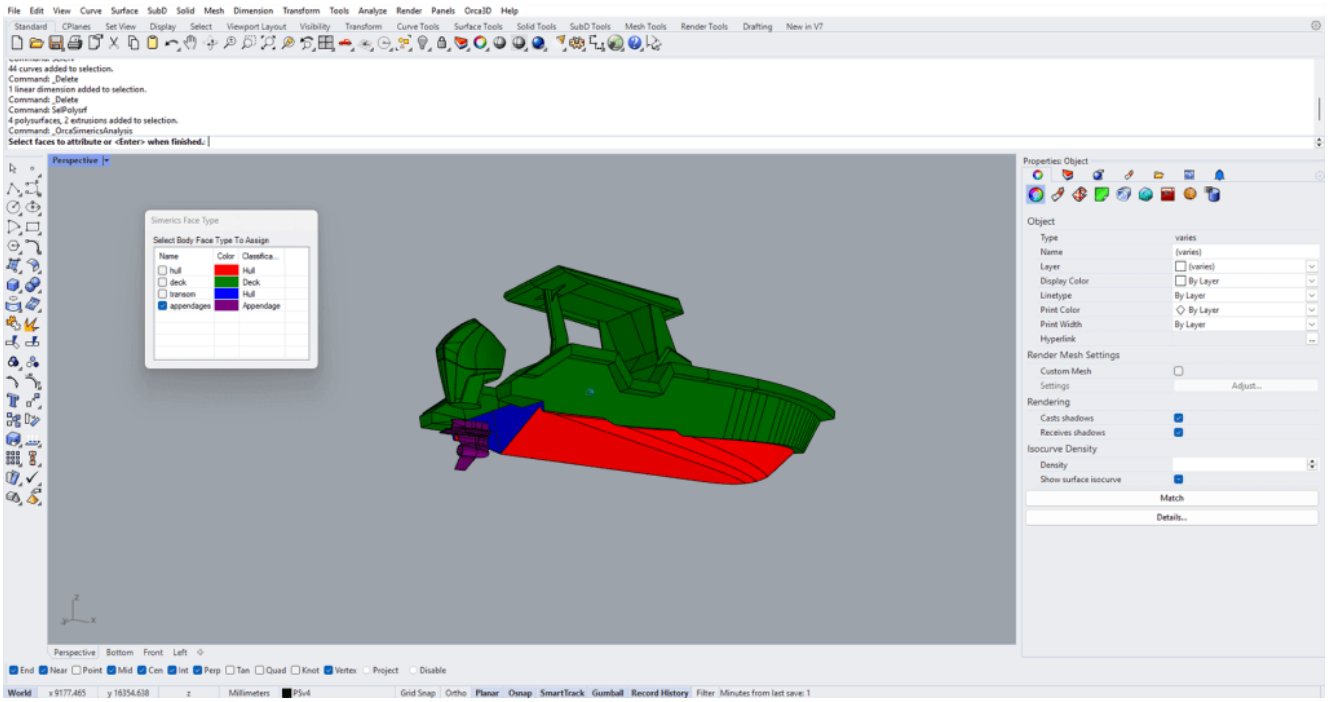
Silverback Grizzly 21 LE: Data-Driven Design for Law Enforcement on the Water

The Silverback Grizzly 21 LE is not a typical patrol boat. Developed through a close collaboration between Petestep AB of Stockholm and Silverback Marine in Tacoma, Washington, this 21-foot aluminum vessel was commissioned by the New Mexico State Parks Rangers with a clear purpose: deliver high-speed response capability, protect the crew from fatigue, and perform reliably across rivers, lakes, bays, and modest offshore conditions.

At the center of this project is an emphasis on performance verified through simulation. Petestep relied on Rhino and Orca3D Marine CFD to refine the hull geometry and validate the efficiency and comfort improvements before fabrication. The result is a new benchmark for the compact law enforcement patrol craft category.



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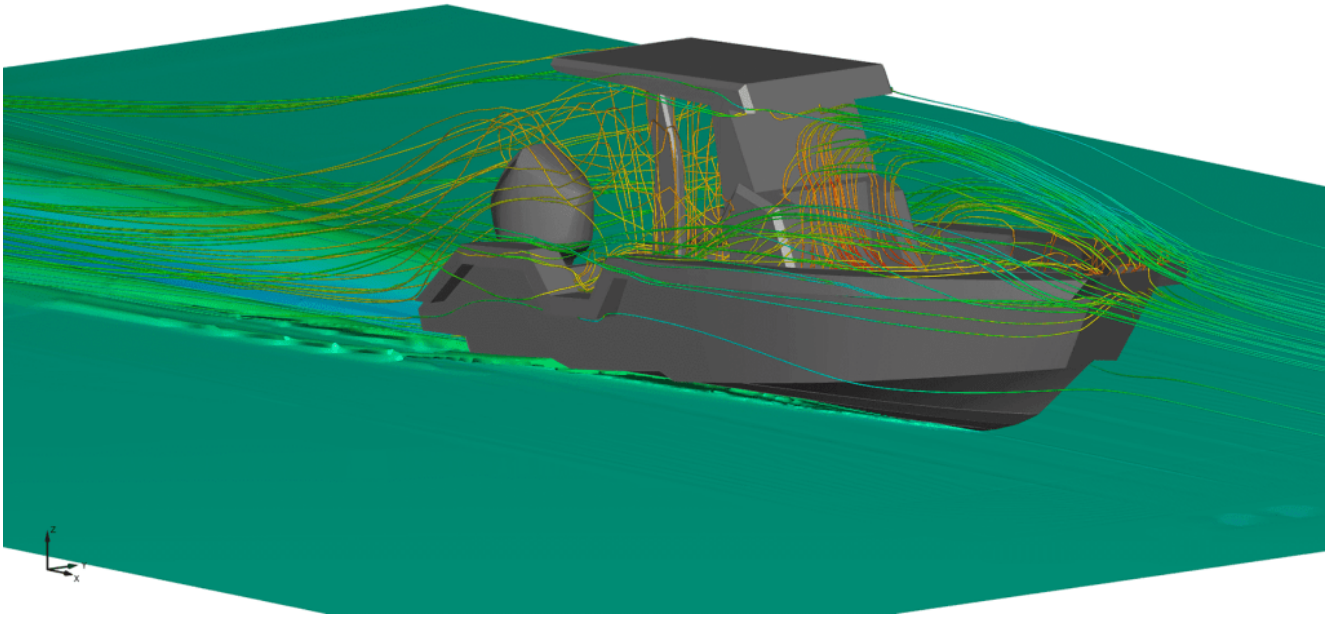
UNDERSTANDING THE MISSION

The design process began with conversations directly with marine law enforcement officers. These discussions revealed several recurring challenges in conventional patrol boats:

- Excessive operator fatigue caused by rough handling and slamming impacts
- Limited ergonomics and shelter in prolonged patrol operations
- Difficulty performing controlled beach landings
- Insufficient storage for safety and enforcement equipment

From these insights, Petestep and Silverback Marine set out to create a boat that would be fast and agile, yet significantly more comfortable and efficient for the crew.



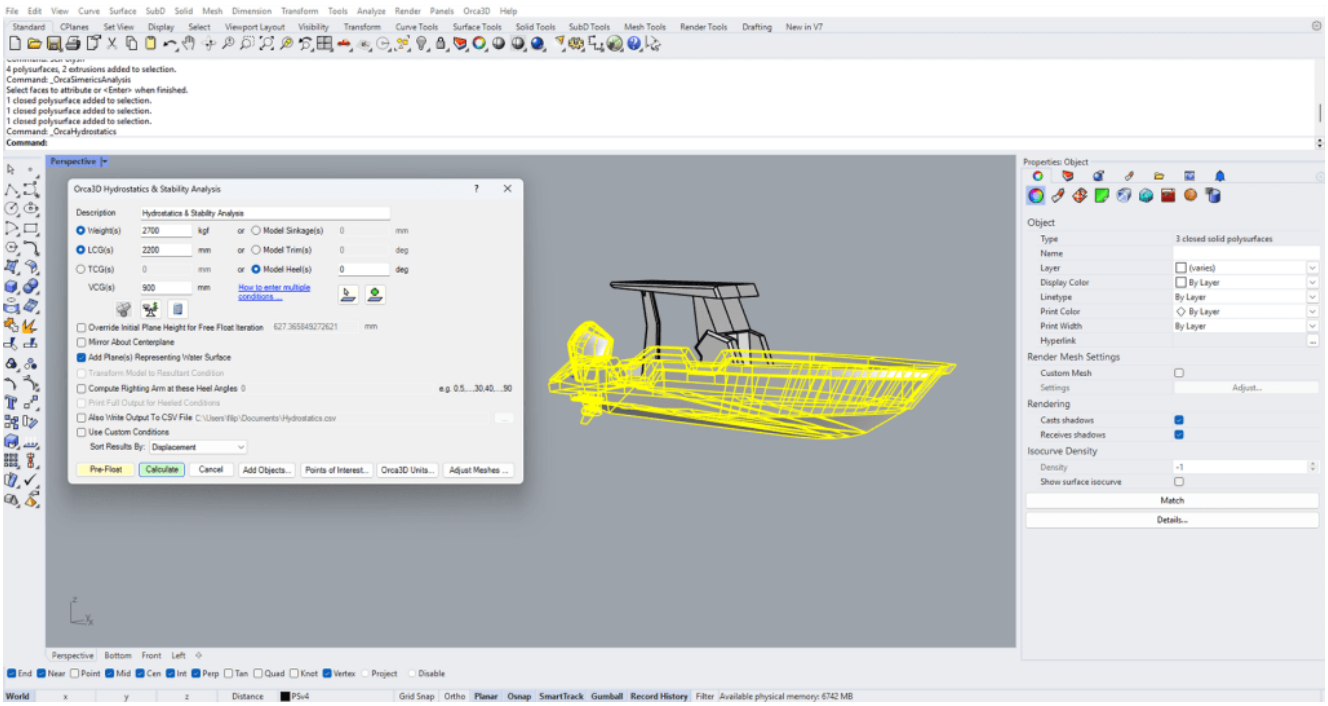
The team used Orca3D Marine CFD to verify that their design would not only reduce slamming and improve ride quality, but also support higher speeds and greater fuel efficiency.

PETESTEP’S SPRAY DEFLECTOR TECHNOLOGY

Unlike traditional stepped hulls that create air pockets, the Grizzly 21 LE employs Petestep’s patented Spray Deflector Technology. The hull features a series of angled surfaces that redirect spray water downward and aft, producing forward thrust while lifting the hull. This mechanism reduces drag, cuts slamming forces, and contributes to a drier ride.

Documented performance improvements include:

- Approximately 30 to 50 percent reduction in G-forces on impact, improving crew endurance
- Up to 35 percent greater fuel efficiency compared to typical monohull patrol craft
- Higher cruising comfort and stability in choppy conditions



Paired with a 23-degree deep-V form and an outboard propulsion system, the boat targets top speeds above 60 mph, supporting rapid response during enforcement operations.

See Also

INTRODUCTION TO ORCA3D

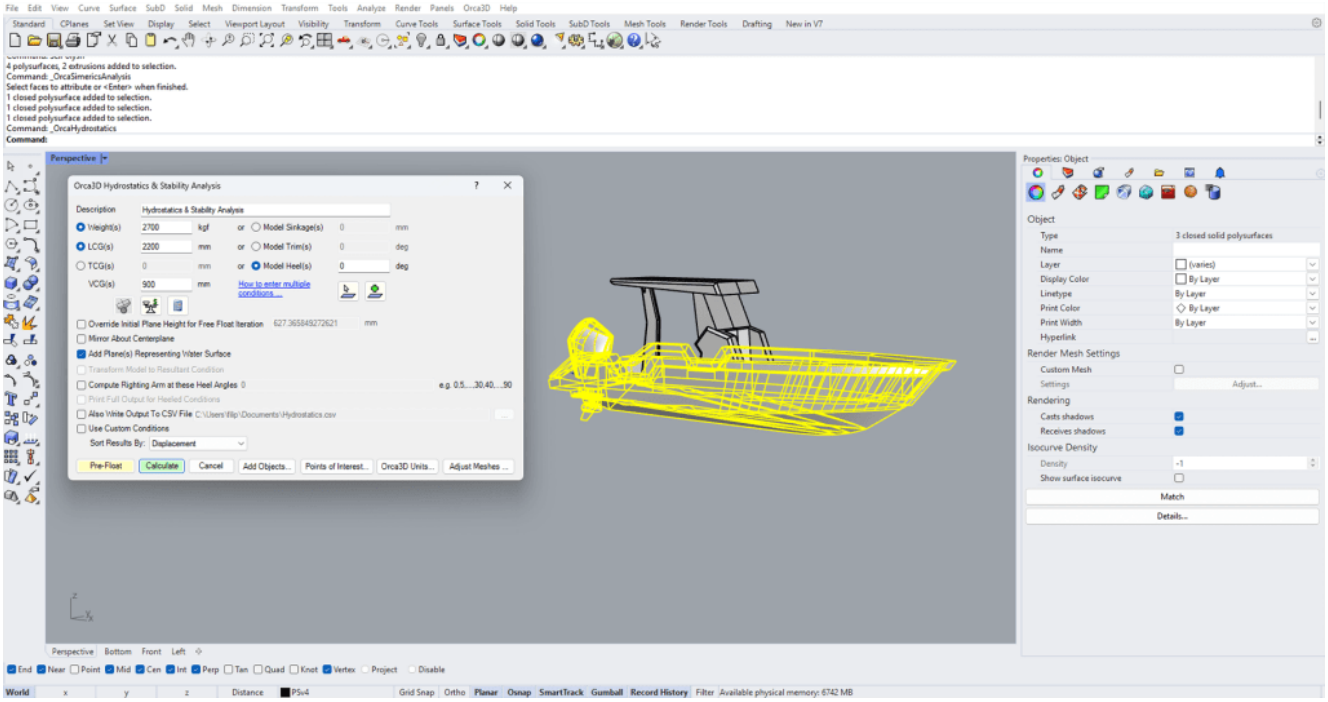
MODELING, SIMULATION, & ITERATION IN RHINO + ORCA3D

All hull and spray deflector geometry was modeled directly in Rhino. This allowed the Petestep team to adjust surfaces with precision and test variations rapidly. Rhino served as the central design environment, enabling surface refinement without interrupting the design workflow.

Once geometry reached key development milestones, the team evaluated performance using Orca3D Marine CFD. These simulations supported:

- Visualization of hydrodynamic and aerodynamic flow patterns along the hull and console
- Analysis of pressure distribution around the bow ramp and freeboards

- Performance assessment across different speeds and trim conditions
- Self-propelled simulations that reflected real engine behavior
- Rapid comparison of multiple hull and deflector configurations



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This iterative, simulation-first workflow gave Petestep confidence in the predicted performance before fabrication and reduced reliance on costly physical prototyping.

BUILT FOR PATROL OPERATIONS

The Grizzly 21 LE includes a number of features specific to law enforcement and field durability:

- 21-foot aluminum deep-V hull
- Petestep Spray Deflector Technology to reduce slamming and increase efficiency
- Approx. 60+ mph top speed capability
- Shoxs suspension seating to minimize crew fatigue
- 18-inch bow ramp for controlled beach access

- Dual weapon storage and emergency light/siren systems
- Enclosed operator shelter for extended duty conditions

The vessel is designed to be flexible across multiple environments, whether a ranger is approaching a shoreline campsite, intercepting a speeding vessel, or performing routine patrol in rough afternoon chop.

The Silverback Grizzly 21 LE sets a new benchmark for speed, efficiency, and crew comfort in law enforcement marine craft.

PROJECT STATUS

The design phase ran from January to March 2025. The boat is now under construction with delivery scheduled for 2025. For Silverback Marine, this project represents a move toward integrated digital design workflows that front-load simulation to improve outcomes and predict performance.

CONCLUSION

The Silverback Grizzly 21 LE illustrates how performance-driven hull design and accessible CFD tools are transforming boat development. By combining Rhino, Orca3D Marine CFD, and Petestep’s Spray Deflector Technology, the design team achieved a patrol boat that is faster, more efficient, and significantly more comfortable for the crew who

will depend on it every day.

For naval architects, public agencies, and commercial builders looking to modernize their fleets, this project demonstrates how data-driven design can meaningfully raise the standards for durability, efficiency, and real-world usability.

CREDITS

Design and Hydrodynamic Development: Petestep AB (Jonas Danielson, Fredrik Wikerman, Filip Wängelin, Vilhelm Djurberg)
Builder: Silverback Marine (Kyle Gracy, Ian Gracey and Team)
Client: New Mexico State Parks Rangers