

# Riverine Assault Support System

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## PROBLEM STATEMENT

Current riverine craft were developed for USMC and NSW missions that do not fully represent USN CONOPs. Today's riverine forces employ combatant patrol and assault craft that rely on road transportability, speed, acceleration, and maneuverability for survivability and multi-mission success. These capabilities are at risk because of the increasing demand to carry more extensive payloads (e.g. combat troops, more expensive C4ISR systems, stabilized weapons, and ballistic armor). As the payload demand increases, the craft's speed, agility, and survivability decreases, while at the same time increasing the acquisition costs. In addition, bottom damage to the aluminum hulls in theater is also contributing to reduced performance. The increased bottom damage resistance and the elimination of weight in order to reduce weight fractions by 25 to 30 percent and deliver improved mission payload on the order of one to two thousand pounds are key objectives.

In support of these objectives the Advanced Composite Riverine Craft (ACRC) prototype will demonstrate new approaches to reduced hull weight fractions for increased payload, impact resistant composite panels, unstiffened bottom panels for improved bottom damage resistance, rafted engines and machinery, flexible structural joints, and adaptability for new remote weapons and future C4ISR systems.

## WHO CAN BENEFIT?

US Navy Expeditionary and special warfare forces maritime mobility components will benefit from application of the technologies developed under the project.

## **BASELINE TECHNOLOGY**

Current riverine craft are built in aluminum. Although aluminum has proven to be a good material for a riverine operating environment, armor solutions required to defeat emerging threats adversely affect performance and payload of an aluminum hulled riverine vessel.

Grounding and impact with submerged objects leaves permanent deformation in aluminum hull plating which cause flow disruption and decreased performance from the waterjets.

Additionally, combatant craft in this highly dynamic riverine environment require an extremely fast, accurate, and tightly integrated surveillance and engagement system.

## **TECHNOLOGY DESCRIPTION**

The structural solution for ACRC is a composite hull built with unique combination of reinforcements, a toughened Epoxy System, and non-conventional joint concepts that yields a 25% lighter weight structure that can absorb as much impact energy as the current Aluminum hull plating without permanent deformation. This structural solution is being used to build a new craft with new features and capabilities for improved crew protection.

## **CURRENT STATE OF DEVELOPMENT**

SBIR Phase II Option funding will fabricate and deliver a craft hull that will achieve TRL 5 - prototype demonstration in a relevant environment. The project has evaluated novel material solutions, completed successful sub-component demonstration testing, and completed design. Principle SBIR Phase II innovations to be incorporated in the craft will include a weight-optimized hull for increased payload, impact-resistant composite structure, rafted engines and machinery, and flexible structure joints. Projected features include a cockpit that accommodates 5 crew and 3 passengers, a forward passenger compartment, and a rear deck that accommodates a combat rubber raiding craft. Space for electronics racks on hinges beneath the cockpit will provide twice the capacity of current riverine patrol boat racks. Foundations for three weapons stations will accommodate future .50-cal and 7.62 remote weapons installations. C-130 aircraft and MTRV MK 23 prime mover transportability are the primary design constraints.

Prototype construction commenced in 4th QTR FY 09 with TRL 5 prototype completion expected in April 2010.

## REFERENCES

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## ABOUT THE COMPANY

Seemann Composites, Inc. (SCI), was founded in 1987 to develop the technology of vacuum infusion, specifically SCRIMP (Seemann Composites Resin Infusion Molding Process). Its founder, Bill Seemann, had worked for decades building fiberglass boats and distributing composite materials throughout the Gulf-South. SCI was founded on its research and development innovation with composite fabrication processes and is a recognized leader in large scale resin infusion technology. SCRIMP enjoys worldwide usage today and has been attributed to starting an industry-wide revolution in vacuum assisted resin transfer molding of composites.

Today, Seemann Composites is primarily focused on manufacturing production components for DOD platforms, but also maintains a significant research and development capability to stay on the forefront of composites processing technology. SCI has fabricated and delivered thousands of advanced composite structures and products (of all sizes and levels of complexity) to all branches of the U.S. military, and many major U.S. defense contractors.

Its skilled and trained workforce of composite technicians produces a product quality competitive with the best in the world. SCI's engineering staff's main purpose is to support production; however, SCI has the tools and talent to perform detailed structural analysis and design of the most sophisticated composite structures. The company's production complex, specifically built around composites processing, consists of three facilities with a total of over 110,000 square feet of manufacturing space. State of the art processing and measurement equipment are leveraged to create production efficiency and built-in quality.