

*Design, construction and maintenance in a single contract helped overcome unique challenges in the development of a high-tech, high-quality facility.*

# Contracting for Unique Needs

By Kimberly Cutlip

**O**n the edge of St. Andrews Bay in Panama City, Fla., a three-story brick and concrete structure rises from the shoreline. It has the appearance of a typical office building and blends well with the older surrounding buildings. Inside, however, it is home to a unique mission—responding to the United States' war on terrorism.

As the U.S. Navy gears up a new fleet of Littoral (coastal) Combat Ships and DD(X) Destroyers for performance in shallow water, scientists are working diligently within the brick walls of the Littoral Warfare Research Facility (LWRF). Their research and development (R&D) will integrate unmanned vehicle (UV) technology on these new warships and enhance their surveillance, communications and combat technology. Robots, once a figment of childhood fantasies, now play a crucial role in the protection and success of the U.S. armed forces. The development of unmanned systems removes the soldier from the minefield.

LWRF also will serve as an international forum for robotics warfare. In June, the facility hosted AUV Fest 2007—Autonomous Underwater Vehicle Performance Demonstration—the largest in-water unmanned systems demonstration ever conducted. Global participation from military, academia and industry communities was encouraged as developing UV capabilities were displayed to research teams from around the world.

The 50 base scientists and engineers who were relocated to this facility demonstrate and test emerging technologies and concepts for cooperating unmanned systems to be used in littoral missions. Research conducted at the 38,000-ft<sup>2</sup> facility involves observing complex warfare tasks with multiple cooperating robots. The center is developing common communication links, computer programs and other support "architecture" for a variety of unmanned systems. In addition, scientists are striving to improve the quality of information relayed by the various UV types.

**The Littoral Warfare Research Facility's waterfront location provides the perfect setting for demonstrating emerging technologies in a common, at-sea environment.**

Photo courtesy U.S. Navy

Underwater, surface, aerial and ground UVs combine to hunt for sub-surface mines. The detection time is reduced exponentially through their cooperative behavior. Each UV type is able to communicate electronically or acoustically to inform other UVs if a mine-like target has been detected. At this point, another UV can be programmed to respond to the same location for verification of the danger. Convenient launch and recovery capabilities assist the Navy in identifying the most promising designs.

## Functionality and Features

The UV facility vision became reality when Naval Facilities Engineering Command (NAVFAC) contracted with The Haskell Co., Jacksonville, Fla., to provide complete design, construction and maintenance services. The project was unique in that it incorporated many facets under a single design-build contract, including the main research facility, demolition and abatement of multiple buildings, marine design, a boat ramp, an industrial waste oil facility, furniture, fixtures and equipment, a separate cable assembly building and an extended five-year maintenance program. The design-build method incorporated various cost savings and value engineering ideas, ensuring the Navy received the best value for their budget.

The facility was designed and constructed with simultaneous testing capabilities, providing an unprecedented opportunity to determine how well the different systems function with one another. The design and construction teams worked together with Navy personnel to ensure utmost functionality.

The spacious robotics facility contains vehicle and sensor laboratories, signal and image processing centers, and a command center for both bay and gulf operational demonstrations. The laboratories, coupled with the administrative spaces, encourage collaboration among the scientists and engineers to consolidate their R&D efforts. Other highly functional features include moveable partitions, hoists and elevated access floors. Equipped with a bridge crane, salt and fresh water test tanks, dock, hoist and boat ramp on the St. Andrews Bay waterfront, the facility will accommodate up to 10 major R&D projects at a time.

However, the most significant features of LWRF are not readily visible. In a post-9/11 environment, blast protection and progressive collapse are as important to critical facilities as bathrooms and stairs. Tilt-up panels allowed the use of brick veneer and stucco accent bands to integrate the new research facility with the surrounding buildings on the base. More importantly, because of its inherent reserve strength, tilt-up is readily adapted to provide the extra ability to avoid progressive collapse in case an explosion damages a portion of the structure.

## The Location

LWRF's waterfront location provides the perfect setting for demonstrating emerging technologies in a common, at-sea environment. The waterfront is a stone's throw from the

multi-bay integration lab, which allows for large UVs and ISO containers to be brought directly inside for work or repair. The adjacent cargo dock and boat ramp permit UVs to be loaded onto ships or launched directly into the water. These features provide considerable savings in transporting objects from the lab to the water.

The confined coastal location also created construction challenges. Construction had just mobilized when Hurricane Ivan came ashore, passing just west of Panama City. Increased waves and tide surge breached the existing seawall and created an urgent need for redesign to incorporate immediate and permanent protection for the site. The design-builder was able to provide a design, locate a sub-contractor, price the work, get approval from the government and start construction in less than two weeks.


This new development created coordination issues on the "postage stamp" size building site. Sheetpile work started on one end while foundations and slabs progressed on the other. As the sheetpile work was completed, an engineered slope revetment was put in place using recycled concrete from the demolition activities. This work was instrumental in assuring the permanent stability of the site.

## Maintainability

Another creative aspect of this facility is NAVFAC's assignment of maintenance responsibility to the design-builder for five years following occupancy. LWRF was one of three projects throughout the country selected by the Navy for this trial program to evaluate maintenance costs. It is theorized that design solutions would be approached more thoughtfully under this arrangement. Product upgrades incorporated as a result of the maintenance contract included upgraded carpet and light fixtures, durable flooring and wall coverings and efficient pumps and heating, ventilation, and air conditioning equipment.

In addition, the facility's design was based on Leadership in Energy and Environmental Design (LEED®) principles, developed by the U.S. Green Building Council. Sustainable design features incorporated into this facility included energy efficiency, a productive and healthy indoor environment, resource recycling and conservation, and facility flexibility. Workshops were held throughout construction as part of quality control meetings to include the wide range of onsite workers in optimization of sustainability principles.

## The Future

This diverse and complex laboratory project benefited from the design-build concept's single point of responsibility. Design, construction and maintenance in a single contract resulted in a high quality research facility with a single mission in mind—protecting our military forces from increased harm and ultimately protecting the people of the United States. 

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