



raising the monitor

The beginnings of America's modern naval power are on display at the Mariners' Museum By: Judith Rubin Photography: Available Light



Previous spread: The Intro Theatre. Top: The entrance to the center. Above: A timeline lays out the Monitor's history

When John Ericsson designed the USS Monitor, the first true ironclad warship, he sketched a new course for naval development worldwide. The Monitor was completed in less than 100 days, at Gosport Naval Yard in Portsmouth, Virginia, during the Civil War. Launched in January 1862, she helped bring about the Union victory. Fast-forward about a century and a half: The \$30-million USS Monitor Center, built to showcase the salvaged ship and tell her story, is steering a venerable educational institution toward its own fresh successes. This new, 63,500 sq.-ft. wing of the Mariners' Museum in Newport News, Virginia is being billed as America's premier Civil War attraction. It was designed by James River Architects and opened March 9, on the 145th anniversary of the historic Battle of Hampton Roads, which pitted the USS Monitor against the Confederate CSS Virginia.

In 1987, the National Oceanic and Atmospheric Administration (NOAA), which is part of the U.S. Chamber of Commerce, designated the Mariners' Museum a repository for artifacts and archives from the USS Monitor. Later, as a partner in the creation of the Monitor Center, NOAA provided \$9.5 million of the center's budget. Twenty million of that budget is in public funds, including \$5.5 million from the city of Newport News, and some \$2.5 million from the Commonwealth of Virginia. The remaining \$10 million was raised in private contributions.

The USS Monitor had a brief career, considering her longstanding impact on vessels of defense. The ship sank in a storm off Cape Hatteras, North Carolina on December 31, 1862. In 1973, the wreck site was discovered. The submerged, encrusted remains were protected and studied by NOAA, which, in the late 1990s, realizing that those remains were deteriorating rapidly, began recovery efforts.

Newport News is a military and shipbuilding town in central Virginia, not far from the historic battle location at Hampton Roads. The Mariners' Museum, founded in 1930, is said to be the largest maritime museum in the U.S., with a formidable collection, and now, the Monitor.

A fine creative team worked long and hard to turn out a multimedia experience that reportedly is getting high marks. DMCD was responsible for overall exhibit design and was on the project for more than two years. (This New York-based firm recently closed its doors when the principals retired after 40 years in business.) Len Soccolich (now senior exhibit designer at Evidence Design, Brooklyn) was lead project designer on the Monitor Center for DMCD. Building on DMCD's work and carrying it through to opening day was independent designer David Lenk, with the museum in the project manager role. Lenk is now with Capitol Exhibit Services Inc., which provided casework and other services during installation. Lighting designer Available Light's team was headed by Steven Rosen, IALD, principal-in-charge, with Matt Zelkowitz, LC, associate IALD, senior designer and project manager, and Donald Christensen, assistant designer. Tom Guidas, of Guiding Media, provided AV design and integration throughout the exhibit space and its three theatres. Media was produced by Batwin + Robin (introductory sequence), Pyramid Studios (Battle Theatre and some interactives and story stations), and Two Rivers Studio (Recovery Theatre and numerous interactives and story stations).

Prominent on the museum team were curator Anna Holloway; John Cannup, director of real estate and planning; Claudia Jew, director of photography and licensing; Jeff Johnston, program historian with NOAA; Jeanne Willoz-Egnor, director of collections management; Priscilla Hauger, director of exhibition production, and her staff: Ralph Ryan, Chris Voll, Pat Simpson, and Dave Merrill, plus technician Marc Marsocci.

The turret motif

"You look at the Monitor now and think 'submarine,' says Len Soccolich, "but, from the point of view of someone living in the 19th century, ships rode on the water—not underwater. It was a unique vessel and we wanted to convey that."

The USS Monitor was, in her day, a most advanced steam-powered marine craft. The ship's screw propeller (instead of a paddle wheel), made her less vulnerable to gunfire, able to sit lower in the water than a wooden sailing ship; it also made her relatively fast. The balanced rudder aft of the propeller provided unprecedented maneuverability. And the Monitor introduced the first marine "head"—flush toilets for use below the waterline. Her star feature was the rotating gun turret that made it possible to fire in any direction without repositioning the boat.

The ship's turret is the center's motif. It was recovered intact but is expected to spend another 20-plus years in its tank in the 17,000 Batten Conservation Laboratory Complex portion of the center, where it is undergoing an electrolytic reduction process to remove encrustations and chloride compounds. It can be viewed from the catwalk outside the lab, through windows and video monitors. Eventually, the turret will take up residence in the Large Artifact Gallery where, piece by piece, the original ship will be reassembled as the parts are stabilized. Other artifacts in this category include two Dahlgren cannons and the steam engine. "The turret is the main artifact, but we knew it wouldn't be there on opening day," says Soccolich. "We had to leave a space that will ultimately hold the real turret, but interpret it for visitors now."

The turret is interpreted multiple times. An upside-down, encrusted version in the Large Artifact Gallery, enhanced with sounds of dripping water, was provided by the fabricator Zibits to show it as when first recovered from the depths. In the same vast, glass-walled gallery is an as-new-built cutaway fabrication, a remarkable recreation done by the museum's in-house team following Ericsson's original plans. The turret appears yet again on the museum grounds on the other side of the gallery glass, atop the actual-size recreation of the ship built by Northrop Grumman. It is further evoked in the cylinder shape and props of the Battle Theatre, and in the spider-like custom steel structure that gripped the original turret and hauled it from the Atlantic Ocean, and now sits outdoors in the courtyard as a sort of industrial gazebo. "You get turret mania," says Lenk.

The Monitor capsizes

Another artifact is the Monitor's signal light—the kerosene lantern that was the last visible sign of her the night she went down was also the first artifact recovered by NOAA. Appropriately, it has its own small gallery (the space is somewhat turret-shaped). Available Light used Fiberstars

fiber-optic lighting recessed into the floor to create a scalloped effect on the walls. Inside the lantern, a fiber-optic illuminator on a dimmer is programmed to flicker.

Prior to the lantern display, visitors pass through a 10-minute introductory sequence for which Batwin + Robin produced the media, beginning with the Intro Theatre. Standing in this simple, pocket theatre, roughly triangle-shaped and lined on all sides, top to bottom, with curved tension-fabric panels that suggest waves and partly conceal the lighting fixtures, visitors take in an overview of the Monitor's demise, shown in standard-def video from three PLC-XF35 Sanyo projectors. The fabric panels were provided by Transformit. Three of them serve as screens and they all pick up vivid washes of color from 40 Color



The Monitor Center's displays include a number of period naval artifacts.

Kinetics Color Blast 6 fixtures powered by 10 Color Kinetics PDS-150e units. "All the panels use the same fabric," says Rosen. "We needed something translucent enough for light to come through but that would have enough gain for the video projection." An Alcorn McBride Digital Binloop supplies video, and audio to a Stewart amplifier DA-70 series. There are five JBL Control 23 speakers in the theatre. Working to DMCD's concept, Batwin + Robin used a combination of CGI, original footage and stock footage. The executive producer was Robin Silvestri.

Visitors next see a model of the shipwreck underwater, set into the floor under glass. Available Light created a sonar light effect beneath the glass by combining a High End Systems Technobeam with several Color Kinetics I-Flex units. A 60" Samsung PPM63M5HB plasma screen displays the Sonar Audio Discovery Video of interviews with people in the recovery effort. It plays back on an Alcorn McBride Digital Binloop.

A series of themed galleries and interactives relate the backstory of naval architecture of the time, the Civil War, leading up to the decision to build the Monitor and introducing some of the issues and individual players.

Around a corner, the setting shifts to a recreated dock at the Gosport Naval Yard. On one side of the walkway is represented, large as life, a traditional wooden warship of the time complete with extruding cannons. On the other side, the Monitor is in the process of being built. Two cast figures are climbing over it. Visitors can walk around and into the ship. Ambient audio supplies the sounds of shipbuilding, stored on three Alcorn McBride 8-Traxx MP3 players and emitted by JBL Control 23s run by Stewart amps. About 25 of these speakers are dedicated to ambient audio through the building.

The Battle Theatre

The 20-seat Battle Theatre comes about the midpoint in the visitor experience and tells the story of the Battle of Hampton Roads. Richmond-based Pyramid Studios, headed by Bruce Hornstein, produced the 16-minute *Ironclad Glory*. In this cinema-in-the-round, the seats swivel so that each audience member in the 35' diameter space can check out all the action on the nine screens. The visuals are delivered in standard video by three PLC-XF35 Sanyo projectors on three 7' tall and 9 1/2' wide front-projection screens with supporting material on six 63" Clarity SN-6010-720 rear projection units. The battle story is told chronologically. "It's complicated, but at least it all happened in one place, in that harbor," says Hornstein, who cooperated closely with historian John Quarstein, curator Anna Holloway, and NOAA specialist Jeff Johnston. "There is a trove of written records," says Hornstein. "Observers were documenting it from minute to minute. You can quote people with some confidence and bring them to life."

Rather than reproduce existing imagery, Pyramid created a series of original stills. "The visual historical record is very inconsistent, with all kinds of styles and things done after the fact," says Hornstein, whose background in multi-image formats, coupled with the versatile Dataton WATCHOUT platform, delivered plenty of cinematic power within budget parameters. To plot the story, they created physical models of all the ships, built a large 10' square map of Hampton Roads, and moved the tiny replica vessels around on the map. Detailed computer models were created and positioned in a Photoshop version.

"Next was the fun part—camera angles," says Hornstein. "We produced heavily detailed storyboards with close-ups, wide angles, aerials, and dissolves." Each shot was finished incrementally, with JPEG files going back and forth between Pyramid and Andy Simmons, the stills artist in England, and the client approval channels. "Andy would render and texture map them, then they'd go to the client, who would help us with the frame-by-frame battle continuity," says Hornstein. "Then Andy would get it back and start adding smoke, firing, water, damage, reflections.

That would go through more approvals. It was about an 18-month process." Character close-ups were based on live-action stills of costumed actors set up and photographed at Pyramid. "Since we weren't filming, the wardrobe details didn't have to be perfect—we could touch up anything," notes Hornstein. An original soundtrack was created by Richmonder Eric Heiberg.

"I bought my Watchout rig in 2004, and it has revolutionized the way we do things," says Hornstein. "Last year, five or six projects all came due within 90 days of each other. I was able to juggle tasks easily using Watchout. It's because of how easily you can program—and because it involves fewer and fewer people between your original idea and your final show. We have a full-blown Avid suite here, but I never got into editing video. Watchout put me back into hands-on design and programming. It allows a smaller company to have huge ideas."

The lighting effects package here includes Precision Projection System Inc. Wave Lights, cued to add a water effect, and six Lumiere Walkovers set into the floor around the perimeter and retrofitted with Lamina Ceramic LED arrays to provide strobes. "We wanted something long-lasting and not a regular strobe," says Rosen, "so we used LEDs, because they last a long time, and provide instant on/off." The effect of a cannon firing overhead is created with ETC Source Four PARs and Diversitronic strobes on the mezzanine overhead, visible through a grate. One of the PARs is mounted to a cannon assembly that swings back and forth.

An Entertainment Technology Marquee Control System is an important electronic brain of this operation, as Rosen explains. "Everything—including the sonar effect, the flickering light in the lantern, and the general lighting in the museum and the three theatres—is controlled by the Marquee system." To make it simpler for the operator, they sought to centralize all the controls to a single system. "We needed some things even the Marquee didn't have," observes Rosen. So Marquee customized it for them—a controller that handles two streams of SMPTE time code at once: One for the Intro theatre and one for the Battle Theatre. (The Turret Recovery Theatre, discussed below, does not use SMPTE code; its Alcorn McBride components send RS-232 protocol commands to the Marquee.)

The Battle Theatre has its own adjoining control area, set up by Tom Guidas of Guiding Media with three racks of equipment, primarily 10 Watchout servers connected via Ethernet IP. Guiding Media also handled the theatre's sound system, which has 12 audio channels and two subwoofer channels, and 13 JBL Control 23 speakers. "It's a good-sounding speaker," says Guidas, "compact and rugged, with a very easy mounting system included, in which the captive screw is hidden from the general public, away from prying fingers."

The Turret Recovery Theatre

In this 35-seat theatre located at one end of the Large Artifact Gallery, a documentary narrated by Sam Waterston imparts some idea of the elaborate process of bringing the Monitor up piece by piece from where she rests 240' beneath the Atlantic. Two Rivers Studios combed through miles of footage captured in a variety of formats, wrote the script, provided the soundtrack, and collaborated on the theatre configuration. A voting mechanism allows viewers to make content selections at certain points in the show. It is presented in high-definition video with a single Sanyo PLV-HD10 projector.

The playback unit is an Alcorn McBride Digital Video Machine HD. The system also includes a Marantz SR 5600 AV surround receiver and Mackie HRS120 power amplifier hi-res powered subwoofer. The 6.5' high screen is 11' wide.

Lighting effects happen in the Recovery Theatre with the assistance of four Phoenix PAR 56 Spots, several Precision Projection System Inc. Wave Lights, a pair of coolsafetyproducts.com Yellow Police Beacons, and four Metalux industrial fixtures.

Two Rivers produced a dozen personal story stations that are installed at various points in the center. These present individuals, both historic and contemporary, who are part of the Monitor story. They are narrated by actors in costume and include touch-screen features to call up supplementary information. All are presented on vertically oriented 42" Panasonic plasma screens. These run in Quicktime video: they were edited in Final cut Pro in HD (1080i), programmed in Adobe Director with a Flash interface and exported to Quicktime.

Two Rivers also created a popular interactive that runs on a pair of PCs and allows guests to try their hands at being ironclad warship designers. The Two Rivers team included partners Mary Kay Sizemore and Tim Ivy, graphic designer/programmer Sara Belmont and scriptwriter Brent Holliday. The interactive was programmed in Adobe Director and animated in Flash.

Northrop Grumman builds the Monitor

The full-scale replica of the Monitor that sits outside the Large Artifact Gallery is called The Evocation. It amounts to an in-kind donation of \$1 million from a company more likely to turn out an aircraft carrier or nuclear submarine than a Civil War relic. However, it proved a valuable opportunity for Northrop Grumman's busy apprenticeship program, which actively recruits from all over the country.

The Evocation is 173' long, 41' 4" wide, and her height from keel to deck is 10' 4". Her keel weighs 18 tons. She was built in 22 welded steel sections made from Navy-donated material—as opposed to the riveted iron plates of the original, but otherwise faithful to the original design. "The museum approached us," says Northrop Grumman

craft instructor Danny Engle, who oversaw the job with apprentice school training administrator Larry Koeck, and Tom Clark, director of the Newport News Shipyard, "and we felt it was a once-in-a-lifetime project." It was fabricated in modular units that were trucked to the site and lifted into place by crane. Hampton Roads Crane and Rigging donated crane work.

Overall, about 250 people were involved in The Evocation, including some 150 apprentices and apprentice graduates. The finished product is very popular with museum visitors who can walk onto the deck and below. It does not include the engine room, but does have the full shell, with anchor, propellers, turret, armor belt and bolt heads to simulate the rivets. (There's even a buy-a-bolt fundraiser going on.) The only visible departure from the original is the pilot house is made of steel



A model of the CSS Virginia.

instead of wood, to weather the elements. The process took about two years, including pre-construction. "We gave ourselves a luxurious schedule," says Engle. "If necessary, 90 days wouldn't have been a problem."

The USS Monitor Center conveys an experience that touches visitors on multiple levels and conveys the drama along with the history. "You have the parallel chronology and the technology of the two ships," says Soccolich. "There was this incredible race between the North and the South to build this new weapon—the USS Monitor—because the North knew about the CSS Virginia. The Virginia was singlehandedly going to destroy the entire Union fleet but, when she went out, the Monitor was there. You have the legacy of the revolving turret in every modern warship today. And you have human drama. There were people behind those ships: Crew, captains, politicians. The people who served on the Monitor and on the Virginia have the same feelings we have today. We tried to create something that would help visitors put themselves in their shoes, inspire them to ask themselves what they would do if faced with those choices." 📖