

THE MV ISLAND SPIRIT

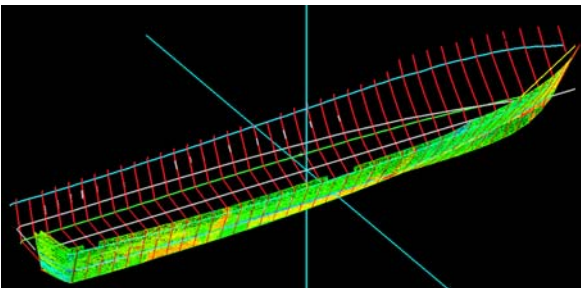
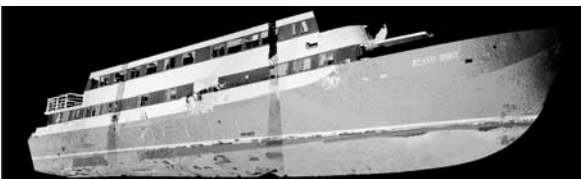
A SCANNING CASE STUDY

3D laser scanning is an excellent method of capturing detailed information about a ship's hull for sponsoring and other modifications. When Jeff Behrens, owner and captain of the small cruise ship Island Spirit, decided to expand into Alaskan waters, he needed to make structural changes to his boat to enhance stability. Because of the age of the vessel, Jeff quickly ran up against the challenge of obtaining data about the existing hull. The naval architect and lofter referred Jeff to Westlake Consultants to obtain the needed data using 3-D laser scanning.

Data about the aft 75-feet of the Island Spirit was needed for stability modifications for Alaskan cruising. The 130-foot vessel was originally built in 1978 as a crew boat for the Gulf of Mexico. Jeff Behrens bought it in 1994, and in 2002 converted it to an overnight tour boat that has been cruising the protected waters of the Columbia River and Puget Sound.

Scanning to Capture As-Built Data

In July 2008, Westlake's scanning crew drove up to the Marine Fluid Systems, Inc., boat yard in Seattle where the Island Spirit was undergoing scheduled maintenance.



Charles "Bob" Blair, Project Manager for Westlake's scan services, explains that the dark blue of the hull limited reflectivity. "We planned an approach and tested it. We were able to adjust our procedure, overlapping the scans to ensure complete coverage and compensate for the lack of reflectivity." It took just 8 scans and a few hours, to scan both sides of the hull from stern to bow, rather than just the area to be sponsored.

The crew also established the ship's geometry, (the centerline vertical keel and horizontal plane). The end result is that the scan data is referenced to the ship's geometry (offset from the centerline) rather than simply a cloud of points.

Back in Westlake's office, the eight scan data sets were registered together, to create a single data set for the vessel's hull. Deliverables were prepared for the lofter.

***Middle Left:** Scan data depicting the entire vessel. The additional time needed to capture the whole vessel was minimal and having the data available for future reference just seemed smart.*

***Lower Left:** CAD data showing both the cross-sections at the frame locations for attachment, and a portion of the "mesh," a realistic model of the surface of the hull including chines and other features.*

How the Data Supported Design

Lofter Mark Siburg of Argonaut Marine needed the as-builts because design drawings for the ship did not exist. Using the scan data to prepare a detailed 3D model of the hull, Mark was able to verify that the vessel's hull form was consistent with the sponson design assumptions. In addition, comparing scan data for the two sides of

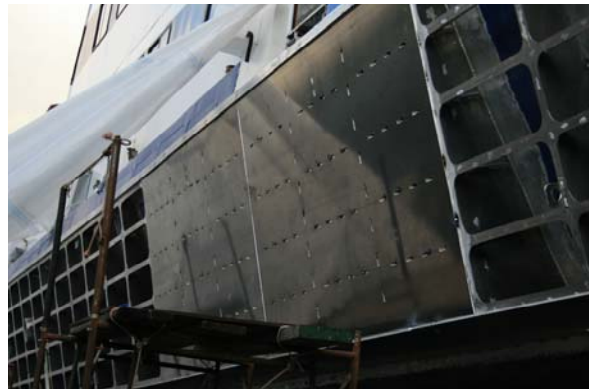
Below: The sponson tank framework was prefabricated off-site.



Below: The Island Spirit during installation of the framework.



Below: Installation of the skin plate.



the vessel made it possible to inspect the vessel shape for asymmetry.

Mark prepared a lofting plan using the "envelope" created from the scan data and the design concept and calculations from the project's naval architect, Elliott Bay Design Group. He detailed how to build, stage, and attach the proposed sponson tank components. Mark also provided Marine Fluid Systems Inc. with a cutting plan so that the pieces could be nested, making efficient use of material.

Project Construction

The scan data and detailed lofting design, enabled the boatyard to pre-cut both the sponson frames and side plates.

This approach dramatically reduced the construction time. According to Dana Bostwick, President of Marine Fluid Systems, Inc., the Seattle boatyard where the work was completed, the sponson was completed well under the estimate provided by the boatyard, saving the owner "untold tens of thousands of dollars." It also contributed to a "green" approach with less waste of materials.

This was Dana's first experience with the use of scan data and a detailed lofting plan. His response: **"All the parts fit! It went together like a jig saw puzzle."**

A Great Success From Many Perspectives

Based on this experience, Jeff Behrens, the Island Spirit's owner, concludes that "scanning is the only way to go". Without the scan data to support design and construction, he feels certain that his boat would have been out of commission for the season. He also estimates that total project costs were reduced by at least \$30,000.