

Research Vessel Construction

The purpose of the new vessel (RV) is to provide full-scale validation of the integrated modeling tools that have been developed as part of the research program. These include both the ship design Computational Fluid Dynamics (CFD) models and the impact assessment models. The new research vessel is being designed by *Teknicraft* based on an optimized hull shape and foil configuration. Construction of the vessel by *All American Marine* in Bellingham is anticipated to begin in September 2008, such that the vessel would be ready for sea trials in May 2009. The new vessel will be run as part of the research program to collect vessel performance and environmental impact data to assess the feasibility of this design as a low impact POFF for the Seattle to Bremerton ferry route over a period of approximately 4 to 6 months.

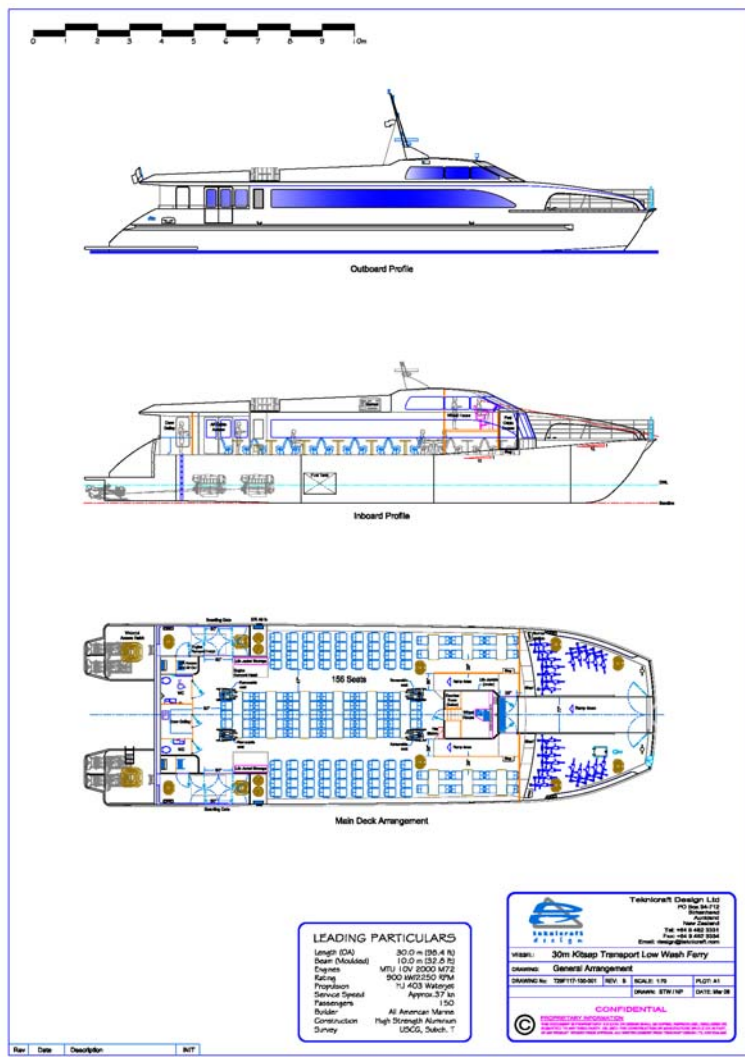
2008												2009											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Vessel Optimization Study												Research Trials											
Prelim Drawings & Specifications			Design & Construction Plans						Vessel Shipping and Delivery														
All American Marine Pricing & Contract				Construction of Vessel												Launch, Sea Trials, Certification							
Construction of Hull																							
Construction of Cabin and Deck																							
Systems and Interior																							
Engines and Painting																							

Composite Hydrofoil Construction

The project team is providing support to Western Washington University's Plastics Engineering Technology group and working with All American Marine and Janicki Industries to design, develop, and construct a dynamic hydrofoil made with composite materials. The composite foil will be designed to reduce weight while maintaining strength, impact resistance, and overall effectiveness. The foil will be equipped with a strain gauge and pressure monitoring system to assess its performance. The foil shall be fitted with a hydraulic system to enable adjustment from the helm. Research has shown that dynamic adjustment of the main foil can significantly improve the efficiency of the vessel under a range of operating conditions.

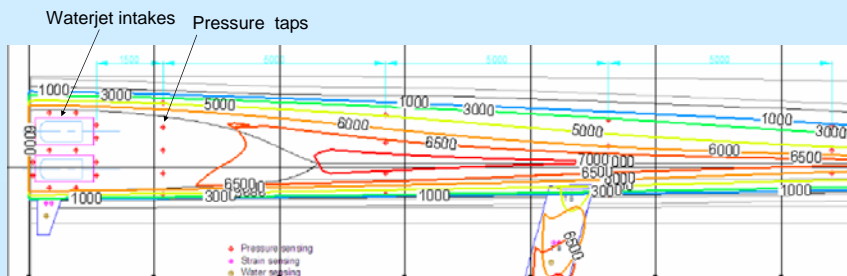
Hull and Foil Monitoring System

A hull and foil monitoring system will be installed on the new research vessel to provide measurements of the pressure distribution on the surface of the hull and foils, as well as the trim, draft, speed, heave, pitch, roll, and precise position of the vessel, ambient sea conditions, and visual properties of the wake. The monitoring system data will allow a more complete validation of the RANS CFD model (CFDSHIP IOWA) and in particular quantification of the forces exerted on the hull through a range of operating speeds as well as confirmation of the anticipated vessel performance.



LEADING PARTICULARS	
Length (LOA)	30.0 (98.4 ft)
Beam (Moulded)	10.0 (32.8 ft)
Engine	MTU 12V 2000 M72
Rating	900 kW/2350 HP
Propulsion	1/2 ACR Waterjet
Service Speed	Approx. 37 kn
Passengers	156
Builder	All American Marine
Construction	High Strength Aluminum
Survey	USCG, Subch. T

Teknicraft Design Ltd 101 1st Street Everett, WA 98201 Tel: 425 442 8388 Fax: 425 442 8388 Email: design@teknicraft.com	
VESSEL: 30m K1500 Transport Low Wash Ferry DRAWING: General Arrangement DRAWING NO: TRF-110-08-001 REV. 8 SCALE: 1/8" = 1'-0" SHEET: 879-10P DATE: 08-08-08	© CONFIDENTIAL



Portside demi-hull pressure distribution and proposed pressure tap configuration

The monitoring system will consist of:

- ✓ Array of hull pressure taps
- ✓ High accuracy vessel position (RTK-GPS)
- ✓ High accuracy pitch, roll, and heading sensor in addition to Furuno compass
- ✓ Water level sensors (4) to provide draft under static conditions
- ✓ Water depth and temperature sensor
- ✓ CCD video camera in tunnel to view flow over foil and two cameras on deck to view water surface fluctuations (bow and stern)
- ✓ Moisture sensor internal to the foil cavity
- ✓ Structural monitoring of foil surfaces and foil structural members under static and dynamic conditions