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F/V DEFENDER
Trawl Technology

New 170-foot Trawler Conversion *F/V Defender* Brings Modern Ideas to the Bering Sea

BY PETER MARSH

Global Seas' Newly-rebuilt 170-foot trawler *F/V Defender* features an advanced fish pump system, a covered fish-handling/sorting area and a large RSW capacity. Photo by Bill Franks, courtesy of Global Seas.



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The arrival of Global Seas' 170-foot trawler *F/V Defender* in Seattle in May has clearly raised the bar in the Alaska Pollock fleet. The vessel features an advanced fish pump system to protect the catch, a spacious covered fish-handling/sorting area to increase crew safety, and a large RSW capacity to increase efficiency. The vessel was converted to its new role at Patti Enterprises' shipyard in Pensacola, Florida between April 2015 and February 2016.

Since 2001, under the direction of CEO and co-founder Bob Desautel, Global Seas LLC has operated a fleet of four Bering Sea trawlers from 60 to 231 feet long. In 2014, the company began discussions with naval architects Jensen Maritime to plan the conversion of a 164-foot New Bedford herring and mackerel boat into the new *Defender* to replace an existing vessel of the same name.

Global Seas has worked with Jensen since the 1990's and had previously selected the naval architects in 2011 to engineer the company's first conversion of an east coast boat at Patti, which became the *F/V Bering Defender*. However, the scope of work to turn the *Western Venture* into the new *Defender* was extensive, and covered many parts of the vessel. Notably, covering the sheltered work areas, adding a European style whaleback over the foredeck and a bulbous bow, plus an additional five feet on the stern, gave the boat an entirely new appearance.

Global Seas' open house at Seattle's Elliott Bay Marina early in June gave *Fishermen's News* the opportunity

F/V Defender

(RIGHT) The top line and tail line trawl winches were re-built by Rapp Marine in Seattle, and the fish pump, also by Rapp Marine, can move 500 to 900 tons per hour. Photo by Bill Franks, courtesy of Global Seas.

to board the *Defender* and get an inside look at this major conversion project that required 230 tons of new steel. On the foredeck, the relocation of the anchor winch allowed for the attachment of the large, pre-fabricated "whaleback" that protects the area from icing. In addition, the original forward deck has been completely enclosed, creating a new 40-foot-wide shelter deck for catch sorting and distribution into one of the ten RSW tanks.

Fish Pump

Amidships, an anti-roll ballast tank was built onto the front of the wheelhouse. On the main deck aft, the 5-foot stern extension increased the overall length to 170 feet and added useful working space around the fish pump, which is the center of the *Defender's* fishing operations. The top line and tail line trawl winches were re-built by Rapp Marine in Seattle and relocated to a new aft deck. The fish pump, also by Rapp Marine, can move 500 to 900 tons per hour. The pump is hoisted up and aft by a fixed overhead boom on the underside of the gantry, then inserted into the cod end.

Johann Sigurjonsson, Rapp Marine's US manager explained the fish pump's operation. The system has been developed in European waters for several decades, he pointed out, and has also become popular on the US East Coast. Two reels on the top of the gantry deploy the fish transport hose and the hydraulic power hose down to the pump.

On deck, the live fish enter an 18-inch diameter stainless steel tube on the port side and are pumped forward to the sorting station and into the RSW tanks. The empty net is hauled onto either of the reels over rollers on the transom, assisted by a power block hoisted by an EST knuckle boom crane mounted on the



starboard side of the aft deck. This system is gentle on the catch, which will be landed by a small crew of seven who will deliver to Unisea and Westward Seafoods in Dutch Harbor.

The *Defender* is only the second operational trawler in Alaska equipped to pump at sea – the first being Westward Fishing Company's *Chelsea K*. It's clear that this is a

subject of considerable interest to everyone involved with Bering Sea trawling, who will be keeping a weather eye on the new boat and the premium the pumping system might earn. "We are hoping that this system provides the best quality fish out there and sets a new standard of product for the in-shore fleet," Bob Desautel stated.

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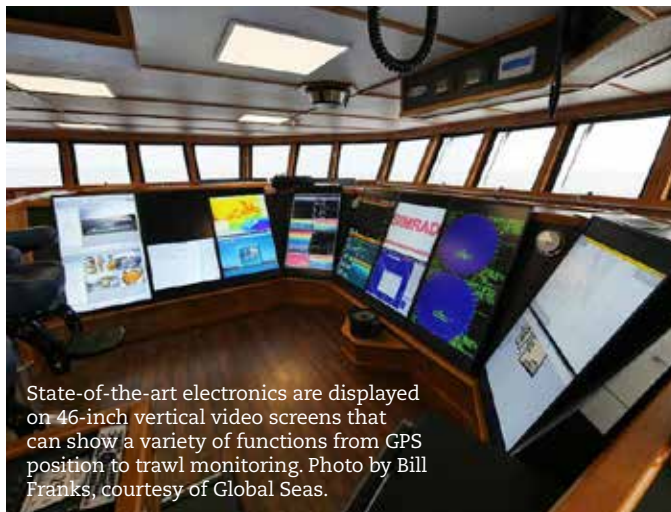
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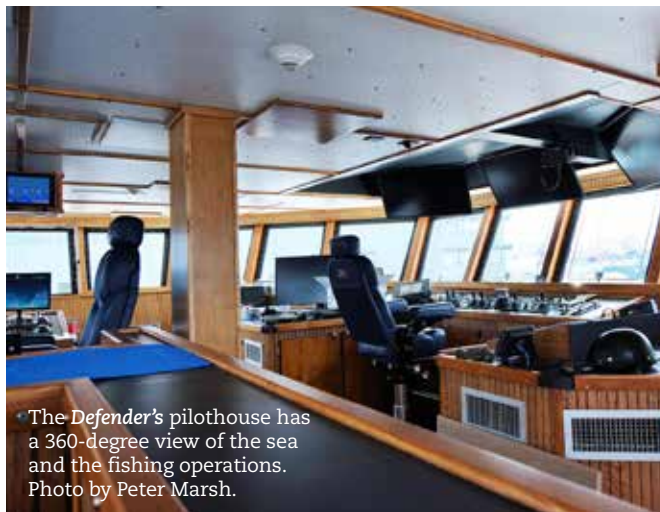
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F/V Defender



State-of-the-art electronics are displayed on 46-inch vertical video screens that can show a variety of functions from GPS position to trawl monitoring. Photo by Bill Franks, courtesy of Global Seas.



The *Defender's* pilothouse has a 360-degree view of the sea and the fishing operations. Photo by Peter Marsh.

The pilothouse was updated with state-of-the-art electronics, and all data are displayed on extra-large 46-inch vertical video screens filling the entire forward console. During the open house, technicians from Harris electric demonstrated

how the screens can show a variety of functions from GPS position to trawl monitoring. The data are gathered by an array of sonar and video technology including modern Omni Simrad sonar in the bow. Sound dampening components

and coatings were applied from the engine room up to the bridge, and all the interior accommodations were given major upgrades.

The ship was originally built in Alabama in 2006, with a beam of 40 feet and draft of 18 feet. At the start of this project, the entire ship was sand or water-blasted, deep cleaned, and re-coated. There are two sets of 5 fish holds that are long and narrow, designed to run fore and aft, not athwartships. The fish holds were coated with the latest FDA-approved paint. Beneath the waterline, the hull was given a new elongated bow bulb that fairs cleanly into the wide beam and holds a new 350-HP Wesmar bow thruster.

With the extra length aft, the water flow has been improved and hull resistance decreased to increase fuel efficiency. The Brunvoll 48-inch, 350-HP stern thruster was overhauled in Seattle by Sound Propeller, and twin high-lift rudders were ordered from Deflector Marine Rudder in Washington and trucked out to Florida.

Global Seas had previously installed a pair of the rudders on the *Bering Defender* and found they increased turning power and improved productivity on the tow. "We will be able to turn and burn faster, catch faster, get back to fishing faster. It all comes down to



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(TOP) The hydraulic room boasts the ten ABB electric motors. (ABOVE) The Caterpillar 3512 mains were rebuilt in place, and each provide 1,800 HP to ZF W7500 4.939:1 reduction gears turning 81-inch propellers inside new nozzles for a cruising speed with full tanks of 10.5 knots. Photos by Peter Marsh.

fuel usage, pennies per pound,” Desautel added.

The full slate of mechanical upgrades began with rebuilding the main engines and generators. The main engines are Caterpillar 3512’s that were rebuilt in place to upgrade their output to 1,800 HP. The engines are coupled to ZF W7500 4.939:1 reduction gears that turn 81-inch propellers inside new nozzles via Aquamet 17 shafts, providing an efficient cruising speed with full tanks of 10.5 knots.

Down the center of the engine room in a line are three gensets: two Cat 3412’s for ship service, putting out 590 kW, and a third Cat C9 184 kW hotel unit. All three generators operate in parallel producing more than 1.3 megawatts of power. This large amount of generating capacity is required to keep all the hydraulic winches and chillers up and running, explained chief engineer Steven Sauer, who worked his way up to this size engine room after a decade on Crowley tugs.

The big 1,868-gallon hydraulic reservoir is pressurized by ten ABB electric motors of 128-kW each. The fish-pump hydraulics are separate from the rest of the system with two 63-kW pumps using bio-degradable hydraulic oil

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to meet the latest environmental requirements for systems working underwater. The twin independent chiller systems are each powered by Sabroe 125-HP and 100-HP electric motors. The entire system was overhauled in Florida by Highland Refrigeration of Seattle and fully commissioned in Puget Sound before the vessel departed for Dutch Harbor.

The ship's entire electrical system underwent substantial upgrades and rewiring by the shipyard, and all mechanical systems were overhauled or upgraded. Global Seas definitely benefitted from its previous experience with conversions, and the final cost was about 40 percent less than building a new vessel, according to the company's director of marketing, Bill Franks.

Jensen Maritime, part of Crowley Maritime Corp., provided engineering services including structural and mechanical work for the conversion. "Jensen built its early reputation one fishing vessel at a time," said Johan Sperling, vice president of Jensen. "Both Global Seas and Patti Marine are longtime customers of ours and we were happy to work with them on this latest conversion."

The Patti family started as commercial fishermen in Pensacola, Florida in the Gulf of Mexico; in 1931 the late Joe Patti started Joe Patti Seafood Company. Joe's son, Frank Sr., started Patti Shipbuilding in 1977, and current owner Frank Jr. took over the business in 2008 as Patti Marine Enterprises.

The yard's marine railway was installed in the early 1980's with an 800-ton capacity and 200-foot length limit. This was replaced by a new 1,200-ton track, and the new system's first haul-out was the 1,000-ton *Western Venture* that was re-launched as the *Defender* with a displacement of 1,040 MT lightship and 2,050 Max deadweight MT. **FN**



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PATTI Marine Enterprises truly values customers like GLOBAL Seas and BBEDC. With the team-work and coordination required on a project the magnitude of the DEFENDER, we couldn't have asked for more understanding partners. It's a rarity to be treated as partners – on the same side with the same goal on the horizon. We thank GLOBAL and BBEDC for undertaking this momentous project with the grace and consideration we've come to expect from their entire team.