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At first glance, the multipurpose light construction vessel (LCV) hints at its capabilities. A 68’6”-dia. heliport deck on the bow, above the level of the wheelhouse, provides for crew changes without returning to base. A 165-MT National Oilwell Varco (NOV) knuckle-boom crane on the afterdeck is designed to handle large, heavy loads in high seas. And the size of the Deep-Sea’s house forward indicates her capacity for storage and accommodations well suited to her far-offshore mission.

“We designed the Harvey Deep-Sea from the outset as a ‘floating island,’” said Jules Schubert, the New Orleans-based company’s executive vice-president for operations. “At long distances from shore, support vessels have to stay on-station for extended periods of time. That’s why we specified large capacities and a helideck.”

**By Max Hardberger, Correspondent**

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**CRANE SUPPORT**

The Deepwater Horizon blowout brought the world’s attention to subsea operations. The failure of the subsea blowout preventer (BOP) for the
Macondo well emphasized the importance of getting the right subsea equipment and procedures in place when structures weighing hundreds of tons have to be placed in service 10,000' below the surface of the sea.

That’s when the capabilities of the NOV 165-ton crane come to the forefront. “The boat is really, in some ways, just a support vehicle for the crane,” explained Schubert. “With the crane’s sophisticated, computer-controlled positioning system, the tip of the boom can be held within a 3'-dia. area above a spot on the ocean floor while equipment weighing up to 100 tons, suspended up to 60' off the side of the ship, is put in place.”

The crane has a computer-controlled “auto-heave compensation” (AHC) system consisting of nitrogen tanks, piping, and valves to provide the high-speed boom and runner movements necessary to compensate for roll and heave. Stability is also helped by the vessel’s anti-heel system, a complex arrangement of computer-operated, high-volume pumps and pipes that transfer ballast water from one side to another.

“Workballast water from one side to another,” said vessel master Capt. Jace Callais. “Whether it’s carrying drill pipe or other standard cargo, or installing sophisticated subsea well-heads and pumping stations 10,000 feet down, this boat was designed to do it all.”

“A 165-MT knuckle-boom crane on the afterdeck is designed to handle large, heavy loads in high seas,” said Darrel Beckham, the Deep-Sea’s chief engineer. “Over 400 alarm sensors in the machinery systems report back to consolidated alarm panels in the engine room control center and in the wheelhouse. Firefighting systems, bypass controls and electrical switching are all done by remote control.” And in case of loss of computer memory, all engine parameters and control actions are recorded in real time on two continuous-scrolling printers, with printouts stored for two years.

The electronics for the machinery systems are so complex, Beckham said, that they require their own cooling-water system, connected to a separate keel cooler on the vessel’s hull.

“We want to be a full-service supply vessel,” said vessel master Capt. Jace Callais. “Whether it’s carrying drill pipe or other standard cargo, or installing sophisticated subsea well-heads and pumping stations 10,000 feet down, this boat was designed to do it all.”

One way in which the vessel’s supply-boat role reveals itself is in its 200-ton stern roller, with a removable stern bulwark for access. But even her working afterdeck had to be modified to fit its subsea-support role. To keep large, heavy hook-loads low, a 40' section of the afterdeck’s starboard side...
bulwark, aft of the crane pedestal, was made to be removable.

“If we’re putting a huge platform on the bottom at 10,000 feet down with a sea running,” Callais said, “the 10-foot height difference could make a big difference in controlling the load.”

To do this, designers placed all of the tank vents that would have been in the way of the removable bulwark on the other side, and provided nut-and-bolt connections in all of the places where the bulwark and its supports would have been welded to the hull.

**TASK ORIENTED**

The *Deep-Sea*’s large 196’x56’ afterdeck is the equal of any dedicated supply boat, capable of carrying up to 3,175 MT. Even here, the subsea support role stands out. A 15’x18’ moon pool is located in the center of the afterdeck, fitted with a cover to make the deck continuous when the moon pool isn’t being used.

“Being able to locate the boom tip over the vessel’s centerline [while working through the moon pool] greatly reduces the tip’s motion in a seaway,” said Callais. “Having a moon pool on a vessel that can also serve as a deck-cargo carrier is pretty unique.”

Another supply boat feature, but sized in keeping with the *Deep-Sea*’s “the-most-of-everything” philosophy, is its big firefighting capability. The three remote-controlled fire monitors that bracket the wheelhouse can each throw 16,192 gpm at a burning rig or platform, as well as 60 minutes of foam.

But its primary mission as a far-offshore subsea installation and support vessel, performing the most demanding tasks today’s OSVs face, is always paramount. To support that mission, it has two ROV bays, one on the port-side main deck and one on the mezzanine deck, for customer-supplied 220-hp work-class ROVs. The *Deep-Sea* has a crane capable of precisely positioning a 100-ton load and holding it in place while the ROVs bolt it down. And the vessel has the GPS, radar, acoustic, and sonar positioning systems to do it safely and efficiently.

The vessel’s complex navigation system includes three *Furuno* GPS Navigator 150 global positioning system receivers, three RS232/RS485 gyroscopes, and three local reference systems: a CyScan laser system, a *Kongsberg* HIPAP 500 acoustic positioning system with two acoustic wells in the hull underbody, and a RADius 17 X-band radar-sounder.

With tankage for 8,200 cu. ft. of dry bulk cargo and 18,870 bbls. of liquid mud, the *Harvey Deep-Sea* can compete with any of today’s large OSVs in rig supply mode. It also has tankage for 613,100 gals. of drill water, 1,710 bbls. of methanol, and a staggering 396,300 gals. of diesel fuel.

“A fuel stop for the *Harvey Deep-Sea* is an expensive proposition,” laughed Schubert. “At today’s prices, it costs $1,400,000 to top off her tanks.”

The *Deep-Sea* has an “endurance speed” range of 20,721 nm at 8 knots and 16,450 nm at 12 knots. It can go two-thirds of the way around the world without refueling. And with a potable-water capacity of 25,210 gals., the voyagers won’t get thirsty.

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**Deepwater Installation Vessel**

The 21-meter-diameter helideck on the bow, above the level of the wheelhouse, provides for crew changes without returning to base.

![Deepwater Installation Vessel](http://images.workboat.com/2013/09/DeepwaterInstallationVessel.jpg)