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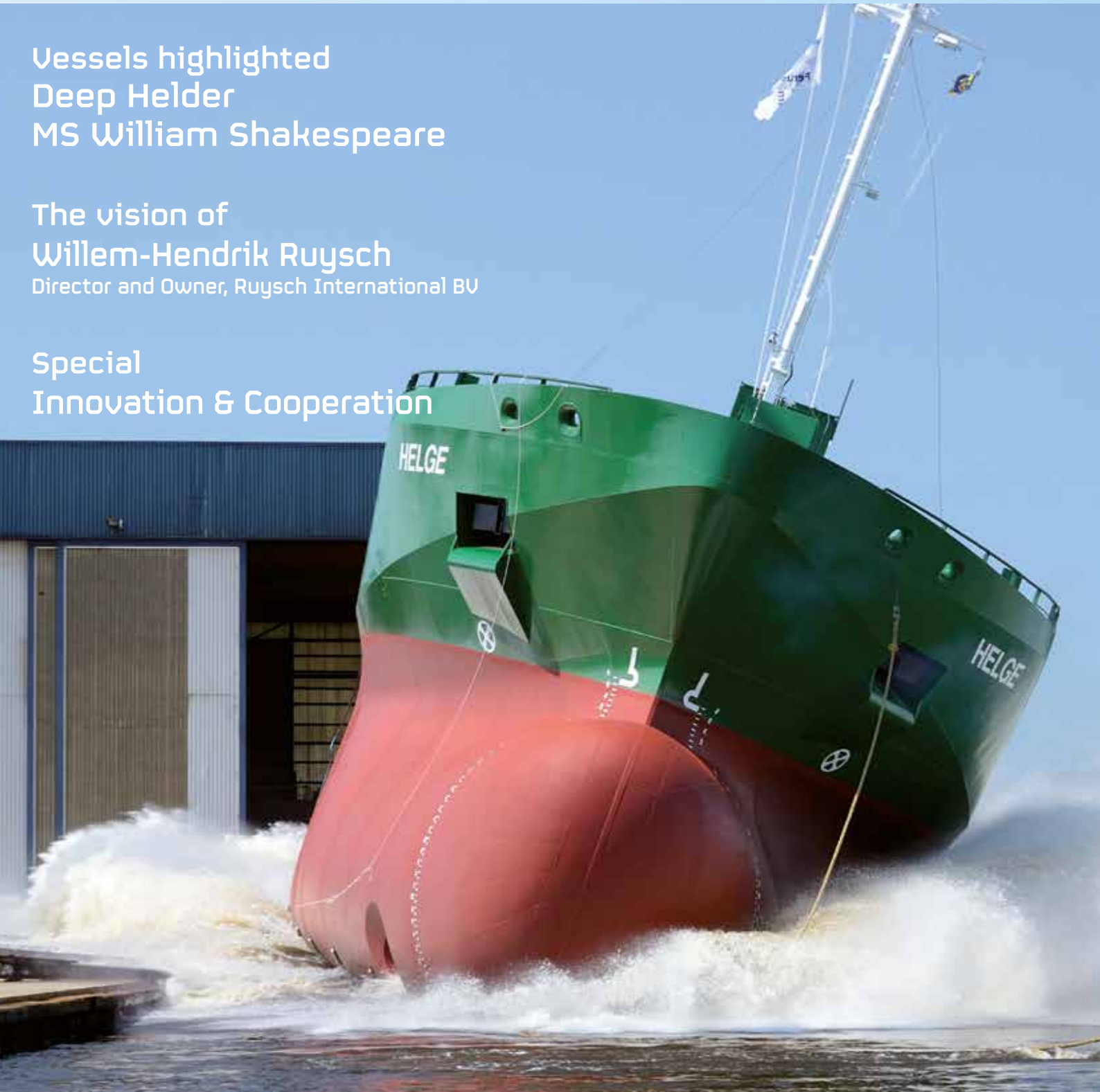
Vessels highlighted
Deep Helder
MS William Shakespeare

The vision of
Willem-Hendrik Ruysch
Director and Owner, Ruysch International BV

Special
Innovation & Cooperation



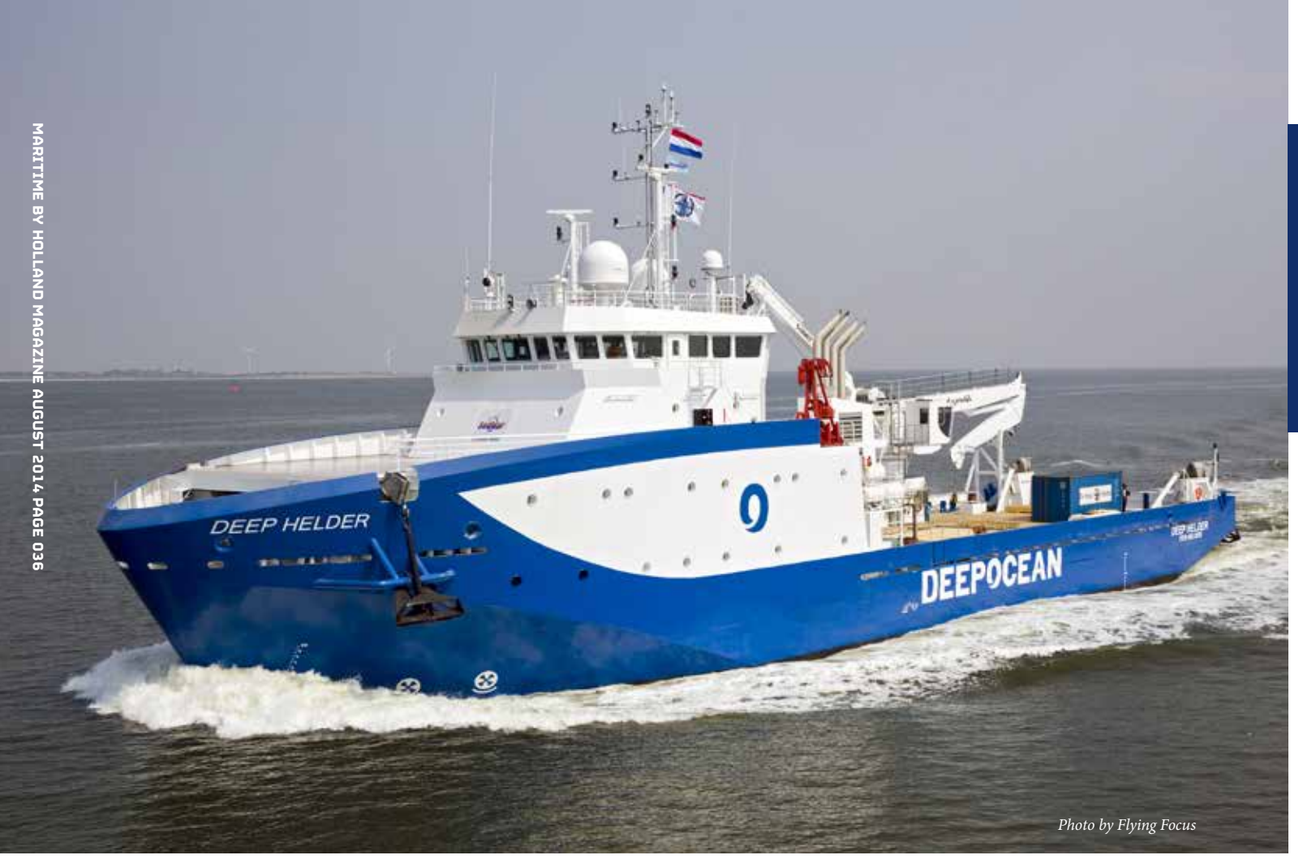


Photo by Flying Focus

DEEP HELDER

HIGH OFFSHORE STANDARDS ACHIEVED BY DUTCH CRAFTSMANSHIP

On 23 April 2014 Shipyard De Hoop launched hull number 465, to be named *Deep Helder*, at their facilities in Foxhol in the Netherlands. Following the successful sea trials on Saturday 14 June, the vessel was handed over to her new owners only one week later, ten days ahead of the original schedule.

Builder
Shipyard De Hoop, Foxhol, the Netherlands

Owner
Seamar Subsea BV, Den Helder, the Netherlands

Principal particulars

Length o.a.	64.80 m
Length bpp.	61.40 m
Beam mld.	15.77 m
Depth mld.	6.00 m
Draught summer	4.50 m
Speed max.	12.5 kn
Speed service	10 kn

Cargo capacities

Deadweight (T = 4.5 m)	1,670 t
Deck area	500 m^2
Deck load	5 t/m^2
Gross tonnage	1,856 GT

Tank capacities

Fuel oil, service	300 m^3
Fresh water, potable	325 m^3
Ballast water/drill water	750 m^3

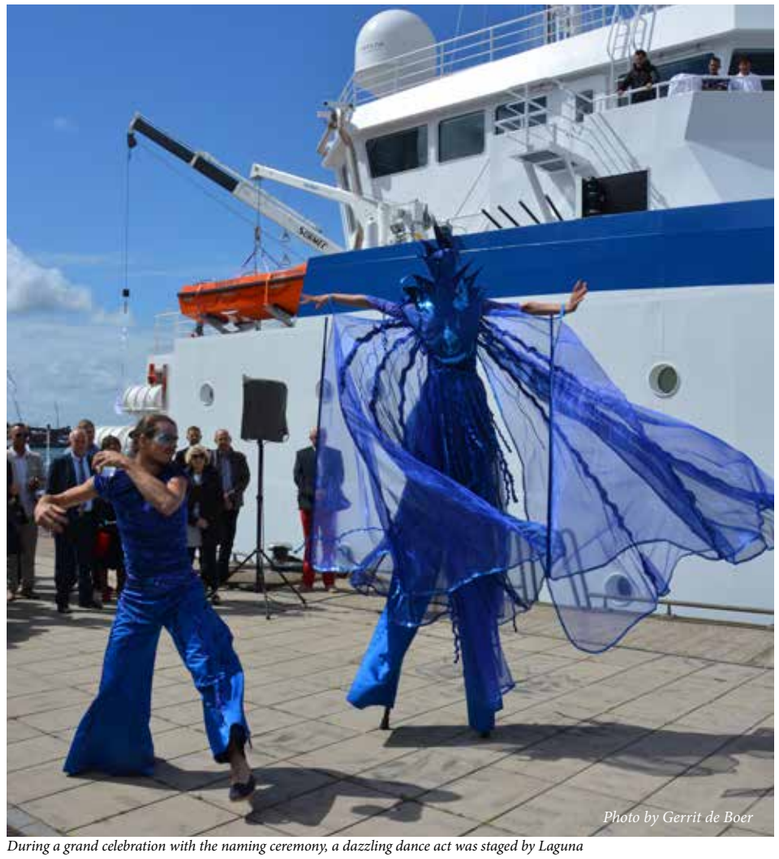


Photo by Gerrit de Boer

During a grand celebration with the naming ceremony, a dazzling dance act was staged by Laguna

In March 2013 SeaMar Subsea BV signed a contract with Shipyard De Hoop for the construction of the Multipurpose Offshore Support Vessel (OSV). Custom-designed to stringent environmental control, this diesel-electric powered 65 metre vessel had to be designed for low fuel consumption. Built to imposing specifications, with a clean ship, green passport, SPS2008 and high comfort class (Comf1) notation, it had to become a unique offshore vessel. 15 months later, according to the client, crew and charterer Deep Ocean (end-user), the vessel outperforms all expectations.

The keel for the hull of the OSV for Seamar was laid on 14 November 2013. The ceremony was performed by Leo Balkema, managing director of Seamar, by placing the traditional coin under the first section. On 20 December 2013, De Hoop hosted a grand celebration with the naming ceremony of m.v. *Deep Helder* at the ferry terminal in the Dutch seaport of IJmuiden. Marion Balkema-Penders, wife of Seamar's CEO Leo Balkema, performed the naming ceremony.

The vessel will be manned and operated from the Netherlands, registered in Den Helder and sailing under the Dutch flag. When the festivities were completed, the vessel immediately went into action commencing a five year charter contract with Deep Ocean. Deep Ocean's first project in 2014 for the vessel encompasses Inspection, Maintenance and Repair (IMR) services on Dong Energy's subsea assets in Danish and Norwegian waters.

The general concept

As stated above, the *Deep Helder* is an OSV designed to use on IMR and intervention projects in the oil, gas and renewables markets. The design is based on a proven De Hoop concept and their 'KISS' methodology has produced a design, which is competitive in overall costs (investment and running costs) and operational reliability.

For this design, Seamar chose a diesel-electric propulsion concept to achieve enhanced flexibility and an economical advantage. The generators are located in the hull below the main deck, just aft of the superstructure, thus contributing to a reduced transmission of noise and vibration into the accommodation. The vessel's propulsion configuration is optimised for excellent DP capabilities, enabling a speed of more than four knots sideways.

The chined hull is wider than previous generations of De Hoop OSVs, but by fairing the hull shape considerable reduction in wave resistance is obtained. The overall result is an even higher speed than on previous OSV-generations (12.9 knots during sea trials) for the same or less propulsion power and a reduction in fuel consumption. Furthermore, the sea keeping characteristics of this design are impressive and comparable to a round bilged hull shape, which is perhaps quite surprising. In addition, passive antiroll tanks are fitted in order to further improve the response to roll motion.

To achieve a low sound level in the accommodation De Hoop invested in 'floating' interior floors, ceilings and walls. As a result no accommodation space has a sound level above 50dB(A), which is a very satisfying result for the effort. To further reduce fuel costs and engine noises, the vessel has been fitted with a sophisticated four point anchoring/mooring system, to be used when staying longer on station.

Dynamic Positioning is guaranteed by the powerful propulsion configuration, controlled

Power generation comprises of four diesel alternators of 995 kW each

by Kongsberg equipment and software, which in turn is fed by four independent positioning or reference systems. Accurately measuring the vessel's position and heading at any point in time are essential for high accuracy dynamic positioning. As stated above, several different position-reference systems are used on board, which is more than the required number by Bureau Veritas class for DP2. The first of these systems is a Hydro-acoustic Position Reference (HPR), the second system is Differential; Global Positioning tracking System (DGPS), whilst the third is the conventional, though very reliable Taut Wire System (TWS) and the fourth is CyScan. HPR measures the relative position between a underwater transmitter (deployed by the vessel) and a hull mounted receiver transducer, whilst GPS is a space-based spatial satellite reference system, both are suitable for when sailing deep water. CyScan is a very straightforward laser-based position reference system, whereby a small prism needs to be installed on a nearby structure. The TWS is the oldest position reference system, but still very accurate in relatively shallow water. A clump weight is lowered to the seabed; by measuring the amount of wire paid out and the angle of the wire by a gimbal head, the relative position can be calculated.

The four point anchoring is used only in relatively shallow water and when the vessel will be on station for a longer period (one or two weeks). This way the use of generators and propulsors is reduced, fuel is saved and the crew are subjected to even less noise and vibration.

Deck lay-out and cargo arrangement

The vessel boasts a large 500 square metre main deck, which is suitable for carrying up to five tons per square metre. The hold can carry stores, spare parts or equipment, which can be loaded and unloaded through a flush deck hatch, and features large under deck workshops. The size of the deck hatch is determined by the foot print of a TEU container.

The deck lay-out also features triple moonpools. One square moonpool amidships on centreline of four metres square and two round moonpools of 1.2 metre in diameter. The round moonpools, located to port and starboard side, are tubes through the hull dedicated to lower sensitive and vulnerable underwater (survey) equipment. In addition, the main deck is strengthened locally at the stern to accommodate a 20 ton A-frame.

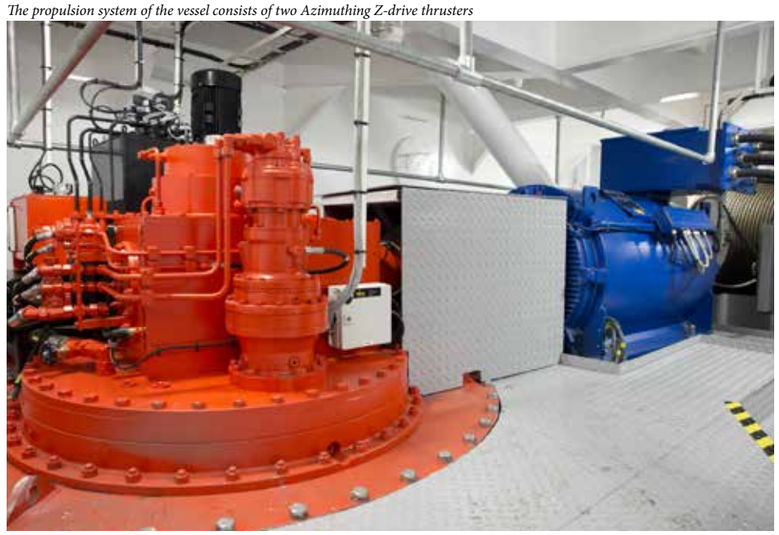
To be able to operate autonomously around offshore facilities, a custom-made mast crane of 20 tons lift capacity at an outreach of ten metres, delivered by Lagendijk, is placed on starboard side aft. This subsea crane has man riding capabilities, a hook travel of 500 metres and can reach up to 25 metres above water level. At its maximum outreach of 21.5 metres, the crane's lifting capacity is reduced to five tons. Just behind the superstructure, on port side, is a second (telescopic) deck crane of 1.5 tons at a reach of 8.8 metres with 50 metre hook travel for provisioning purposes.

"Made in Holland, operated by Dutch personnel"

Anchoring and mooring equipment

A full suite of anchoring and mooring equipment is provided as is to be expected. The sheltered foredeck houses two electro-hydraulic anchor winches with steel wire storage drums, containing 1,000 metres of 36 millimetre diameter steel wire each. The lay-out of the forward anchoring assemblies is very compact, as a result of two wire pulleys above each other, guiding the wire in an S-shaped curve from the drum to the port or starboard bow anchor respectively. This allows the arrangement to be located all the way to the outside, providing an unobstructed foredeck. Furthermore, to the bow is one electro-hydraulic capstan on centreline with two bollards and a warping head on each side for mooring purposes.

The propulsion system of the vessel consists of two Azimuthing Z-drive thrusters



"Custom-designed to stringent environmental requirements"

Aft we find the two stern anchors, one on portside and one on starboard side in a self-catting frame against the stern. Each anchor hangs down from an above deck foundation; the steel anchor wire is guided from the anchor stem into the thruster room through an inverted hawse pipe. The lay-out of the below deck anchor winch assemblies are similar to those on fore deck and are just as compact, the drums however have a larger capacity for 1,300 metres of 36 millimetre wire. The aft anchor winches are additionally fitted with a 'slack sensor', to ensure proper tensioning of the wire during a four-point anchoring situation. Aft deck on either side is an electro-hydraulic capstan with two bollards (one of which is integrated in the bulwark, whilst the other one is on main deck) for mooring purposes.

The anchors are four Flipper Delta's of 2,500 kilogrammes each. The complete anchor and mooring assembly is delivered by Machine- & Lierenfabriek Kraaijeveld from Sliedrecht. The anchors are provided by Wortelboer from Rotterdam.

Engine room and propulsion

Power generation comprises of four diesel alternators of 995 kW each, which can be used in any combination. This flexibility ensures fuel consumption is reduced to a minimum, while speed and manoeuvrability is guaranteed. All generator sets are water-cooled Caterpillar C32 engines with alternators, delivered by Pon Power, and are all located down in the engine room approximately amidships. The main alternators can all be run in parallel and the selection of the correct number of generators for any given scenario is done by the power management system. The emergency/harbour generator set, a Caterpillar C6.6 of 99 kW, is located higher on officer's deck inside the superstructure.

The propulsion system of the vessel consists of two Azimuthing Z-drive thrusters in the stern and two bow thrusters. The stern thrusters are Veth with fixed pitch propellers in a nozzle, driven by electro-motors of 968 kW. One of the bow thrusters is a Veth azimuthing retractable of 400 kW, which is predominantly used in DP-mode. The second bow thruster is a tunnel type of 600 kW, again supplied by Veth.

The lay-out of the forward anchoring assembly is very compact

Eekels Technology is responsible for the complete electrical installation, including the design installation of all switchboards, drives, converters, the power management system and the alarm/detection systems.

Wheelhouse and accommodation

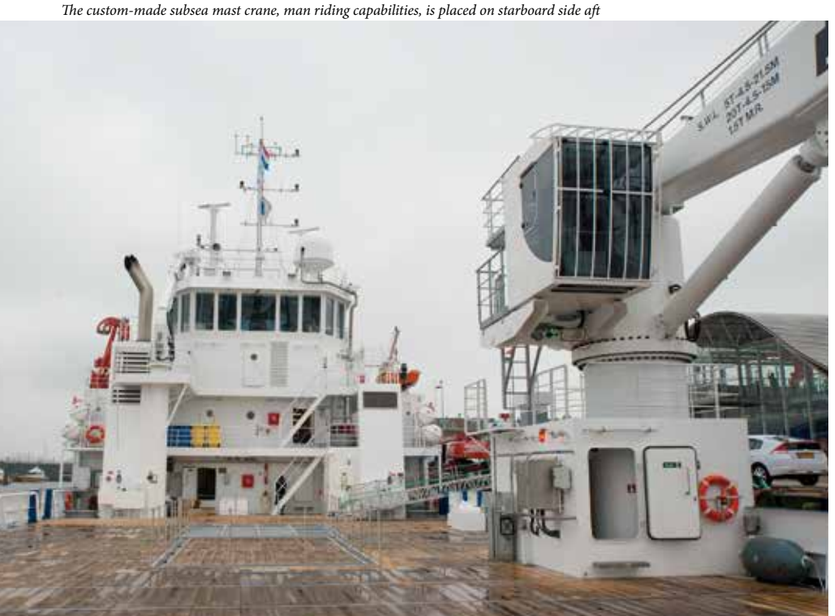
The bridge houses ergonomically designed consoles for a good view of the instruments and ease of operation of all equipment. The wheelhouse windows are full height and specially designed to provide optimal 360 degree visibility.

The wheelhouse deck is separated into two effective bridges: the forward facing part, used solely for transit sailing and the aft facing area, where the DP, four-point anchoring and loading or unloading can be controlled. Between the two bridge parts are the pantry facilities, officer's office, survey room and the stairs going down to lower decks. The *Deep Helder* is equipped with a comprehensive navigation and communication package, supplied by Alphatron Marine.

The interior is designed to the current standards in the 24/7 offshore industry and each cabin has access to internet, radio and television. All cabins have individually controlled air-conditioning. Accommodation for a crew compliment of 50 persons has been provided, divided over ten single berth and 20 double berth cabins. Furthermore, the superstructure features a survey room, server room, changing room, fitness room, mess room, two dayrooms (smoking and non-smoking) and various offices.

On both sides of the open deck of the first level of the accommodation, next to the engine room exhaust and ventilation casings, the life rafts are to be found in dedicated cradles. Outside on the officer's deck is the Man-Overboard-Boat (MOB) with its davit installation on starboard side. On this same deck is, beside the emergency generator, also the air-treatment room.

The custom-made subsea mast crane, man riding capabilities, is placed on starboard side aft



The wheelhouse aft facing area, where the DP, four-point anchoring and (un)loading can be controlled

SAM Electronics delivered the complete IP entertainment system for *Deep Helder*. The system comprises a satellite antenna with eight transponders and is capable of providing up to 60 channels to some 33 television sets in the IP network. The system is interfaced with the PA/GA system and mutes all streams in case of an emergency announcement or alarm. A Video-on-Demand (VoD) server with a hard disk space of two Tb is capable of 100 concurrent VoD streams a four Mb/s. It is also capable of storing underwater survey footage.

Shipyard De Hoop, Seamar Subsea and Deep Ocean

With the ship management and crewing being in the hands of Seamar, built by a 100 per cent Dutch shipyard with the aid of Dutch subcontractors and sailing under the Dutch flag, *Deep Helder* is a showcase for Dutch craftsmanship. Seamar and De Hoop can be justly proud of the high quality of the product and its performance and this is a testament to the collaboration with Deep Ocean, a Norwegian company with the highest standards in offshore operations.

Tom Oomkens

Subcontractors and suppliers of equipment fitted on board the *Deep Helder* - YN 465

ACO Netherlands, Doetinchem	: sewage discharge system
Alphatron Marine, Rotterdam	: navigation and communication equipment
Atlas Copco Compressors Nederland, Zwijndrecht	: air compressors
Axces, Tholen	: exhaust silencer
Bureau Veritas, Rotterdam	: classification society
Datema Nautical Safety, Delfzijl	: FCS-plan; lifesaving, safety and medical equipment
De Haan, Hoogezand	: ventilation
Deno Compressors, Krimpen aan den IJssel	: starting air compressor
Distrimex Pompen & Service, Doetinchem	: hydrofore boosterset
Econosto Nederland, Rotterdam	: appendages; valves
Eekels Technology, Kolham	: electrical installation
Electrolux Professional, Alphen aan den Rijn	: laundry equipment
Esme Interieurbouw, Groningen	: interior outfitting
Facet International, Almere	: bilge water separator
Famos, Gdansk, Poland	: doors; interior walls
Global Marine Decking, Hardinxveld-Giessendam	: floors
Hatenboer Water, Schiedam	: desalination system
Jac de Vries Gesta, Middenbeemster	: heating elements
Kieboom-Werkendam, Werkenboom	: Helmsman's chair
Kongsberg Maritime Holland, Spijkenisse	: dynamic positioning system
Kraaijeveld C, Machine- & Lierenfabriek, Sliedrecht	: anchor and mooring equipment
Kramp, Varsseveld/Leek	: hatch control system
Lagendijk Equipment, Wemeldinge	: knuckle boom crane
MarteQ, Rotterdam	: gangway
Metos, Ruurlo	: galley equipment
MX Brandbeveiliging, Almere	: gas extinguishing systems
Noordhof Schilderwerken, Kropswolde	: paintwork
NRF, Mill	: anodes
Palfinger Ned-Deck, Barneveld	: rescue boat and rescue boat handling equipment
Pon Power, Papendrecht	: *Caterpillar* generator set
Reikon, Spijkenisse	: *Azcue* pumps and *Ueberall* uv sterilizer
Rubber Design, Heerjansdam	: anti-vibration mountings
SAM Electronics, Rotterdam	: IP entertainment system; PA/GA system; Video-on-Demand System
S.I.N., Oranjewoud	: design, delivery and installation of piping
Sormec, Alcamo, Italy	: *Sormec* crane
Technisch Bureau Uittenbogaart, Rotterdam	: *BioCompact* sewage treatment plant and *Jets* vacuum toilet system
Temaro, Rotterdam	: sun blinds
Trinoxx, Hardinxveld-Giessendam	: windows and portholes
VDI Isolatie, Ridderkerk	: delivery and installation of insulation materials
Veld Koeltechniek, Groenlo	: cool and freeze installations
Veth Propulsion, Papendrecht	: azimuthing thrusters; tunnel bow thruster; retractable bow thruster
Viking Life-Saving Equipment, Zwijndrecht	: liferafts
Wetcab Sp. Z.o.o., Gdansk, Polen	: sanitairy units
Winel, Assen	: watertight doors
Wortelboer, Rotterdam	: anchor, anchor chains and steel anchor wire

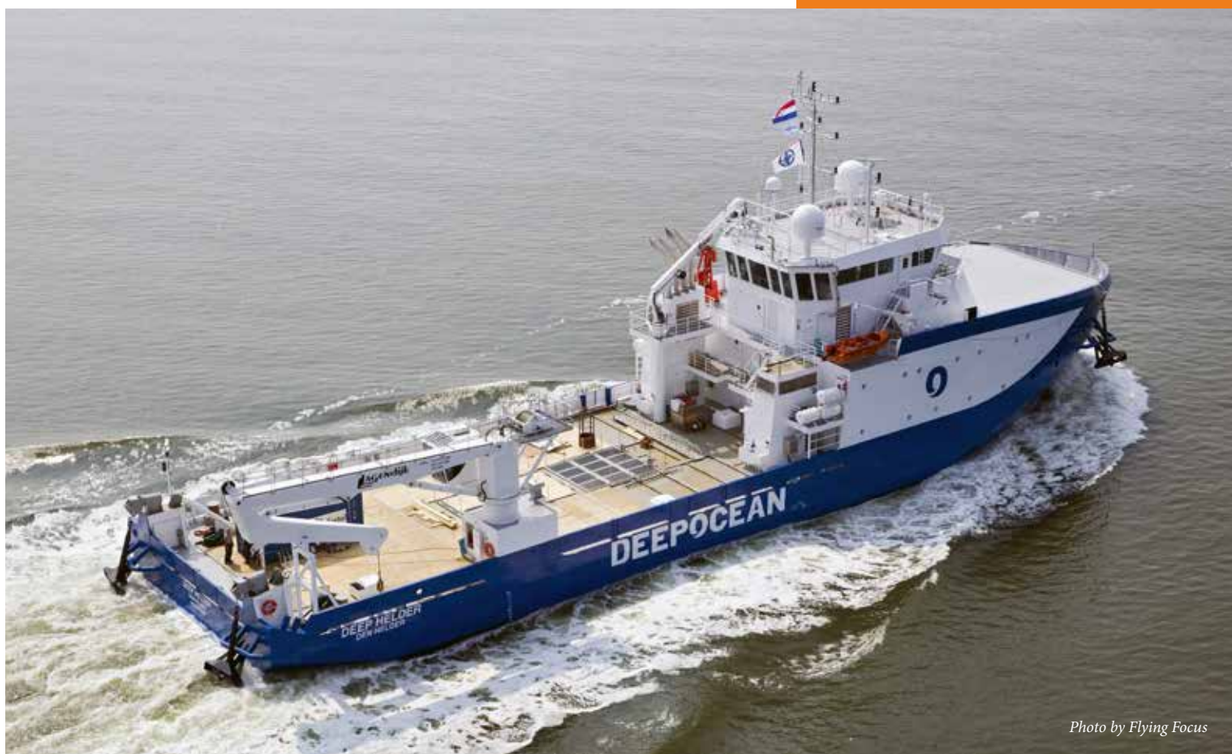


Photo by Flying Focus