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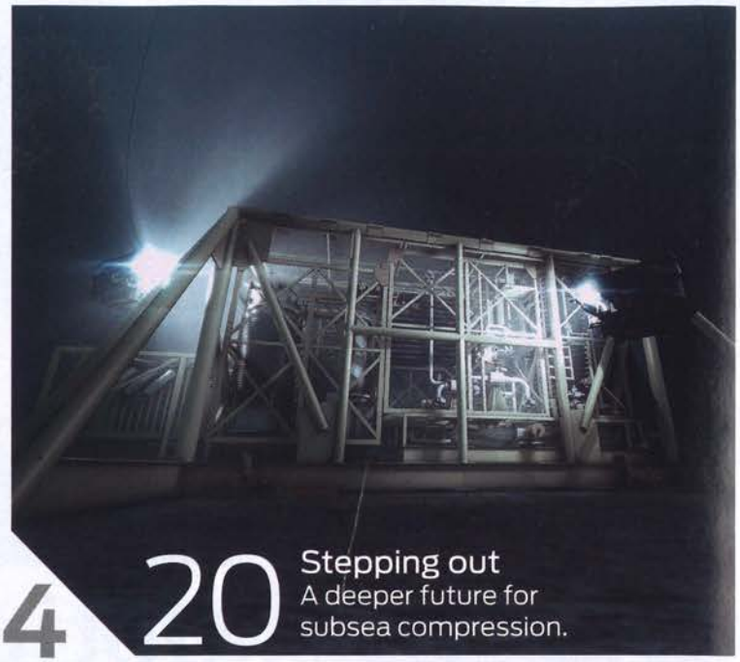

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Tech Talk

Lift-off for Pioneering Spirit

In a fast-moving sequence of events through August, a major piece of offshore history has been made. Allseas' spectacular new flagship has breezed through offshore trials and its first commercial contract. Adrian Cottrill summarises.

The most ambitious speculative gamble ever seen in the offshore construction business has started to pay off.

At 18.00 hrs on 22 August, the mighty decommissioning vessel *Pioneering Spirit* slowly backed away with the 13,500 tonne topsides of the Yme production platform safely transferred to its keeping.

After decades in development and construction, the unique ship had at last performed the critical centre-piece of its first commercial contract, at this location 100 kilometres off Norway.

That centre-piece was a "fast-lift" of the topsides by the 12 lift beams on the vessel's twin bows. Over a period of about one minute, hugely powerful hydraulic rams at the tip of each beam worked together to raise the load two metres clear of its severed support legs. All systems are said to have worked flawlessly on a ship that was "solid as a rock".

A day later, *Pioneering Spirit* had arrived at Norway's new Lutelandet dismantling yard, north of Bergen, for inshore transfer of its cargo.

In one of the oil industry's great engineering stories, Allseas owner and president Edward Heerema has spent 28 years and €2.6 billion ($2.9 billion) tenaciously pursuing his vision of a catamaran-style decommissioning vessel able to lift off whole platform topsides as a single piece.

In its second contract, next summer, the ship is scheduled to raise the 23,500 tonne topsides of Shell's Brent D platform, still well short of its 48,000 tonne maximum lift capability.

After an 18-month period in Rotterdam's Alexiahaven basin, installing and commissioning the dozen lift beams currently mounted on *Pioneering Spirit*'s fore-deck (Upstream Technology 4/2015), the vessel performed harbour tests through July.

Each beam was individually tested to 3700 tonnes, and then in the linked pairs of their normal working configuration. The final harbour test on 23 July saw four beams combine to lift 14,700 tonnes — a load provided by cargo barge *Iron Lady*, suitably water-ballasted.

Out to sea

Then things started moving fast. First came the 6 August departure of *Pioneering Spirit* to the Dutch sector to perform offshore trials throughout August under varying weather conditions.

In the event, the vessel spent just 10 days at the test platform site in Dutch waters. Work there involved placing a 5500 tonne "test topsides" — a system of water-filled tanks — on a substructure in the K-13 field, then lifting it off and placing it again.

Sea conditions ranged up to just over two metres significant wave height. "Although it would have been nice to see the system work in higher sea states, that

ALOFT AT LAST: At the 'fast-lift' centrepiece of the operation a two-metre gap opened up at the pre-cuts in Yme's three legs. (The caisson in the foreground is not part of the lift.)

AERIAL VIEW: Six pairs of lift beams worked together at five support points beneath the topsides.

ON A HIGH: Allseas president Edward Heerema a week later at the ONS show in Stavanger in August.

Photos: Allseas/Kaia Means

MOVING OUT: Safely clear of Yme's leg stumps, the *Pioneering Spirit* readies for departure to Lutelandet once the hull connection beam has been closed across its prow.

was enough to demonstrate the proper functioning of the active and passive heave compensation systems, and it was better to move on," says Heerema.

By 17 August, *Pioneering Spirit* had travelled north to arrive at Repsol's Yme field. With permission to start granted by the client, on 20 August the vessel moved in to enclose the three legs of the jack-up-style platform.

The lift beams were brought up to five yoke positions beneath the topsides and connected. Four of the beam pairs did so at individual yoke positions, and the other two pairs joined forces at a single yoke-point near the vessel's bridge. Leg cutting tools developed in-house by Allseas were installed and tested on the platform.

Then came the big day. On 22 August the "go" was given for Yme's three 3.5 metre diameter tubular steel legs to be burnt through. A few hours later all was ready for the fast lift.

In a sea state generally about two metres and up to 2.5 metres significant wave height, the relative motion between lift vessel and platform was "a maximum of about a few dozen centimetres vertically and horizontally". All this was dealt with by the vessel's hugely sophisticated motion-compensation system.

With that system clearly handling its job with ease, all was ready for Heerema on the bridge to push the "fast lift" button. By all accounts, the lift-off was entirely silent, with no noticeable reaction by the ship.

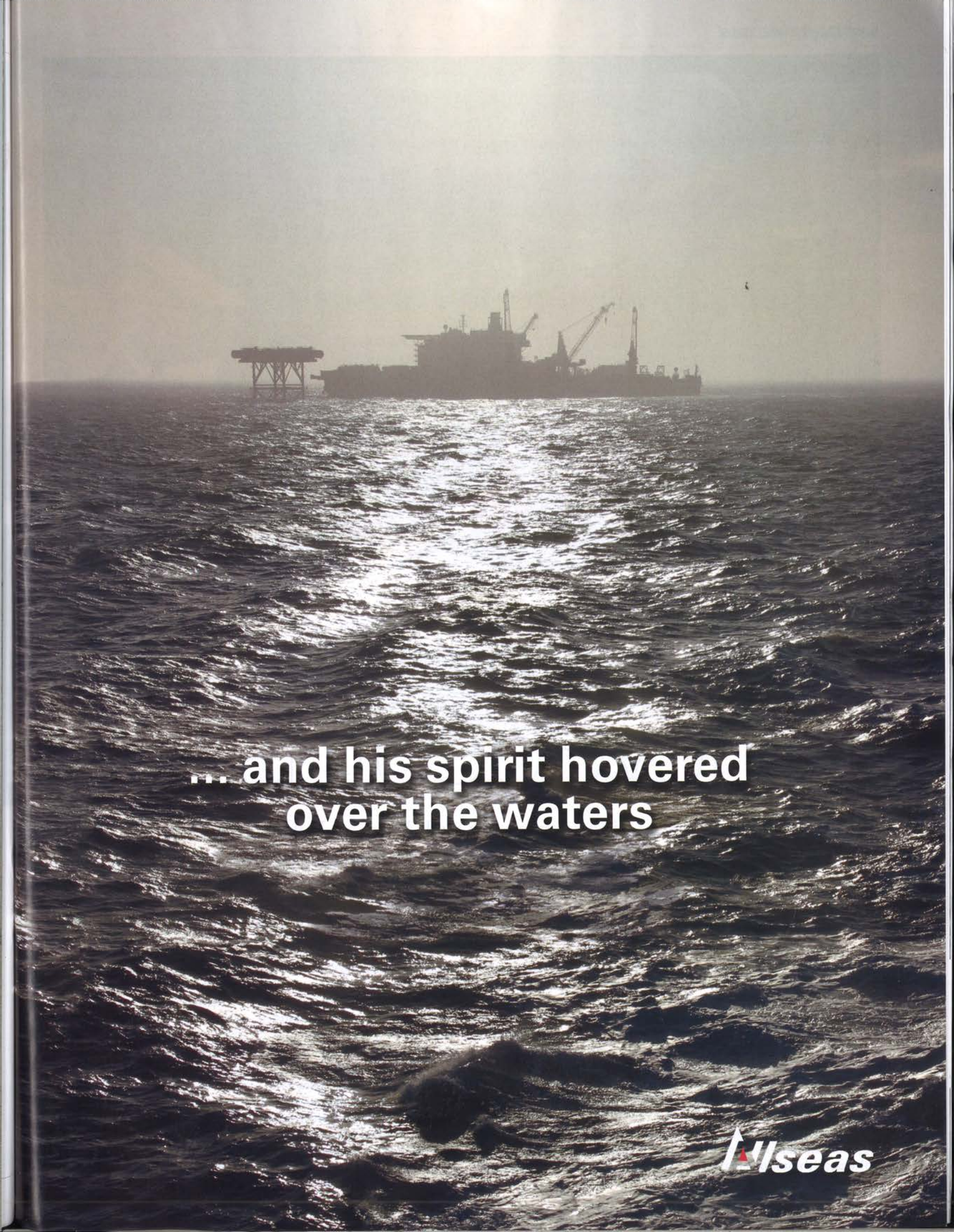
Within seconds of the fast lift, *Pioneering Spirit* was re-trimmed by rapid ballast-dumping and could start moving clear of the leg stubs. The mood moved from quiet to euphoric and that evening "an unforgettable party" was held on board.

On this, its first commercial test, "the motion compensation system performed entirely up to expectations, as did the station-keeping of the DP system," summarises Heerema.

"At 13,500 tonnes, the Yme operation becomes the largest lift yet made in the offshore industry."

In the future, the fast-lift will be even quicker, speeded up by an air pressure system that will widen the weather window for this phase. "That system was just not fully commissioned yet," Heerema explains, but when it is, "a lift like Yme will actually take nine seconds".

With Yme's topsides offloaded at Lutelandet, *Pioneering Spirit* will now be fitted with its final four beams — currently all complete and waiting in Rotterdam — and reach its full complement of 16 beams, ready for the even larger Brent D lift next year.


... and his spirit hovered
over the waters
Ilseas