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## COVER

A state-of-the-art motion elimination system will be key to securing early market success for the giant monohull 'single lifter' Pieter Schelte, especially in harsh offshore environments such as the northern North Sea. The hydraulic system was developed in-house by Allseas specifically for its new multirole platform installation/decommissioning and pipelay vessel, due in service in 2014. It is meant to prevent the damaging re-impact of a large lifted topsides – weighing anything up to 48,000t – onto its base structure. Allseas CEO Edward Heerema is pictured with a working model of the system at the company's Delft engineering office (see page 27).

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## SIZE MATTERS



Offshore contractors have taken delivery of some pretty big pieces of floating hardware lately but the daddy of them all – Allseas' ultra-versatile platform installation/decommissioning and pipelay vessel *Pieter Schelte* – won't be making its giant presence felt until early 2014. **David Morgan** checks progress and prospects with Allseas boss Edward Heerema.

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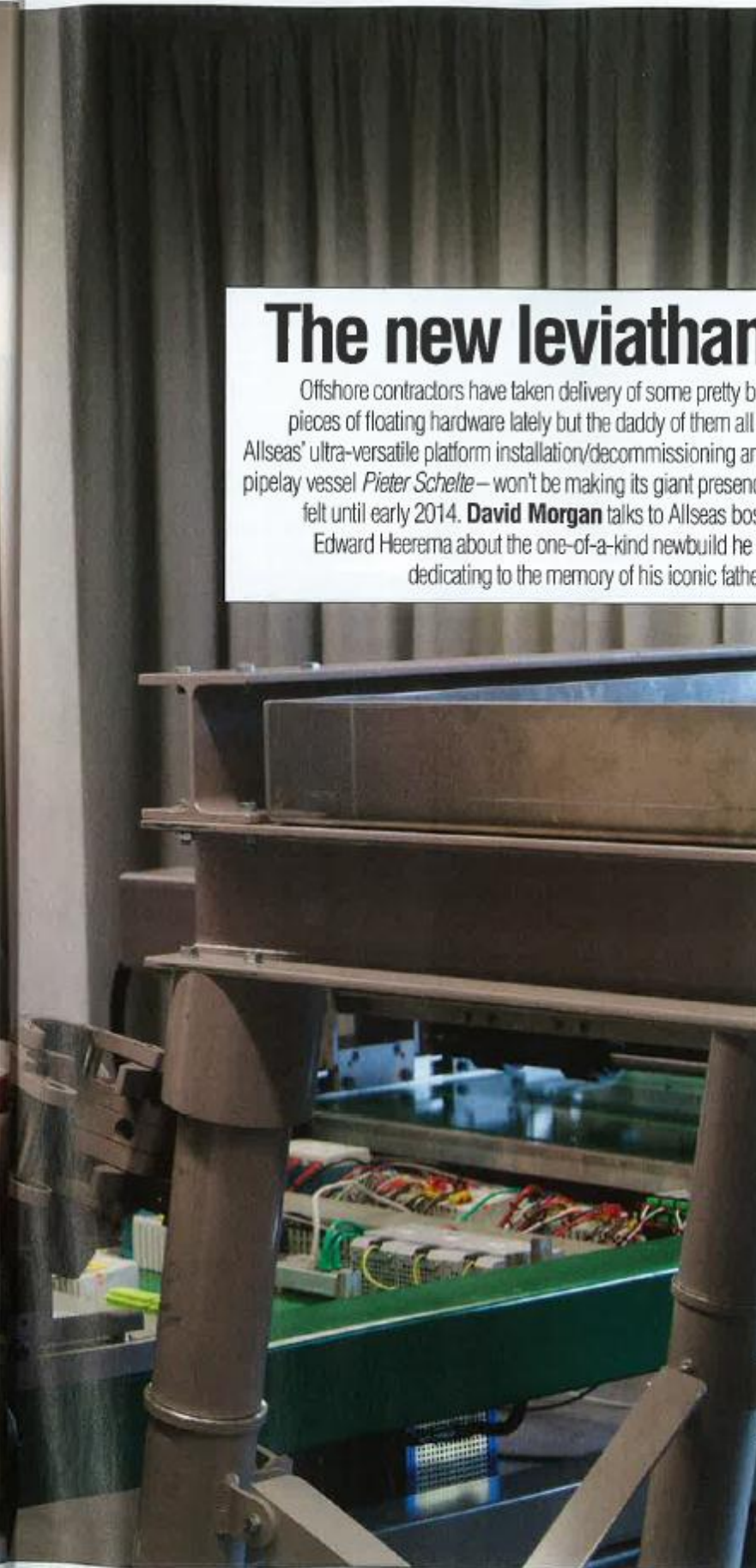
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Allseas chief executive Edward Heerema with a working model of the Pieter Schelte's state-of-the-art motion elimination system.



## The new leviathan

Offshore contractors have taken delivery of some pretty big pieces of floating hardware lately but the daddy of them all – Allseas' ultra-versatile platform installation/decommissioning and pipelay vessel *Pieter Schelte* – won't be making its giant presence felt until early 2014. **David Morgan** talks to Allseas boss Edward Heerema about the one-of-a-kind newbuild he is dedicating to the memory of his iconic father.



'I think the oil companies are quite aware now of the advantages of single lifting.'  
Edward Heerema, Allseas

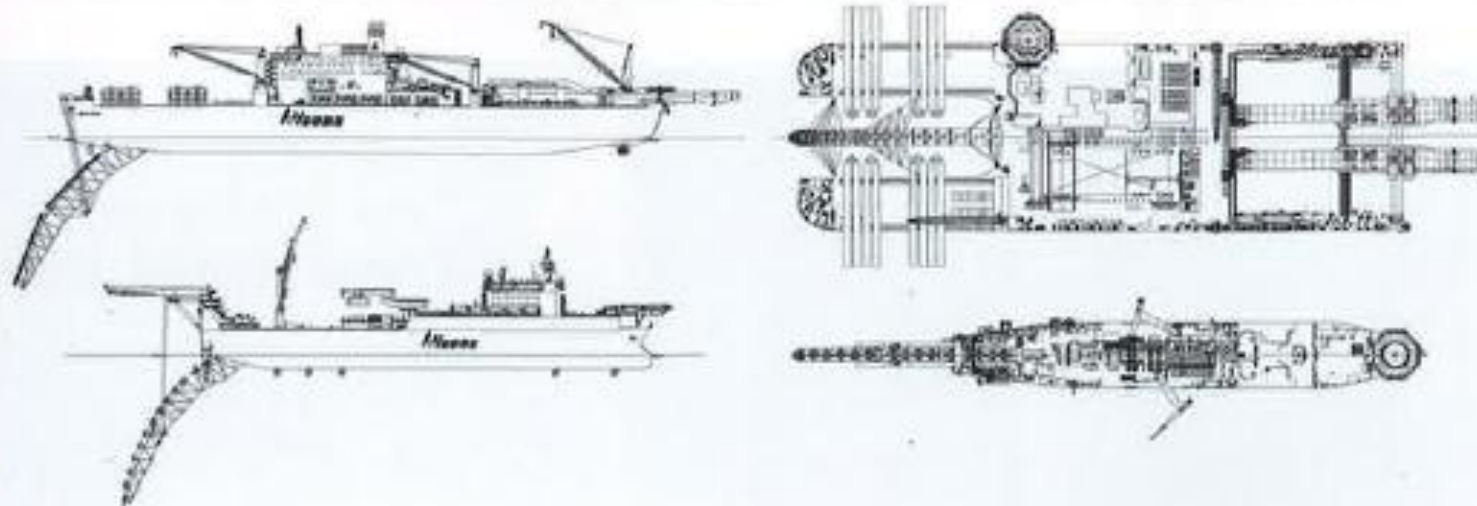
In April 2008, on the 100th anniversary of the birth of offshore heavy lift pioneer Pieter Schelte Heerema, his son Edward spoke to *OE* of his determination to build a mould-breaking, multi-role vessel worthy of his father's name. Four years later his enthusiasm for the project is undimmed, despite the credit crunch having put its construction back a couple of years and equipment cost inflation having raised the asking price from €1.3 billion to €1.7 billion.

'Our targets were a bit ambitious,' he admits today. 'In the initial planning stage you always shoot for too short a period; you don't see all the difficulties that you have to go through, the time a shipyard takes, and so on. And of course the financial crisis intervened. Our banks got pretty weak and needed time to recover.'

But Heerema, clearly a man of the 'glass half full' persuasion, is quick to add: 'Although that set us back, it had a big advantage too, because we could use the year and a half that we lost to get the detailed design done properly. We had our basic design done but we needed a big engineering office to do all the detailed calculations of plate thicknesses and such. You can put the making of the detail design in the contract with the shipyard, but if you deliver it to them already done, they are in a much better position to meet their estimates, so you get a better-defined bid.'

The bigger the vessel, the bigger the sums and risks involved, but Heerema sees no cause for alarm or despondency. When Allseas' planners sat down to re-estimate project costs in 2010, they came up with a figure of €1.7 billion – 'more realistically, with contingencies, it is €1.9 billion', Heerema calculates, without flinching.

'We have no regrets, because with a major investment like this you need to think ahead 20 years,' he adds. 'Yes, the costs involved are huge, and you wonder if you can ever amortize such an expensive ship. But of course she's set for many years of duty and we always say: if the design is really good it will sometime earn itself back. *Solitaire* [the Allseas flagship since 1998 and still the world's largest pipelayer] too in its time was a



How Pieter Schelte (top) will compare in size with sister ship Solitaire, the world's largest pipelay vessel.

very expensive vessel, and some worried that it might be just too big to warrant the investment, but it did nicely because it has such an outstanding performance.'

Allseas first started looking at single-lift vessel concepts, and the kind of motion compensation systems needed to enable them to operate in hostile seas, in 1987. Back then the idea was to rigidly connect two super-tankers and leave a slot between their bows to enable platform topsides to be brought in on large beams. Continuing efforts were made to expand the vessel's design horizons so that it could handle all manner of platforms: large and small, narrow and wide, jacket-based or gravity-based. Over 20 frustrating years, countless solutions were embraced, then rejected, before Edward Heerema felt able to declare that he was 'very happy with the configuration we have now for *Pieter Schelte*'.

That moment came in 2007, when three key issues simultaneously resolved themselves. Allseas at last had a concept versatile enough to go ahead with, the finances were now in place to kick off a

project of this magnitude, and a much better defined market for the vessel's services was emerging, particularly in the large platform removals sector.

### Size matters

So just how big a splash will *Pieter Schelte* make when Korean shipyard Daewoo delivers it at the end of next year, complete with topsides lift system and pipelay spread (the plan is to fit the jacket lift system a year later). Excluding any protruding lift equipment, the new vessel will be 382m long compared with sister vessel *Solitaire*'s 300m (excluding stinger). Shell's *Prelude* FLNG facility, due in service in 2017 and hailed in advance as 'the world's largest floating offshore facility' (*OE* July 2011), will be 488m long. But it is the plan view of these vessels that is the more telling in terms of displacement. *Pieter Schelte* will be 117m wide, against *Prelude*'s 74m and *Solitaire*'s 40.6m.

Edward Heerema admits to still being astonished occasionally by the sheer scale of his new vessel and its component parts, which for example include two separate

engine rooms, both huge and extremely complex. 'Because you want to lift so much, the lifting appurtenances – the beams, the clamps, the cylinders – are all giants. Unbelievable!' he adds, pointing to a workshop photograph of a triangular casting – just one of 16 that will operate the levers of the *Pieter Schelte*'s topsides lift system – that dwarfs the man standing beside it.

Proprietary Allseas motion compensation technology will also be pivotal, he believes, in securing a unique position in the marketplace for the new vessel. 'In rough areas such as the North Sea, motion elimination is essential to avoid re-impact of a lifted structure onto its base structure, which could cause severe damage. *Pieter Schelte*'s motion elimination system will give it the big benefit of being able to work in the northern North Sea most of the summertime. Uncompensated topsides floatovers can be done in, for example, Australia and West Africa because you get a lot of calm sea periods there, but in the northern North Sea you might get only one or two days a month in the



Allseas worked through various vessel design iterations over many years looking for optimal versatility before deciding on this one.

## Components and capabilities

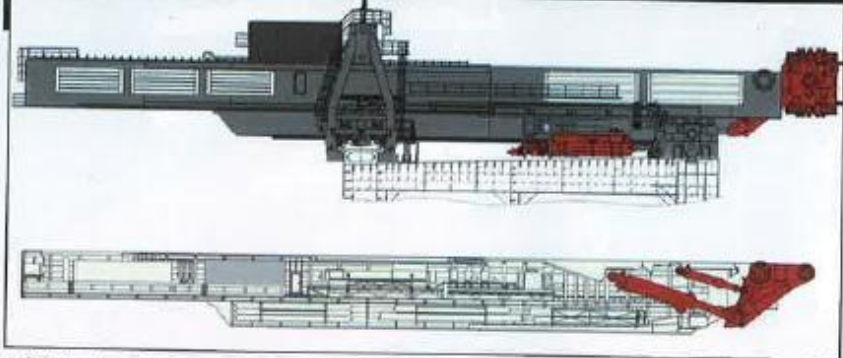
*Pieter Schelte* will be capable of single-lifting topsides up to 48,000t and jackets up to 25,000t. Topsides will be lifted from a 122m long, 52m wide slot at the bow using eight sets of horizontal lifting beams, four on each side of the slot, equipped with friction clamps. Two lifting lift beams at the vessel's stern will be used for the installation or removal of jackets, and for regular crane lifts.

The vessel will also serve as a pipelayer, with S-lay tension capacity up to 2000t (4 x 500t tensioners) for installing record-weight pipe up to 68inOD (including coating) in deep or shallow water. The firing line is located along the vessel's centre line under the main deck to keep the deck free of obstructions and available for storing 12m pipe sections or, when not in pipelay mode, platform components, foundation piles and the like. The 170m long stinger, suspended in the slot at the bow, can be removed and stored on a cargo barge when not required.

The vessel will be equipped with eight main diesel generators providing total installed power of 96MW, driving 12 azimuth thrusters for dynamic positioning (DP3) and for propulsion. There is accommodation for 570 people in two-berth cabins.

Model basin testing at Marín indicated wave response behaviour superior to semisubmersible crane vessels in operational wave conditions – topsides and jackets can be installed or removed in significant wave heights of up to 3.5m. For a vessel its size and shape, *Pieter Schelte* will boast pretty useful transit speeds. The wave basin speed tests indicated a maximum speed of 14.5 knots in calm seas, but Edward Heerema is quick to concede that will rarely be achieved. 'You never have a fully calm sea – you have currents and you have wind, and you also have marine growth on the ship that slows you down noticeably. Talk by other vessel owners of very high average speeds is naive, just commercial hype.'

The vessel will carry light ice class, model tests in Hamburg's specialist ice basin having confirmed its ability to operate for extended periods in the polar regions, until ice builds up too heavily.



A fabrication shop worker points up the sheer scale of *Pieter Schelte*'s component parts, in this case one of 16 levers being produced for the vessel's topsides lift system (inset).

summer that are good enough for a very big floatover. It could well be that you go out and spend four weeks waiting for that day.

'We want to be able to work most of the time; the motion elimination system indeed is a very vital element, and an expensive one too.' The system was developed specifically for the *Pieter Schelte* but Allseas has secured only limited patent applications for pipes, Heerema taking the view that a full patent 'doesn't help very much in this instance' and would possibly be too easy to circumvent.

Allseas is very busy at present doing removal studies for a number of clients based on their particular platform and its peculiarities. As well as raising funds, these FEED studies enable potential clients to get used to the ship and its workings while also helping Allseas to identify ways of augmenting the vessel's capabilities (see panel). 'These studies have confirmed that the vessel is extremely versatile,' says Heerema. 'But every platform is different, surprisingly different. Every case points to new

elements that you still have to take care of.'

At this stage, Allseas has no firm projections on the likely split of business between the three market segments. 'We don't really know,' says Heerema. 'One year we'll be laying much more pipe than doing platform work; another year we may have three platforms and lay very little pipe. It'll probably continue along those lines.'

Whereas its pipeline and new platform installation work are likely to be fairly globally spread, the prime market for platform removal work will clearly be the northern North Sea. 'The bigger the project is, the rougher the circumstances, the better for us. We can make money on a mid-sized platform, but with the benefits the new vessel will bring we can make a more interesting difference on a large platform,' explains Heerema.

The concrete legs of some North Sea gravity structures are too widely spaced to be accommodated in the 122m long, 52m wide slot at the bow of the vessel, but Allseas calculates that more than half of such structures – and of course their

heavy topsides – will be within *Pieter Schelte*'s reach.

Single lift's time has come in this sector, believes Heerema. Removing large topsides module by module using a traditional crane vessel, or dismantling them in small pieces offshore, will be time-consuming, hazardous and expensive, he says. 'I think the oil companies are quite aware now of the advantages of single lifting. They have seen the removals of Frigg, North West Hutton and Ekofisk, projects that have gone well but also demonstrated the complexity of removal in a modular way – the time it takes, the difficulties associated with it, the amount of offshore time involved, and so on. So we demonstrate our advantages quite nicely there. Nevertheless the competition of the heavy-lift semis, doing modular lifts, will always be felt.'

On the pipelay front, had *Pieter Schelte* stuck to its original delivery schedule it would quite conceivably have been heading to Western Australia by now to tackle the heavier sections of the deepwater Gorgon/Jansz pipeline infrastructure now being installed (OE April 2006). 'There are more such projects we are of course just too late for,' notes Heerema, with mock resignation given that *Solitaire*, no poor substitute, is doing the job anyway. Later this year, *Solitaire* will kick off the second of three seasons' work on Gorgon/Jansz, with *Lorelay* meantime laying the development's lighter pipelines.

With 2000t tensioner capacity – double that of *Solitaire* – *Pieter Schelte* will be targeting the larger, heavier pipeline jobs – in shallow or ultra-deep water – as and when they come along. 'You can lay small pipelines with this ship but it is not very economical,' admits Heerema.

### Independent streak

Edward Heerema has over the years made clear his disdain for stock market-driven business cultures. His views have not mellowed with age. 'Allseas absolutely wants to maintain its independence. We would not have taken such big, bold steps – *Lorelay* in the beginning with a totally new principle of laying pipe on DP, *Solitaire* later with its sheer size, and now the groundbreaking *Pieter Schelte* – if we had first had to convince a lot of co-investors that it was the right thing to do. They generally think only in the short term and would therefore never have the courage. We can afford to think ahead 10, 15 or 20 years if we want to, and accept that we may well make a loss in the initial years.'

It's a business philosophy straight out of his legendary father's handbook. What would he have made of the mighty vessel

now taking shape in his name?

'Sometimes people ask me: "Would your father have thought of this ship?", and I say "Yes, he would, but it wouldn't have taken him so long!" I very often ask myself what he would have said about this vessel, what would he have criticised and done differently. That's a good thing to ask yourself, because he was so incredibly imaginative and so critical of technical solutions. He would have seen any weaknesses in no time.'

In the nature of peer-reviewed technical sessions of its kind, Edward Heerema's paper (OTC 23169) on the new

vessel at this year's Offshore Technology Conference in Houston was a rather modest, low-key affair. 'I wanted to be objective and give the balance between uncertainties and benefits, so I avoided banging on the chest too much,' he says. But the facts about this awe-inspiring ship and its capabilities will have spoken for themselves. OTC observers will have been left in no doubt that *Pieter Schelte*, like its namesake's giant semisubmersible crane barges 30-odd years ago (OE June 1977), is well on course to become an offshore industry game-changer. OE

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